Facet Theory: Design, Analysis and Applications

Edited by Wolfgang Bilsky and Dov Elizur
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CONTENTS

Preface ........................................................................................................................................... 1

Chapter 1. Psychological Assessment

Smallest Space Analysis of the Wechsler Intelligence Scale for Children – IV
A. Cohen, C.A. Fiorello, F.H. Farley ......................................................................................... 3

Validation of Rorschach Scoring System through Smallest Space Analysis
A. Cohen ......................................................................................................................................... 11

Chapter 2. FT and Evaluation Research

Faceting Program Evaluation: A Systematic Approach
W. Bilsky, D. Cairns .................................................................................................................... 19

Program Evaluation: A Facet-Theoretic Approach
A. Döring .................................................................................................................................... 27

The Use of Facet Theory for the Identification of Scholastic Competences
A. Roazzi, B.C. de Souza, W. Bilsky, M.B.B. Dias ................................................................. 39

Chapter 3. Social Issues - Social Representation, Attitudes, Stereotypes

Modeling Social Representations of European Nations and European Union:
A Facet Theory Approach
A.S. DeRosa, M. D'Ambrosio, E. Cohen .................................................................................. 49

Exploring the Structure of Social Representations of the Euro via Facet Theory
Approach and WSSA1 Procedure
C. Gioiosa, A.S. DeRosa, M. D'Ambrosio .............................................................................. 57

National Stereotypes of Slovenians and Italians by Slovene Students of Psychology
V.S. Rus, P. Meneghin, L. Horvat, M. Rus-Makovc ................................................................. 65

The Underlying Dimensionality of the Survey of Cultural Attitudes and Behaviors
S. M. Miller, A. Cohen, K.L. Miller ............................................................................................ 75

Questionnaire Design and Data Analysis using the Facet Approach: Examples
from the International Census on Attitudes toward Languages
K. Manabe .................................................................................................................................... 81
Chapter 4. Self and Emotion

The Wellbeing of the Self's Personality: A Structural Facet Analysis
S. Levy, C. Sabbagh ................................................................. 91

The Structure of Feminine Self-Concept of Preadolescent Religious Girls in Israel
A. Cohen, H. Grizim, S. Levy .................................................. 103

The Structure of Emotions in Learning Situations
G. Böhm, H.-R. Pfister ........................................................... 111

Chapter 5. FT in Work and Organizational Research

Ten Answers in Search of a Question
F.J. Landy .......................................................... 123

Organizational Culture: A Facet Analysis
A. Sternberg, D. Elizur, A. Carmeli ..................................... 135

The Theory of Work Commitment: A Facet Analysis
A. Carmeli, D. Elizur, E. Yaniv ........................................... 147

The Bi-Polar Professional Self of Aspiring Teachers: Mission and Power
I.A. Friedman .......................................................... 159

Values of Work and Other Life Areas: A Facet Analysis
D. Elizur, F.M. Tchaicovsky, J. Kantor ............................... 171

Chapter 6. Managerial and Organizational Issues

The Pyramid Model of School Management
Y. Fisher, I.A. Friedman ................................................ 181

Using Smallest Space Analysis and Workplace Data for Arriving at a Structure of Knowledge for an Engineering Technology Curriculum
S. Waks .............................................................. 191

Congruence in Perception of Job Characteristics between Managers and Psychologists: A Basic Demand for Predictive Validity of Psychological Assessment
Z.E. Josman, E.S. Kaplan ........................................... 199
Facet Analysis in Organizational Research: Corporate Governance Applications
*E. Solomon* .................................................................................................................... 211

A Differentiation between Reported Computer Security Incidents Directed towards the Bank/Finance Sector
*M. Kjaerland* .................................................................................................................. 221

**Chapter 7. Methodology**

External Variables: Some Novelties and Applications
*E.H. Cohen, R. Amar* .......................................................................................................... 231

**Chapter 8. Values**

Value Structure at an Early Age: Cross-Cultural Replications
*W. Bilsky, F. Niemann, J. Schmitz, I. Rose* ................................................................. 241

Civic Values in Learning Environments in 24 Countries. A Theory Based Analysis with Methodological Applications
*M. Westling Allodi, I.M.E. Munck, S. Fischbein* .......................................................... 249

Towards a Typology of Values: Application of Facet Theory to the Study of French Jews
*E.H. Cohen* .......................................................................................................................... 263

Values of Occupational Work in Switzerland: The Double-Pyramid
*R. Meyer Schweizer, N. Jenkel* .......................................................................................... 275
Preface

Facet theory was developed by Louis Guttman to help scientists to construct structural and other theories and test them empirically. It provides guidelines for analyzing and structuring research contents, for the formulation of hypotheses, designing the observations and provides concomitant procedures for processing empirical data. The main objective of facet theory is to facilitate cumulative knowledge and provide new possibilities for discovering laws in substantive domains of research. Concepts and techniques developed in facet theory, such as mapping sentences, regional hypotheses, faceted multidimensional scaling, unidimensional and multiple scaling have been found useful in a wide variety of research in the behavioral sciences, and have provided new insights in domains such as work and organizations, values and attitudes, intelligence, marketing, communications, education, health, social, clinical and organizational psychology.

This book is intended to provide recent elaborations of issues in theory development and methodology as well as reports of research utilizing facet theory in a wide variety of domains. The articles in this volume, presented at the 10th International Facet Theory Conference in Roma, 10-13 July 2005, provide a good representation of the variety of research domains in which facet theory has been applied recently. The articles cover such diverse content domains as attitudes, stereotypes, and social representation; self and emotion; managerial, organizational, and work issues; and personal and social values. In addition, methodological problems relating to psychological assessment and to evaluation research have been discussed, as well as recent developments in data analysis.

We are confident that the readers will find the contributions compiled in this book useful for their future scientific work. By reading this book one may realize that we have made impressive strides in advancing the cause of facet theory. What is even more exciting is the future prospects of facet theory in scientific research. It is our hope that this volume will serve as a spring board for future developments in facet theory and its increased utilization.

This volume is the result of the efforts of many people. First we would like to thank the members of the Scientific Committee for reviewing the abstracts.

Special thanks to Milena Zeithamlova and her staff for their efforts in publishing this volume, and to Jutta Siepert for patiently handling the manuscripts and serving as connecting link between organizers, board members and authors.

Finally we wish to thank the authors for providing their articles. It is their ability, insight and effort that provided this fine volume.

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Chapter 1.

Psychological Assessment
Smallest Space Analysis of the Wechsler Intelligence Scale for Children – IV

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Abstract. The purpose of the present study is to validate Guttman’s model of intelligence in the recent version of the WISC-R. Thus, the intercorrelation matrix of the WISC-IV subtests of the entire normative sample was submitted to SSA yielding a three-dimensional cylindrical structure with a coefficient of alienation of 0.067. The obtained solution very closely matches Guttman’s original model of intelligence but offers further differentiation of the visual mode into geometric and pictorial modes. The Guttman model organization of the present solution provides an elegant description of the structure of intelligence and allows theorists to identify previously unmeasured aspects of intelligence.

Introduction

The pursuit of the underlying structure of intelligence has intrigued psychologists since the dawn of the previous century. The most common method of examining the underlying nature of a set of variables in general, and the subtests of an intelligence test in particular, is factor analysis. In fact, factor analysis was originally invented by Spearman (1904) in order to conceptualize the nature of intelligence. Its underlying assumption is that observed variables are the functions of latent variables called factors and its goal is to identify these factors. Indeed, most widely accepted models of intelligence today are based on factor-analytic research (e.g., Cattell-Horn-Carroll Theory; McGrew, 1997). Factor analytic studies of cognitive abilities such as Carroll’s meta-analysis yield a hierarchical structure, with g at the apex, an array of broad cognitive abilities underneath, and narrow abilities under those (Carroll, 1993).

The Wechsler scales, the most commonly used tests of intelligence, have traditionally been divided conceptually into verbal and non-verbal (performance) sections. However, with the publication of the WISC-R, factor analyses revealed the presence of a third factor separate from the verbal and performance factors (Kaufman, 1979), calling into question the two-part model of intelligence. During the development of the WISC-III, therefore, an additional subtest was developed to attempt to clarify the factor structure of the test, leading to the emergence of four factors (Wechsler, 1991), though the
venerable Verbal and Performance IQs remained. The most recent, fourth edition (WISC-IV; Wechsler, 2003) has embraced and expanded the four factors, leading to the abandonment of the Verbal and Performance dichotomy in favor of four scores: the *Verbal Comprehension Index* (Similarities, Vocabulary, Comprehension, Information, Word Reasoning), *Perceptual Reasoning Index* (Block Design, Picture Concepts, Matrix Reasoning, Picture Completion), *Working Memory Index* (Digit Span, Letter-Number Sequencing, Arithmetic), and *Processing Speed Index* (Coding, Symbol Search, Cancellation).

While factor analysis is the most widely used multivariate analysis method, some non-metric alternatives have been developed in search for order relations in psychological phenomena. Some of these alternatives relate to multidimensional scaling (MDS, L. Guttman, 1968; Kruskal, 1964). These methodologies represent variables as points in Euclidian space with interpoints distances corresponding to proximities measures among the variables (e.g. intercorrelations). The underlying rational of this approach is that the isomorphism between the proximities measures among the variables and their interpoints distances in the Euclidian space, enables direct observation of intercorrelation matrix. The underlying assumption of this approach is that geometric representation of order relations among variables, rather than mathematical expression of items’ loadings on factors, may highlight in the data structures that are not so apparent in factor analytic solutions. In view of the potential of MDS in revealing aspects of the construct of intelligence that may be obscured by traditional factor analytic techniques (Sternberg, 1984; p xii), the scarcity of its application to the study of intelligence is surprising. Nevertheless, few of these studies yield interesting insights into the underlying structure of intelligence in general and I.Q. in particular.

Indeed, the few studies that have focused on the study of intelligence by employing MDS approach indicated a radex model (L. Guttman, 1954). This model describes an appearance of simultaneous two ordering of the variables, one from the center to the periphery and the other a circular order around the center. This arrangement forms a disc in two dimensions or a sphere in three dimensions with sectors or conics areas relating to different characteristics of the variables. In ability testing this structure suggests the appearance of more complex tasks close to the center of the figure and less complex tasks farther away from the center and the appearance of verbal, numerical and figural-spatial test content in separate sectors. The radex model of intelligence was tested through MDS (Marshalek, Lohman & Snow, 1983; Snow, Kyllonen & Marshalek, 1984) or SSA (Adler & R. Guttman, 1982; Beauducel, Brocke & Liepmann, 2001; Koop, 1985; L. Guttman, 1965a, 1965b; Peled, 1984; Schlesinger & L. Guttman 1969; Tziner & Rimmer, 1984; Tziner & Rimmer, 1991; Ziedner & Feitelson, 1991). In all the above studies, encompassing various ability testing and batteries in various samples characteristics the finding
were more or less similar, indicating a two dimensional solution where the tests were ordered from the most complex and abstract and relating to inferential tasks at the origin to the more simple task relating to simple learning tasks at the periphery. Furthermore, in most studies, subtests that include items in the verbal mode – like vocabulary, figural-spatial mode – like matrices, and numerical mode – like mathematical exercises, clustered separately in different sectors around the center.

Interestingly enough, although the Wechsler IQ test is the most popular measure of intelligence, the radex model was tested on the WISC only once. In a study that included responses to the WISC-R (Wechsler, 1974) of two large of American and Israelis samples, L. Guttman and Levy (1991) obtained a three dimensional solution using SSA. Based on these findings they offered a modified three-dimensional version of the radex theory of intelligence. The first dimension according to this version relates to the level of abstract thinking required of the examinee, with three levels:

1. Rule inferring tasks – tasks that require abstract thinking.
2. Rule applying tasks – tasks that require knowledge the data presented in an item, such as defining a vocabulary word or solving an oral arithmetic problem.
3. Task that requires new learning or rule following, such as clerical or short-term memory tasks.

The second dimension relates to the mode of representation or content of the item. This dimension has three categories:

1. Verbal. The item involves words, such as answering general knowledge questions.
2. Numerical. The item involves numbers, such as recalling digits or solving math problems.
3. Visual. The item involves geometrical or pictorial representations, such as finding the missing part of a picture or matching a design with colored blocks.

The third dimension relates to the output mode required of the examinee. This dimension has three categories:

3. Paper and pencil. The examinee writes or marks a response on paper.

In view of the recent publication of the new version of the WISC (WISC-IV) and the introduction of new subtests in the battery, the purpose of the present study is to examine the applicability of the radex model of intelligence to the new version of the scale. More specifically, the purpose of this study is to examine whether the theoretical categorization of the new subscales would fit the actual MDS solution. Thus, Table 1 includes the 15 subscales of the WISC-IV and their categorization according to Guttman’s three dimensional model.
Table 1. The WISC-IV subscales and their categorization

<table>
<thead>
<tr>
<th>The Subtest</th>
<th>Code</th>
<th>Level of Abstraction</th>
<th>Presentation Mode</th>
<th>Response Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block Design</td>
<td>BD</td>
<td>High</td>
<td>Geo/Pic</td>
<td>Manual</td>
</tr>
<tr>
<td>Similarities</td>
<td>SI</td>
<td>High</td>
<td>Verbal</td>
<td>Oral</td>
</tr>
<tr>
<td>Digit Span</td>
<td>DS</td>
<td>Low</td>
<td>Numeric</td>
<td>Oral</td>
</tr>
<tr>
<td>Picture Concepts</td>
<td>PC</td>
<td>High</td>
<td>Geo/Pic</td>
<td>Manual</td>
</tr>
<tr>
<td>Coding</td>
<td>CD</td>
<td>Low</td>
<td>Geo/Pic</td>
<td>Pencil</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>VC</td>
<td>Medium</td>
<td>Verbal</td>
<td>Oral</td>
</tr>
<tr>
<td>Letter-Number</td>
<td>LN</td>
<td>Low</td>
<td>Numeric</td>
<td>Oral</td>
</tr>
<tr>
<td>Matrix Reasoning</td>
<td>MR</td>
<td>High</td>
<td>Geo/Pic</td>
<td>Manual</td>
</tr>
<tr>
<td>Comprehension</td>
<td>CO</td>
<td>Medium</td>
<td>Verbal</td>
<td>Oral</td>
</tr>
<tr>
<td>Symbol Search</td>
<td>SS</td>
<td>Low</td>
<td>Geo/Pic</td>
<td>Pencil</td>
</tr>
<tr>
<td>Picture Completion</td>
<td>PCM</td>
<td>Medium</td>
<td>Geo/Pic</td>
<td>Manual</td>
</tr>
<tr>
<td>Cancellation</td>
<td>CA</td>
<td>Low</td>
<td>Geo/Pic</td>
<td>Pencil</td>
</tr>
<tr>
<td>Information</td>
<td>IN</td>
<td>Medium</td>
<td>Verbal</td>
<td>Oral</td>
</tr>
<tr>
<td>Arithmetic</td>
<td>AR</td>
<td>Medium</td>
<td>Numeral</td>
<td>Oral</td>
</tr>
<tr>
<td>Word Reasoning</td>
<td>WR</td>
<td>Medium</td>
<td>Verbal</td>
<td>Oral</td>
</tr>
</tbody>
</table>

Methodology

The intercorrelation matrix of the WISC-IV subtests of the entire normative sample of the scale was obtained from the Technical and Interpretive Manual (Wechsler, 2003). The total sample consisted of 2,200 children, 100 male and 100 female in each of the 11 age groups, and was very representative of the U.S. population based on census data from March, 2000. Thus the intercorrelation matrix of the WISC-IV total sample was analyzed through Weighted SSA1 (WSSA1, Amar & Toledano, 2001).

Results

The SSA solution for the total normative sample of the WISC-IV yielded a three-dimensional model with a coefficient of alienation equal to .07 (a two-dimensional model yielded a c.o.a. of .11).

Figure 1 presents a two-dimensional projection of the SSA solution.
The figure demonstrates a two-dimensional projection with a circular base around the axis (radex). The central circle includes subscales of high inferential ability - Similarity (SI), Matrix Reasoning (MR), and Picture Concept (PC). The second circle includes subscales that require less inferential ability (Arithmetic (AR), Information (IN), Vocabulary (VC), Comprehension (CO), Word Reasoning (WR), and Picture Completion (PCM). Please note that IN, VC, and AR are still close the central circle. The third circle includes subscales that requires learning or low inferential ability – Letter-Number (LN), Symbol Search (SS), Coding (CD), and Cancellation (CA).

Thus, the first dimension from the center to the periphery indicates level of inference. The second dimension is apparent in the various sectors, dividing the circles into subscales of verbal nature - SI, VC, IN, CO, WR - numeral - AR, LN, DS - geometrical – MR, SS, BD, CD - and pictorial – PC, PCM, CA. The third dimension is represented in Figure 1 by small arrows. Arrows pointing up represent points above the plane and include subscales that require oral mode of response – SI, DS, VC, LN, and CO. Arrows pointing downward represent points below the horizontal plane and include subscales that require pencil and paper mode of response – CD, CA and SS. The remaining points without arrows represent items in the vicinity of the plane and subscales that require oral mode of response – MR, PC, PCM, and BD. The regionality index for each of the three dimensions yielded perfect match between the hypothesized classification and the appearance of the subscale on the SSA solution.
Discussion

The current analysis supports Guttman’s model of the structure of intelligence. The three-dimensional model derived from the WISC-IV differs only slightly from Guttman’s original model, derived from the WISC. The first dimension, degree of abstraction, and the third, mode of response, are the same as in the original model. The second dimension, mode of representation, has an additional segment which differentiates the geometric from the pictorial. This may be a reflection of the greater number and variety of subtests available on the more recent revision. However, even the 15 subtests of the WISC-IV provided relatively few points in space to define the model, necessitating further validation with additional instruments.

Interpretation of intelligence test results is a complex process, and the radex model does not eliminate this complexity. Rather, it adds additional factors that should be taken into account when interpreting cognitive functioning. Where factor analysis emphasizes and broad categories of cognitive ability, SSA highlights groupings based on content and mode of response while simultaneously representing the g loading of the subtests. In doing so, it makes clear that the content, or mode of representation, of a subtest is less important for the more abstract, g-loaded tasks, while becoming more important for the more automatic, low-level tasks. The g loading in this analysis appears to represent what John Horn (e.g., Horn & Noll, 1997) calls Gf, or Fluid Reasoning, rather than a global intelligence. However, neither of these models explicates the neuropsychological processes or information processing underlying cognitive performance, necessitating the integration of another level of analysis in individual assessment.

The organization of the radex model provides an elegant description of the structure of intelligence, while still maintaining both broad cognitive abilities and the concept of level of abstraction, a reflection of fluid reasoning across modalities. Furthermore, the model’s depiction of the whole of the structure allows theorists to identify gaps and generate new tasks to assess previously unmeasured aspects of intelligence. For example, in this analysis of the WISC-IV, the most highly abstract tasks are figural and verbal, with no coverage of numeric or pictorial reasoning. The somewhat less abstract rule application level is heavily verbal, and has no figural content, and the least abstract, automatic tasks are entirely numerical and figural. This suggests the possibility of the addition of new tasks to cover those areas untapped by the current test, such as a numerical reasoning task or a short-term memory task using words.

In addition to the obvious implications for test development, the radex model may also be useful diagnostically. Creating a cross-battery assessment that fully covers all three dimensions may allow identification of strong or weak modes for use in planning remediation or accommodation for children with learning disabilities or other school difficulties.
References


Validation of Rorschach Scoring System through Smallest Space Analysis

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Abstract. The purpose of the present study is to compare solution of previously published Rorschach factor analytic study to SSA solution of the same data. This analysis yielded radex structure with a modulating facet ranging from number of responses and location scores at the origin to determinants and response quality at the periphery. The polarizing facet divided the map into sectors representing response determinants – color variations vs. form variations. This solution supports Rorschach scoring system but suggests that the distinctions between different types of movements (human vs. animal), colors (chromatic, achromatic and shading) and the distinction between them and their primary form counterparts, have been exaggerated.

Introduction

The Rorschach is the most frequently used projective test in clinical setting throughout the United State as well as in the rest of the world. It consists of ten ambiguous inkblots of varying designs and colors. These inkblots are shown to the respondent one at the time with a request to describe or interpret what he sees. The subjects’ responses are then converted through elaborated scoring systems into a symbol system important aspects of the original responses. While the Rorschach scoring system contains more than 100 characteristics they are divided into several major categories: A. location – did the respondent report seeing the whole blot as one picture or just one particular area of the blot? B. determinants - did the respondent see something that involves movement, form, color, shading or texture? Further distinction in these determinants relates to variants of these categories. If the response involves color, is it chromatic or achromatic? If it involves movement, is it human movement, animal movement, or inanimate movement such as fireworks. Further codes of the determinants relate to combinations of form and color variations such as “red butterfly”. Another distinction in the case of combination of form and color is which determinant was primary – color or form. C. Response quality – clear or poor form. D. Content – did the respondent report seeing sexual content in the blot, human figure or animal? E. Popularity – how popular is the specific response, i.e. does it appear at least once in three protocols. Additional scores of the total Rorschach response protocol relate to the total number of the scores, or to the
frequency of organizational activities, i.e. responses that involves a perception of interactions between or among parts of the blots.

The scientific status of the Rorschach test is one of the most controversial issues among clinical psychologists and psychometricians alike. On the one side, the Rorschach is very popular among clinical psychologists. Watkins, Cambell, Nieberding and Hallmark (1995) report that 85% of clinical psychologists indicated that they use the Rorschach “occasionally” and 43% indicated that they administered it “frequently” or “always” in their test batteries. Furthermore, Sutherland (1992) estimates that about 6 million Rorschach are administered every year. Others (Anastasi, 1988; Jensen, 1965) on the other hand, argue that the Rorschach lacks standardized administration procedures, adequate norms, and sufficiently well-documented evidence for the reliability and validity of its scores.

In view of the high popularity of the Rorschach, and the criticism against it, no wonder that Hunsley and Baily (1999) titled the Rorschach as “the most cherished and the most reviled of all psychological assessment instruments” (p. 266).

Nevertheless, a significant change in the scientific status of the Rorschach has occurred when John Exner (1969) has presented his Comprehensive System (CS). In this book, as well as in the ones that followed (Exner, 1993; Exner & Weiner, 1995), Exner re-established the legitimacy of the Rorschach as a sound assessment instrument. He provided empirically based detailed rules and instructions for the administration of the test and its scoring, and presented an impressive set of norms for patient and non-patient populations. Indeed, several studies have indicated its good test-retest (Viglione, 1991) and inter-rater reliability (Exner, 1993) as well as respectable validity (Hiller, Rosenthal, Bornstein, Berry, & Brunell-Neuleib, 1999). In contrast, Lilienfeld, Wood, and Garb (2000) have reviewed the CS scoring system and argued that the overall reliability of the CS has been over-rated. They point out several methodological flaws in meta-analytic studies on its validity and claim that its increment validity has not been established. Finally, they conclude that in contrast to many psychologists' belief, “the Rorschach Inkblot Test remains a problematic instrument from a psychometric standpoint” (p. 38).

One way to obtain insight into the underlying structure of a psychometric instrument and to support its theoretical assumptions is through factor analysis. Furthermore, factor analysis can reveal among a set of intercorrelations latent variables that may support summational issues or serve some practical applications. Thus, it is surprising that relatively few studies of have been applied to factor analysis in general and to the CS specifically. Although over forty studies have employed factor analysis to the Rorschach, about half of them were not standardized Rorschach cards or obtained through non-standardized individual testing protocols. Meyer (1989) has reviewed the standardized based studies and performed a factor analytic study as well. He reports in the
Rorschach form-dominated shading factor and non-form dominated color and shading factors, in addition to two response frequency factors. In another report on the same study, Meyer (1992) states that although the Rorschach exhibits a relatively consistent factor structure, its “internal structure does not clearly correspond to that which would be expected from traditional variable interpretation” (p. 132). Furthermore, Meyer argues that with the exception of some partial account “it is very doubtful that any theoretical perspective would actually predict the Rorschach structure that has emerged in this study and repeatedly in previous research” (p. 133). Meyer discounts the possibility that the “consistent but unexpected findings [serve as] evidence that the factor analytic method is inappropriate for the data of the Rorschach” (p. 133). Nevertheless, issues like colinearity, interdependence, variables with skewed distribution, very low or very high base rates, and very small variances may constitute a problem in the application of the Rorschach to factor analysis. Furthermore, in view of the non-metric alternatives to factor analysis, it is surprising that these alternatives - multidimensional scaling and smallest space analysis (SSA) (Guttman, 1966) - have never been employed in the study of the Rorschach.

In view of the unique characteristics of these approaches (Cohen, 2003), the purpose of the present study is to apply SSA to Rorschach data that were analyzed previously by factor analysis.

Method

The intercorrelation matrix of 17 Rorschach variables was obtained from Zillmer and Vuz (1995). These data were selected because of the meticulous attention of Zillmer and Vuz to the suitability of each of the Rorschach variables for factor analysis and the detailed information on the factor analytic solutions that they obtained.

Results

Zillmer and Vuz's (1995) original intercorrelation matrix was submitted to WSSA (Amar & Toledano, 2001) and yielded a two-dimensional solution with a coefficient of alienation of .176 (a one dimension solution yielded c.o.a = .313). The space diagram of this solution appears in Figure 1.

The space diagram in Figure 1 represents a radex structure. At the center appears the total number of responses (represented by the letter R) a variable that correlates with all Rorschach measures. The second circle in Figure 1 contains two holistic measures that indicate an integrative ability, an ability to perceive the card as a whole (W) or to integrate different parts of the cards into a holistic percept (Zf). The third circle includes the response determinant. The sector at the bottom of Figure 1 contains responses with combinations of form
and color variants (i.e., color, shading and achromatic color determinants). Going clockwise, the next sector includes S responses, namely responses that include white space area of the card. The next sector, in the third circle, contains all color responses determinants. This sector is the counter point of form dominant responses in the opposite sector. The following sector includes three figure dominant "projective" scores, i.e., responses that incorporate form and additional characteristic such as movement (M – human movement, m- inanimate movement, or FD – dimensionality, like depth or distance.

Fig. 1. Smallest space analysis of Rorschach data from Zillmer and Vuz (1995)

The next sector is empty. It should have included pure form responses, a variable that has not been included in the analysis. (Instead, only good form responses were available). The next circle contains scores that indicate perceptual accuracy (popular responses, percents of responses with good form quality, lack of bad form quality or form responses with good form quality). It should be noted that SSA of the same data without the variable R yielded a very similar map.

In order to compare the present SSA solution with the factor analytic solution of Zillmer and Vuz (1995), Figure 2 represents Zillmer and Vuz's factor solution superimposed over the original SSA solution.
Fig. 2. Zillmer and Vuz (1995) factor solution superimposed over the SSA solution

Discussion

The SSA solution of a previously factor-analyzed Rorschach data yielded a radex solution. The modulating facet ranged from “holistic and organizational” at the origin of the map, to “accuracy” of the response at the periphery or from number of responses to percent of good Form responses. The middle category includes the determinants of the responses, namely variants of combinations of color and form. The polarizing facet relates mainly to the response determinant section and includes its main characteristics. One sector includes form dominant responses with color variants as a secondary characteristic. The opposite sector includes variants of color responses. Between these two polarities, we find a sector with variants of form response with additional characteristics (movement or depth – “projective forms”).

Please note that there is no sector for pure Form responses. Nevertheless, the location of the Popular and F+% scores in the outer circle suggests that the empty space between the “projective form” sector and the form-dominant sector should include the pure form score. Percent of form responses (without form quality indicator) was eliminated from the original data probably because of its high correlation with F+% and P responses. In future studies the location of F may be ascertained by alternate analyses with pure F responses versus F+% and P.
The sector opposite to the “empty” form sector is the sector with space response. The space response is categorized in Rorschach coding system in the “Location” category. The present SSA solution could incorporate the space response in the “Location” region near the “Whole” response. Nevertheless, in view of the overall configuration of the solution, it seems more appropriate to consider space response as a determinant response. Indeed, it deals with the white color and it is close to achromatic color responses (C’), namely responses that deal with white, gray, and black as colors. Furthermore, space code is not a pure location code even in the standard scoring system as it is always appears in conjunction with the three primary location codes W, D, or Dd.

In the original study of the same data, Zillmer and Vuz (1995) have identified four factors: (a) Holistic Response (Zf, W, M), (b) Perceptual Accuracy (X+% , X-% P, F+%), (C) Non-Form-Dominant (CF+C, C’F+C’, ShadeF, M,) and (d) Form dominant (FC Fshade, S, R, FC’, FD). As can be seen in Figure 2, there are some similarities between the SSA and factor analysis. The perceptual accuracy factor is exactly as in the SSA solution. The Form Dominant and the Non-form-dominant factors are almost the same as in the SSA solution. Nevertheless, the SSA solution is more elegant, it is without any deviations, and it presents holistic view of the interrelations among the regions (“factor”).

In general, the present study indicates that the Rorschach responses are divided into four main determinant categories: form only, form dominant, color dominant, and white space responses. This finding is somewhat similar to Mayer (1989, 1992).

Another conclusion from the present study is that the distinction among the variations of color responses as well as among primary form responses and among movement responses is somewhat artificial. Previous factor analytic studies (Meyer, 1989; 1992; Singer & Brown, 1977; Wittenborn, 1950) indicated similar conclusions.

Finally, the findings of the present study support the basic concepts in Rorschach scoring systems – Location, determinants, and form quality. Nevertheless, these findings do not necessarily support any of the Rorschach diagnostic implications such as depression, neuroticism, or egocentricity. Nevertheless, the study limitations should be acknowledged as well. It is based on one sample of hospitalized patients and the Rorschach scores are not controlled for the number of responses, a factor that may skew the findings.

References


Chapter 2.

FT and Evaluation Research
Faceting Program Evaluation: A Systematic Approach

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Abstract. The facet approach has been applied to different fields of evaluation in the past. Program evaluation, however, has been widely ignored until today. In faceting program evaluation, we start from a general mapping sentence of evaluation. Next we specify this mapping sentence in such a way as to clearly define those tasks to be accomplished in program evaluation. Then, we demonstrate how the mapping sentence of program evaluation may be further specified to focus on special evaluation standards. Finally, we point to the fact that this approach may be used in order to conduct meta-evaluations.

1. Introduction

Evaluations play a central role in everyday life and in scientific life. Generally speaking, they may be characterized as statements about a reference object, ranging from positive to negative with respect to some subjective or objective standard. The facet approach has been applied to very different fields of evaluation in the past, like attitudinal research (Guttman & Levy, 1982), architectural psychology (Canter, 1983; Donald, 1994; Hackett & Foxall, 1997), communication analysis (Taylor, 2002a,b), or education (Lewy & Shye, 1978). One important branch of evaluation research, however, has been widely ignored until today - program evaluation. This is in sharp contrast to its particular importance in disciplines like administration, criminology, economy, education, or psychology. In view of the large number of scientifically questionable evaluation studies to be found in the literature, a systematic approach to program evaluation seems urgently required (e.g., Sherman et al., 1997). Facet theory offers the instruments needed for such an approach (Bilsky & Cairns, in press).

2. Program Evaluation

2.1. General Mapping Sentence of Evaluation

To demonstrate how the application of FT to program evaluation may be accomplished, we start from a General Mapping Sentence (GMS) of evaluation. As indicated before, every evaluation can be characterized as a statement about an object, ranging from positive to negative with respect to some standard. This
standard may be either subjective or objective. While an evaluation according to subjective standards is usually called an *attitude*, and dealt with in personality or social psychology, evaluation in the stricter sense, i.e., *scientific evaluation*, responds to objective standards which are the focus of psychological and socio-logical methods. To arrive at a better understanding of a particular evaluation, two further aspects require attention: the *object of reference* and *time*. Figure 1 summarises these aspects in a GMS of evaluation.

Fig. 1. General Mapping Sentence (GMS) of Evaluation

The elements comprised by facet A (*reference*) closely relate to categories found in socio-scientific literature. They may be tentatively qualified as follows: Object (animate or inanimate), content (concept, plan, goal), instrument (intervention, test), process (action), and product (result). Of course, their application to a concrete research problem requires further specification.

### 2.2. Facets of Program Evaluation

Next we specify this mapping sentence in such a way as to clearly define those tasks to be accomplished in program evaluation. We do so by closely referring to standard literature of evaluation (Rossi et al., 1999; The Joint Committee, 1994) and to frequently discussed applications (e.g., Sherman et al., 1997).

Both with respect to the planning and to the results of an evaluation, the perspective of the respective protagonist (*x*) has to be considered: Depending on whether s/he is a sponsor or stakeholder, a scientific evaluator (researcher), or a practitioner who is in charge of implementing an intervention, the (objective) standards applied may differ. Consequently the *person facet* (*X*) needs specification (see Fig. 2).

As regards the *content facets* of the GMS, program evaluation can be characterised as the appraisal of an intervention (a3), relating to the past, present or future (b1-b3), and following objective criteria (c2). Depending on the re-
sources (budget, time, and staff) available, this intervention may be temporally limited or open-ended. Correspondingly, projects and programs are usually treated in the literature as two distinct forms (elements) of an intervention (The Joint Committee, 1994), as indicated in facet A below. This facet is supposed to moderate the outcome of an evaluation.

The second facet B, time, relates to the fact that an evaluation may serve different functions. Thus, past projects may be of scientific interest as possible templates for planning and implementing new interventions. Ongoing projects may be on the test stand to come to a decision on whether or not they should be continued. Or, the expected efficiency may be a criterion for approving or discarding a planned new project. In all these cases, process and/or effect of an intervention may be in the focus of interest.

Independently of these (and other conceivable) determining factors that might function as moderating facet(s), the criteria of evaluation are the core of this mapping sentence. They therefore form the elements of the standard facet (C). Formally, the dominant position of this facet results from the fact that it is explicitly related to by the response facet. In other terms, it is considered to be a stem-facet of this mapping sentence. Figure 2 summarizes these considerations.

**Fig. 2. Mapping Sentence of Program Evaluation**

In specifying the elements of the stem-facet above, we directly adopted the terminology of The Joint Committee (1994). Thus, utility (c1) is to ensure that the need for information of the customers and end-users of this evaluation is taken into consideration. Feasibility (c2) is to guarantee that the intervention has been planned and realised in a realistic and cost-conscious way. Propriety (c3) is closely related to issues of ethics and legality. Finally, accuracy (c4) covers those aspects which closely relate to methodological standards, like reliability and validity.
2.3. Accuracy of Evaluation

While all elements of the standards facet are of scientific interest, it is usually *accuracy* which is in the focus of the evaluation literature. We take the differentiated discussion on this topic into account by expanding accuracy in an own sub-facet as shown in Figure 3. It becomes obvious then, that both formative and summative aspects of evaluation need special attention (Rossi et al., 1999).

![Fig. 3. Mapping Sentence of Accuracy](image)

3. Conclusions

Starting from a general and rudimentary mapping sentence and fleshing it out in a stepwise manner heightens the transparency of the type of program evaluation to be accomplished. Thus, the evaluator is obliged in the very beginning to map his *task* and to name the *criteria* of evaluation to be considered on a basic level. These have to be specified according to different sub-tasks by means of additional, more specified mapping sentences. In this way a system of *hierarchically* ordered mapping sentences results, which are directly related to one another because of their *common range*. In addition to heightened transparency, the systematic construction of instruments needed for realising program evaluation, i.e. *operationalisation*, is facilitated.

Designing program evaluation as sketched out a priori ensures a systematic and interpersonally traceable way of appraising *individual* projects or programs. Beyond this, however, this approach enables the researcher also to compare *different* projects and programs systematically (Döring, 2005). In particular, it avoids the weakness of conventional reviews and essayistic documentations which are grounded in the non-transparency and selectivity of criteria applied by the respective author. Insofar it meets requirements like those posed by the Campbell Collaboration (Farrington, 2001) with respect to systematic reviews of empirical research.
References


Appendix: The Program Evaluation Standards
The Joint Committee on Standards for Educational Evaluation, James R. Sanders (1994)

U Utility Standards
The utility standards are intended to ensure that an evaluation will serve the information needs of intended users (p. 23)

F Feasibility Standards
The feasibility standards are intended to ensure that an evaluation will be realistic, diplomatic, and frugal (p. 63)

P Propriety Standards
The propriety standards are intended to ensure that an evaluation will be conducted legally, ethically, and with due regard for the welfare of those involved in the evaluation, as well as those affected by its results (p. 81)

A Accuracy Standards
The accuracy standards are intended to ensure that an evaluation will reveal and convey technically adequate information about the features that determine worth or merit of the program being evaluated (p. 125/126)

A 1 Program Documentation The program being evaluated should be described and documented clearly and accurately, so that the program is clearly identified.

A 2 Context Analysis The context in which the program exists should be examined in enough detail, so that its likely influences on the program can be identified.

A 3 Described Purposes and Procedures The purposes and procedures of the evaluation should be monitored and described in enough detail, so that they can be identified and assessed.

A 4 Defensible Information Sources The sources of information used in a program evaluation should be described in enough detail, so that the adequacy of the information can be assessed.

A 5 Valid Information The information gathering procedures should be chosen or developed and then implemented so that they will assure that the interpretation arrived at is valid for the intended use.

A 6 Reliable Information The information gathering procedures should be chosen or developed and then implemented so that they will assure that the information obtained is sufficiently reliable for the intended use.
A7 Systematic Information  The information collected, processed, and reported in an evaluation should be systematically reviewed and any errors should be corrected.

A8 Analysis of Quantitative Information  Quantitative information is an evaluation should be appropriately and systematically analyzed so that evaluation questions are effectively answered.

A9 Analysis of Qualitative Information  Qualitative information is an evaluation should be appropriately and systematically analyzed so that evaluation questions are effectively answered.

A10 Justified Conclusions  The conclusions reached in an evaluation should be explicitly justified, so that stakeholders can assess them.

A11 Impartial Reporting  Reporting procedures should guard against distortion caused by personal feelings and biases of any party to the evaluation, so that evaluation reports fairly reflect the evaluation findings.

A12 Metaevaluation  The evaluation itself should be formatively and summatively evaluated against these and other pertinent standards, so that its conduct is appropriately guided and, on completion, stakeholders can closely examine its strengths and weaknesses.
Program Evaluation: A Facet-Theoretic Approach

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Abstract. The present study explores the contribution of facet theory to program evaluation. A facet-theoretic model for program evaluation was formulated based on current literature of outstanding importance in this field. Explorative FT analyses were based on a sample of 25 crime prevention reports. The results indicate that FT methods are promising tools for the systematisation of evaluation criteria as well as for the assessment of the quality of evaluation reports.

1. Introduction

Improving the quality of our physical and social environment and enhancing our individual and collective well-being is a major aim of many programs in various fields of application. For each of these programs, the evaluation of its actual effectiveness is of outstanding political and practical importance. This is because the outcomes of program evaluations guide political decisions and allocations of personal and financial resources. So, what are the characteristic features of a good program evaluation? Due to in-depth evaluation research during the last decades, this question can be further clarified. Today, there exist up-to-date evaluation guidelines (e.g., Rossi, Freeman & Lipsey, 2002) as well as popular, internationally accepted, and continuously revised program evaluation standards (Joint Committee on Standards for Educational Evaluation, 1994).

For the assessment of the value of a certain program and the quality of the respective program evaluation, an approach that goes beyond the specific program is especially fruitful. Embedding the program into the larger context of other related programs facilitates comparisons and general statements. Unfortunately, programs are traditionally reviewed within a relatively idiosyncratic format, so that it remains difficult to estimate their quality and relevance. In order to overcome this problem, there exist two well-established techniques. First, the Cochrane Collaboration and the Campbell Collaboration have developed the “science of systematic reviews” (Farrington, 2001, p.127). Systematic reviews have explicit objectives and use rigorous methods for locating, appraising and synthesising evidence from prior evaluation studies. The second contribution to improving reviews was made by a technique called “meta-analysis” (e.g., Lipsey & Wilson, 2001). In a meta-analysis, a common framework for the integration of multiple studies that research the same issue is provided, so that empirical findings can be synthesised.
The present study pursues the same aims. However, the author has applied Facet Theory (FT) as an alternative approach. Both, mapping sentences as FT models and FT data-analytic methods are geared toward systematisation, explication and integration. In this way, it becomes obvious that evaluation research and FT share many of their main objectives. Although FT seems to be especially promising in this context, program evaluation is a relatively new field of application for Facet Theory. Therefore, the character of this study is rather explorative.

The basic idea of this study is to get away from the still predominant, more or less essayistic, type of evaluation reviews. For this purpose, a set of mapping sentences for program evaluation is developed, which should allow for the integration of multiple evaluation reports into one common framework. Based on these mapping sentences, two types of explorative statistical analyses are conducted. The first analysis is an initial attempt to clarify the structure among evaluation criteria. This is accomplished by creating a display of similarities and dissimilarities between them. The second analysis focuses on whether a facet-theoretic model and facet-theoretic data analyses are useful tools for the researcher who is concerned with the assessment of the quality of evaluation reports.

2. Development of a Facet-Theoretic Approach for Program Evaluation

A general mapping sentence for evaluation (Bilsky & Cairns, in press) was chosen as a starting point for the present research. It is presented in these proceedings (Bilsky & Cairns, n.d., Figure 2. Mapping Sentence of Program Evaluation). This mapping sentence contains one facet for the person who evaluates (x) and several domain facets (A, B and C). The type of intervention (facet A) and the time perspective (facet B) are important for the description of a certain evaluation. However, what researchers are most interested in (e.g., Rossi et al., 2002; Joint Committee, 1994) is the way in which an evaluation is conducted. Standards or criteria to judge the quality of an evaluation are the focus of current research. For this reason, facet C (standard) is the core of the mapping sentence. Its importance is visualised as it is directly referred to in the response facet.

The notation of the elements in this facet corresponds to the notation within the Standards developed by the Joint Committee on Standards for Educational Evaluation (Joint Committee, 1994) as internationally accepted standards of outstanding importance. These standards are organized around four main attributes: utility, feasibility, propriety, and accuracy. Utility standards guide evaluation, so that it will be informative to the intended audience. Feasibility standards ensure that evaluations do not consume more resources, materials, personnel, or time than necessary to address the evaluation questions.
Propriety standards are intended to facilitate protection of the right of individuals affected by an evaluation. The standards summarised under the fourth attribute, accuracy, determine whether the evaluation of a program is comprehensive, technically adequate, and whether the judgements rendered are linked logically to the data. Because of its accordance with the Standards of the Joint Committee as internationally accepted standards of outstanding importance, this mapping sentence seems to be especially promising.

For the present study, the mapping sentence of Bilsky and Cairns (in press) was adapted to the situation of the evaluation of a report (Figure 1). This allows for the integration of evaluation reports as the units of analysis. Consequently, the intervention facet (A) was replaced by a facet for the report. As a report is the final product of an evaluation process, the meaning of the facet (B) as a timeframe of the evaluation changes and becomes a facet for the timeframe of the report.

\[ R_{\text{evaluation}} \rightarrow \text{(well done ) in terms of the standard (C4).} \]

\[ \text{(not well done )} \]

**Fig. 1. Mapping Sentence 1**

The further development of the facet-theoretic approach in this study can be described as a specification of the mapping sentence of Bilsky and Cairns (in press) step by step. The specification process in the present work concentrates on the element Accuracy, a standard which is the focus of current evaluation literature. As each mapping sentence on the next lower level becomes more concrete, a set of hierarchically structured mapping sentences evolves. The author closely followed the Standards by the Joint Committee, with regard to the content elements as well as with regard to the structure. Rossi, Freeman and Lipsey (2002) and a journal article recently published by the Campbell Collaboration (Farrington, 2003) provide additional technical knowledge on program documentation and validity. These sources were therefore chosen to complement the Standards. The close relation between the mapping sentences and these three important sources was intended to ascertain that the model reflects the current state of research and scientific expertise.
Following the 11 accuracy standards in the Standards by the Joint Committee, the accuracy facet was further specified (Figure 2).

<table>
<thead>
<tr>
<th>A: Report</th>
<th>B: Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a1 project intervention)</td>
<td>(b1 published)</td>
</tr>
<tr>
<td>(a2 program intervention)</td>
<td>(b2 unpublished)</td>
</tr>
</tbody>
</table>

**C4: Accuracy**

| (c4.1 program documentation)    |
| (c4.2 context analysis)          |
| (c4.3 described purposes and procedures) |
| (c4.4 defensible information sources) |
| with respect to                  |
| (c4.5 valid information)         |
| (c4.6 reliable information)      |
| (c4.7 systematic information)    |
| (c4.8 analysis of quantitative information) |
| (c4.9 analysis of qualitative information) |
| (c4.10 justified conclusions)    |
| (c4.11 impartial reporting)      |

\[ R_{\text{evaluation}} \]

→ (well done) in terms of the standard (C4).

(not well done)

**Fig. 2. Mapping Sentence 2**

Based on key terms in *The Program Evaluation Standards* and complemented by Farrington (2003) and Rossi et al. (2002) these 11 standards were further elaborated (Figure 3).

### 3. Explorative Empirical Investigations

**Sample.** For an empirical investigation, the model was applied to a heterogeneous, however non-representative sample of 25 evaluation reports from the field of crime prevention, an area which is in the focus of current research and political discussion. Here, a *coding frame* served as link between the model and the process of data collection. This coding frame included indicators for each evaluation criterion within the facet for evaluation standards as well as rules for the calculation of concrete values. Using this coding frame, the 25 reports were coded by the same person (the author) in a random order.
The evaluator (x) evaluates a (a1 project intervention), which is (b1 published) (a2 program intervention) (b2 unpublished)

**C4: Accuracy**
- (c4.1.1) description of the unique features of the program
- (c4.1.2) description of the component parts
- (c4.1.3) description of the implementation of the program
- (c4.1.4) association of the components of the program with its effect
- (c4.2.1) geographic location of the program
- (c4.2.2) its timing
- (c4.2.3) the political and social climate surrounding it
- (c4.2.4) the staff
- (c4.2.5) pertinent economic conditions
- (c4.3.1) the evaluation purposes
- (c4.3.2) description of the procedures
- (c4.4.1) description of the sources of information
- (c4.4.2) variety of sources
- (c4.4.3) description of the sample
- (c4.4.4) dealing with missing data
- (c4.5.1) construct validity
- (c4.5.2) internal validity
- (c4.5.3) statistical conclusion validity
- (c4.6.1) assessment of the reliability of the instruments
- (c4.7.1) assuring that all information is as free from error as is possible and kept secure
- (c4.8.1) use of initial explorative analyses
- (c4.8.2) use of more sophisticated and complex analyses
- (c4.8.3) visual displays
- (c4.9.1) set of categories
- (c4.9.2) test of categories for validity and reliability
- (c4.9.3) meaningfulness of conclusions and recommendations
- (c4.10.1) adequate interpretation of statistics
- (c4.10.2) relation of conclusions to statistical results
- (c4.10.3) possible alternative explanations for results
- (c4.11.1) neutral and objective style of reporting at any stage of the report

\[ R_{\text{evaluation}} \]
- (well done)
- (not well done)

**Fig. 3. Mapping Sentence 3**

For the purpose of empirical investigations, the elements within the facet for **Accuracy** are treated as variables (v\(^1\)-v\(^{30}\)). The corresponding labels are noted on the right.
The resulting data consist of a set of profiles. There is an individual profile for each report, consisting of one value per evaluation criterion, where a higher value indicates a better quality. These profiles are summarised in a rectangular matrix, called “scalogram”, in which the evaluation reports are presented in the rows, and the evaluation criteria are presented in the columns (Figure 4).

**Fig. 4.** Scalogram

### 3.1. Structure among Evaluation Criteria – Similarities and Dissimilarities

**Data Analysis and Results**

The analysis concentrates on revealing the structure among evaluation criteria (treated as variables). For the purpose of the present study, a small N of 25 was accepted, in order to get a first idea of similarities and dissimilarities. Smallest Space Analysis (SSA) was applied to measures of similarities between variables ($MU_2$), using Guttman’s coefficient of alienation as a loss function. The elements within the facet of interest in the present study deal with different aspects of the evaluation process. A facet whose elements represent unordered qualitative aspects of a content universe – i.e., different aspects of the evaluation process – plays a polar role (Dancer, 1990). The SSA space can be partitioned into wedge-shaped regions emanating from a common origin. The precise circular order of the elements was explored by means of the computer program **SYSTAT 10**.

A two-dimensional SSA resulted in a coefficient of alienation of $k=0.27$. This coefficient is higher than Louis Guttman’s recommendation. However, for the present explorative investigation, this coefficient was accepted, and the researcher focused on an interpretation of the output. As expected, the variables are arranged in a circular order, and the space can be partitioned into wedge-shaped regions (Figure 5). The program (v1) is placed in the centre. It is surrounded by variables that describe different aspects of the evaluation process. To visualise the structure of the variables, the graph can be partitioned into regions, so that each region contains only variables with a common feature. In this way, the space can be partitioned into 8 regions within which the variables form a homogeneous set (Figure 5). Each region deals with one qualitatively different

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1 It was found that for 10 of the evaluation criteria, over 80% of the evaluation reports under study received the same value, which was either very low or very high. As regards content, this finding indicates, in how far the reports under study meet the quality requirements of current evaluation standards. Skewed distributions mean that the expectations formulated in the respective evaluation criterion were met by either many or very few evaluation reports. However, from a statistic point of view, the respective criteria do not give information on differences between reports. The respective columns were therefore excluded from further analyses.
Fig. 5. Configuration of regions in the SSA output – a polar structure. The evaluation criterion “unique features of the program” (v1 or c4.1.1) is placed in the centre of the graph and is symbolized by a dot (○)

aspect, varying from scientific criteria (validity, objectivity, reliability) and different types of analyses (quantitative, qualitative) to the implementation, the context and aspects of the proceeding (avoiding errors and assessing the need for the program).

3.2 Usefulness of the Model in Assessing the Quality of Evaluation Reports

Data Analysis and Results

The central aspect under study is the usefulness of evaluation criteria in assessing the quality of reports. Multidimensional Scalogram Analysis, more concrete the HOMALS module of SPSS 11, was employed to create displays of the structure of the reports that visualise their quality. Referring to these displays, the usefulness of each variable in distinguishing between qualitatively
good and qualitatively poor reports was investigated. HOMALS solutions consist of a “space diagram” displaying the profiles (i.e., the reports), and a series of variable diagrams, called “item diagrams”. The configuration of the reports is the same in both types of displays. However, in an item diagram, a report is labelled in terms of its membership in one of the categories of the variable. HOMALS was realised in a stepwise procedure\(^2\) which aims at finding the largest set of well-discriminating variables.

This stepwise proceeding resulted in a final set of 13 variables which are presented together with their item diagrams in Figure 6. In each item diagram, a straight line was drawn to visualise a separation between well-done and not well-done reports in terms of the respective evaluation criterion.

### 4. Discussion

The results of the present study provide the researcher with interesting ideas about possible contributions of FT to program evaluation. Moreover, they highlight directions for future research.

Current program evaluation standards could be formulated as elements of a mapping sentence. This mapping sentence was applicable to a heterogeneous sample of crime prevention evaluation reports. An SSA revealed a meaningful polar structure among evaluation criteria, showing similarities and dissimilarities between them. The results of HOMALS showed that the quality of the reports under study could be assessed by many, however not by all of the chosen evaluation criteria. The item diagrams as the central HOMALS output offer a comprehensible display of the quality of the evaluation reports. Hence, it seems to be an interesting method in the field of evaluation, where comprehensibility is very important with regard to an effective communication between scientists and practitioners. However, the reader should keep in mind the explorative character of this study. Methodological limitations include small sample size and lack of controls in the coding process.

According to Canter (1985), a mapping sentence can be the start as well as the conclusion of a research project. In the present study, the formulation of the mapping sentence closely followed the structure inherent in the Standards by the Joint Committee. This proceeding resulted in one large facet for evaluation criteria, which could possibly be formulated more elegantly by moving away from the structure inherent in the Standards. Apart from elaborating the mapping sentence, future research should also move towards generalisability of

\(^{2}\) Step 1: Calculation of a two-dimensional MSA with all variables. Step 2: Deletion of variables with discrimination measures lower than 0.3 on both the first and the second dimension. Step 3: Calculation of another MSA with the remaining well-discriminating variables. Step 4: Check that no discriminating variables were excluded. Stepwise inclusion in order of the discrimination measures, starting with the highest value. A variable was re-included if a partitioning of the respective item diagram was possible with 3 or less wrong classifications.
**v1**
Description of the unique features of the program

**v3**
Description of the implementation of the program

**v4**
Association of the components of the program with its effect

**V7**
The political and social climate

**V9**
Pertinent economic conditions

**V12**
Description of the sources of information

**V14**
Description of the sample

**V16**
Construct validity

**V17**
Internal validity
the findings. Basically, there arise two main ways to generalise. Firstly, the model covers only the aspect of accuracy, which seems to be the core aspect in treating evaluation reports. Nonetheless, utility and feasibility as other major parts in the Standards by the Joint Committee are of essential practical relevance. Therefore, it is desirable to introduce utility and feasibility (or even the fourth main aspect in the Standards: propriety). Secondly the mapping sentence that was developed in this study should be applicable to evaluations in different content areas. Yet, until now it has only been applied to a small sample of crime prevention reports as one specific sample. This application of facet theory to program evaluation standards has shown that it is a fruitful approach. But, future research is needed, to validate and to generalise the results and to elaborate practical implications.

References

The Use of Facet Theory for the Identification of Scholastic Competences

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Abstract. The National Examination of Intermediate Level Education (ENEM) in Brazil aims to evaluate five basic intellectual competences by means of the assessment of 21 abilities. The underlying idea was that the competences correspond to different combinations of abilities. However, such competences were originally defined with a great deal of overlap. Therefore, an SSA was done on actual data from the ENEM 2000 in order to identify the basic organization of the abilities without overlapping. An axial structure with three distinct groups of abilities emerged from the results, each corresponding to a clearly defined competence. Performance indicators for these three competences were then computed, as well as their association to socio-demographic variables. In the end, implications of the findings are discussed.

1. Introduction

The National Examination of Intermediate Level Education (ENEM: Exame Nacional do Ensino Médio; Brazil, 2005) was created by the Brazilian Ministry of Education aiming to evaluate five basic competences: Mastery of language, Understanding of phenomena, Facing of problem situations, Construction of arguments, and Elaboration of proposals. For this purpose, 21 abilities were defined, each one measured through three questions with increasing levels of difficulty, totalizing 63 items. The basic idea underlying the test is that different combinations of abilities correspond to each one of the competences being evaluated. It occurs, however, that the combinations defined for each competence present a great amount of overlap, as each individual ability is used for the evaluation of three to five distinct competences. This makes it difficult or even impossible to clearly differentiate between these competences.

The purpose of this article is to make use of Facet Theory to better understand the identification of school competences using the National Examination of Intermediate Level Education (ENEM). This exam was established by the National Institute of Studies and Educational Researches - INEP, in 1998, to be given to end-of-term students and those with equivalent education. The ENEM is done annually, with the main purpose of evaluating students’ performance at
the end of basic education, to confront the development of fundamental competences with what is considered necessary to fulfill their citizenship. The exam is made of a single test and includes assorted areas of knowledge in which the pedagogic activities of the basic education in Brazil are organized. In order to structure the exam, a model was conceived defining competences and abilities, associated with the contents of the fundamental and medium teaching, that are inherent to individuals during their period of cognitive development, corresponding to the end of basic education.

This so called Competences Model was developed to structure ENEM in order to clearly define its assumptions and sketch its operational characteristics. This model contemplates the definition of competences and of the students’ general abilities during the cognitive development period at the end of basic education, considering it associated with the contents of fundamental and medium leveled teaching. Within this context, competences are structural modalities of intelligence, i.e., actions and operations used to establish relationships with and among objects, situations, phenomena and people one wants to meet. Abilities result from the acquired competences and refer to the immediate plan of “knowing how to”.

More specifically, the Competences model developed to structure ENEM aims to evaluate five basic competences: 1. Mastery of language; 2. Understanding of phenomena; 3. Facing of problem situations; 4. Construction of arguments; 5. Elaboration of proposals. Each competence would be related to a series of abilities (21), each of them being measured three times through objective questions evaluated as of high, average and low difficulty. Therefore, the ENEM test, from the cognitive perspective, results from an exam of competences and abilities which shapes the contents translated into a series of items/questions (63 objective questions).

Thus, the basic purpose of the test is that different combinations of abilities correspond to each one of the competences being evaluated. From this theoretical model of competences and abilities three facets could be detected, as shown in Figure 1: [A] Competences (5 levels), [B] Abilities (21 levels) and [C] Level of Difficulty (3 levels).

It happens, however, that a verification of the defined combinations for each competence reveals a great amount of superposition, with each ability being used in the evaluation from three to five different competences. Moreover, each competence is evaluated by a different number of abilities, hindering or even disabling a clear distinction among the last ones (see Table A1 in the Appendix). More specifically, while competence 2 is evaluated by a quite large number of abilities – 17, the competences 1 and 4 are evaluated by 11 abilities, the competences 3 and 4 by 14 and 15 abilities, respectively.
The level of performance of a student \((x)\) in an item involving a competence as:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>[1. Mastery of language]</td>
<td>[01. Ability 1]</td>
</tr>
<tr>
<td>[2. Understanding phenomena]</td>
<td>[02. Ability 2]</td>
</tr>
<tr>
<td>[5. Elaboration of proposals]</td>
<td>[21. Ability 21]</td>
</tr>
</tbody>
</table>

\[
\begin{array}{ccc}
\text{C} & \text{[1. high]} & \text{[right]} \\
\text{Measured through items} & \text{[2. intermediate]} & \rightarrow \text{answer} \\
\text{of difficulty} & \text{[3. low]} & \text{[wrong]}
\end{array}
\]

**Fig. 1.** Mapping Sentence of the ENEM Competences Model

In Table 1 a matrix is shown indicating the number of similar abilities shared between the five competences and pointing out a quite high overlapping for each comparison. In the end, these considerations are important in order to show how the competences, by the way they were theoretically elaborated, are not independent of each other.

**Table 1.** Number of abilities shared between the five Competences

<table>
<thead>
<tr>
<th>Competences</th>
<th>I. Mastery of language</th>
<th>II. Understanding phenomena</th>
<th>III. Facing of problem situations</th>
<th>IV. Construction of arguments</th>
<th>V. Elaboration of proposals</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Mastery of language</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Understanding phenomena</td>
<td>8</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. Facing of problem situations</td>
<td>6</td>
<td>10</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV. Construction of arguments</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>V. Elaboration of proposals</td>
<td>7</td>
<td>11</td>
<td>9</td>
<td>7</td>
<td>-</td>
</tr>
</tbody>
</table>
This exam already resulted in several data sets since 1998. Taking this data basis into consideration, it is possible to accomplish an empiric verification of the theoretical model of competences and abilities in agreement with facet theory.

In the present article, the model of Competences will be verified from the data basis of the year 2000, composed of 352,487 participants. This corresponds to 23% of the end-of-term students from high school – if we consider the school census of 1999 ($N = 1,535,943$). From the results of these analyses, to be done using the Statsoft STATISTICA 6.0 statistical package, it will be possible to identify the natural groupings of the 21 abilities without superposition or ambiguities and so establish underlying structural properties of facet(s) that represent the universe of the information that compose ENEM problems. The establishment of these facet(s) and its relationships will make it possible to supply support for future and probable problems elaboration and questions on ENEM tests.

2. Method

The sample of this study comprises the 352,487 participants of the ENEM 2000 (59.1% girls and 40.9% boys). The frequency distribution for the year of birth is presented below in Figure 2. More than half of the participants (64.8%) were born in 1983 or later, indicating a majority of individuals aged 17 or less.

The frequency distribution for the monthly family income is presented in Figure 3, below. Based on the mid-points of the seven intervals of income considered in the form, and given a minimal wage value of R$ 151.00 at the time, it is possible to estimate the average income of the sample to be of roughly R$ 2,487.24, which is equivalent to approximately US$ 1,100.00.

About 42.7% of the participants went exclusively to 9th, 10th and 11th grade in public schools, 49.6% exclusively in private schools, and 7.7% to both public and private schools. Estimating again from the mid-points of the seven intervals of income considered in the form, the average income of those who studied in:

- Public schools alone was of roughly R$ 1,038,58;
- Both in public and privates schools was of roughly R$ 2,275,36;
- Private schools alone was of roughly R$ 4,031,70.

Measuring income in the original 1-7 Likert scale used in the ENEM-form, all the differences in income between the three types of schooling are statistically significant ($p<.05$ on the Mann-Whitney U test).
Year of Birth

Fig. 2. Year of birth for the participants of the ENEM 2000

Family Income (No. of Minimum Wages)

Fig. 3. Monthly family income of the participants of the ENEM 2000
3. Results

3.1. SSA Classification of Abilities

The Spearman correlation matrix of the 21 abilities measured with the test (each ability evaluated on a 0-3 scale based on the number of correct responses on three questions) was used as the basis for calculating a distance matrix (1-Spearman Rho). This particular metric was chosen due to the ordinal nature of the variables involved. Such distances were then used in order to produce an SSA where three clearly discernible regions can be identified on the 2D scatter-plot (Figure 4).

![Scatterplot 2D](image)

An axial partition is clearly observed, with three distinguishable regions. A semantic analysis of the abilities in each region shows that, from left to right, the first group corresponds to abilities involving reading, writing, verbal reasoning and so forth (Language), the second one to abilities regarding physics, chemistry, and biology and their applications (Science), and the third one to abilities that have to do with the mathematics of space (Geometry). One could consider the existence of two elements, one being Verbal (Language) and the other Non-Verbal with two "sub-regions" (Science and Geometry), but it seems far simpler and more intuitive to simply consider three distinct ordered elements of an ability-facet.
Considering the Language, Science and Geometry elements as underlying dimensions of the exam, it is possible to create indexes for them based on arithmetical average of the number of correct responses out of the three test items pertaining to each of the abilities that comprise each element of the ability facet.

### 3.2. Logistic Regressions

Considering that 50% of correct answers or more on the exam is equal to “1” and less than that is equal to “0”, it is possible to run a logistic regression analysis using such a dichotomous variable as the dependent one. After doing so with all of the other variables on the ENEM form as independent ones (sex, age, income, level of private schooling, no. of computers at home, access to computers at school, taking or not computer classes, night schooling), the following step-wise models were obtained (Table 2).

**Table 2.** Logistic regression analysis of the performance on Science, Language and Geometry items (50% right or more vs. Less than 50%) as a function of several variables.

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variables and Parameter Estimates</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Chi²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science</td>
<td>No. of Computers at Home (0.39), Income (0.21), Private Schooling (0.18), Night Schooling (-0.37), Computer Classes (-0.38)</td>
<td>68%</td>
<td>64%</td>
<td>391.99</td>
<td>&lt;.0000001</td>
</tr>
<tr>
<td>Language</td>
<td>Income (0.37), No. of Computers at Home (0.31), Private Schooling (0.11), Computer Classes (-0.41), Night Schooling (-0.44)</td>
<td>94%</td>
<td>30%</td>
<td>386.79</td>
<td>&lt;.0000001</td>
</tr>
<tr>
<td>Geometry</td>
<td>No. of Computers at Home (0.32), Income (0.23), Private Schooling (0.10), Age (0.06), Computer Classes (-0.18), Night Schooling (-0.34)</td>
<td>37%</td>
<td>81%</td>
<td>220.58</td>
<td>&lt;.0000001</td>
</tr>
</tbody>
</table>

**OBS:** All models used the Quasi-Newton estimation method and included all the variables with a Ward's probability of .05 or less (other variables being discarded).

The fact that the logistic regression models used for the prediction of the three variables in question all have widely varying degrees of success and a different set of selected predictive variables indicates that such variables have distinct statistical behaviors and associations with other variables. In other words, this confirms that it is reasonably safe to assume that they refer to three separate entities.

### 3.3. SSA of Language, Science and Geometry Skills Plus Socioeconomic Factors

Using dichotomous versions of all the variables investigated (median or higher equals “1” and less than that equals “0”, except when the variable in question is
already binary), so as to establish a common scale, it is possible to do an SSA, associating the socio-cultural variables present in the official ENEM form with the indexes created for each of three elements of the ability facet identified, so as to characterize the relationship between the three cognitive dimensions in question and also between them and the predictive social and cultural variables considered in the logistic regressions mentioned above (see Figure 5, below).

Fig. 5. SSA of the socio-cultural variables and Language, Science and Geometry (Manhattan City-Block - Ward’s Method – Stress = .07 and Alienation = .12 – 2D Scalogram).

A glance at the scalogram above clearly shows that:

- Science and Geometry are more closely associated to each other than to Language;
- Science and Geometry are closely associated to income and to having access to a computer at home, and, to a lesser degree, to private schooling and having access to computers at school;
- Language is also positively associated to income and to having access to a computer at home and, to some extent, with age;
- Science and Geometry show a distant association with the variables age, participation in computer courses and night schooling (negative correlations, as indicated by the coefficients from the logistic regressions summarized on Table 4);
Language seems to have a distant association with the variables private schooling, having access to computers at school, participation in computer courses and night schooling (negative correlations, as indicated by the coefficients from the logistic regressions summarized on Table 4).

The above results tend to further corroborate the notion that the three elements of an ability-facet identified are indeed distinct dimensions each with their particular behavior and associations.

4. Discussion and Conclusion

The SSA study of the multidimensional associations between the 21 abilities measured by the ENEM 2000 showed the existence of an axial structure comprised of three distinct elements (Language, Science and Geometry). A series of logistic regression analyses with indexes for each of the facets as dependent variables produced results indicating different dynamics and explanatory factors for each of them. Therefore, it is safe to assume that the relationship between the 21 abilities can be expressed by a mapping sentence that classifies them into the three distinct categories found.

The three categories arising from the data analysis are in stark contrast to the a priori five-fold classification suggested by the proponents of the exam. The categories that were actually found were mutually exclusive, while the five original categories overlap in two thirds of the abilities or more. Also, while the five-fold classification attempted to divide the abilities according to types of reasoning, the actual three categories found classify them according to subject matter. The bulk of this evidence argues against the validity of the initial classification.

Income, private schooling, computers at home and access to computers at school all showed a positive association with the performance on the exam. Age, participation in computer courses and night schooling all had a negative association.

References

### Table A1. Abilities vs. Competences (1 = evaluates, 0 = does not evaluate)

<table>
<thead>
<tr>
<th>Abilities</th>
<th>I. Mastery of language</th>
<th>II. Understanding phenomena</th>
<th>III. Facing of problem situations</th>
<th>IV. Construction of arguments</th>
<th>V. Elaboration of proposals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>01. Understanding of written descriptions or instructions</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>02. Interpretation of Cartesian plots</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>03. Analysis and interpretation of statistical distributions</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>04. Association between the uses of language in different fields of knowledge</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>05. Interpretation of texts according to sociocultural context</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>06. Analysis of the functions of the variations of language in a text</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>07. Characterization of energy conservation/transformation and its uses</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>08. Understanding of the impacts of using material and energetic resources</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>09. Understanding of the importance of water and its physical variations</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>10. Using different time scales to describe transformations in geographic space</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>11. Knowledge of the structures, patterns and processes of living organisms</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>12. Knowledge of factors associated to human development and quality of life</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>13. Understanding Earth’s bio-system and the impacts of human</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>14. Application of planar and spatial geometry to real-life problems</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>15. Knowledge of Probability and Statistics and their use to actual problems</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>16. Analysis and interpretation of environmental problems and their solutions</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>17. Understanding how materials and energy are obtained and the implications</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>18. Understanding of variety and value of ethno-cultural assets</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>19. Confrontation of the perspectives of history, science, art and common sense</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>20. Understanding of socioeconomic processes and their contexts</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>21. Understanding of history and geography along with their causal factors</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

Total: 11, 17, 14, 11, 15, 68
Chapter 3.

Social Issues - Social Representation, Attitudes, Stereotypes
Modeling Social Representations of European Nations and European Union: A Facet Theory Approach

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Abstract. The goal of the EuroSkyCompass research program is to analyze how cross-national positioning is expressed via attitudes and the social representations (SR) of geopolitical entities (nation, Europe, world, European States), conceived as a system of interrelated representations in relation to North-South-East-West geo-political parameters. Results obtained by WASSA1 and Facet Analysis conducted on the data collected in 2003, one year before EU enlargement, via an Attitude Scale towards 38 European States, (EU Members and Non) took into consideration the subjects' nationality and the polarity indexes as attitudinal measures derived from the Associative Networks with regard to nation, Europe and world.

Key words: Social Representations, Europe

1. Theoretical introduction

The following results reconstruct the social representations (SR) that university students from 9 States, EU members (Austria, Finland, France, Germany, Great Britain, Italy, Portugal, Spain) and non EU members (Tunisia), had about Europe, the EU, and European countries in 2003. These results were extrapolated from a larger body of data collected via a multi-method questionnaire within the scope of a research project (EuroSkyCompass¹) as follow-up of a previous cross- national study on the topic conducted by de Rosa (de Rosa, 1996).

In this paper we are offering some empirical results concerning cultural "belonging", value systems, social representations (SR) and attitudes towards Europe and European States. We assume that the different nationalities and cultural contexts, the various levels of subjects' identification with their own

¹ See website http://www.europhd.psi.uniroma1.it.
nation and Europe, the systems of social categorization associated with those identifications will synthesize and be translated into attitudes towards other European States.

Using Facet Theory (traditionally linked to research on attitudes) to study relationships between national belonging and attitudes towards other European countries, EU members or non-members, is crucial to understand Europe, EU and European States SR dynamics.

2. Methodology

**Data Collection Tools:** For data collection we designed a questionnaire, which integrates projective tools (Associative networks, EuroSkyCompass, Silent Map of Europe) and structured tools (questions on socio-demographic features, questions on countries representing European regions and a seven point Attitude Scale referring to the 38 European countries).

In this paper, we will discuss results about the Attitude Scale and the Associative Networks for the stimuli “nation”, “Europe”, “world” in terms of Polarity Indexes. The Associative networks (de Rosa, 2002), is a verbal association task. To evaluate the implicit attitudinal component in the representational fields, de Rosa suggests the Polarity Index (P.I.) that is determined from the subjects' valence (positive/negative/neutral) for the elicitations of key words. Results vary from –1 to +1 and are recoded in three classes according to their value as: negative (1), neutral (2) and positive (3).

**Data Analysis Techniques:** In order to better understand the complex inter-relationships of such a large data set, a multi-dimensional tool known as Smallest Space Analysis was used. This technique, developed by Louis Guttman, presents the data graphically, portraying the structure of the data. First, a correlation matrix is calculated using the non-linear, regression-free Monotonicity Coefficient.

Points are plotted according to a principle that can be intuitively understood: the higher the correlation between two items, the closer they are on the map and, conversely, the lower the correlation, the further apart they are (Levy 1985). After the basic map is generated, other variables, such as sub-populations, may be introduced as "external variables" (Cohen and Amar 2002). The external variables are plotted, one by one, in such a way that the original structure is not affected.

**Aims and Hypothesis:** We assume that the positioning of subjects of different nationalities vis-à-vis the concepts of “nation”, “Europe” and “world”, measured

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2 PI formula: $IP = (N_{positive} - N_{negative}) / (total\ N\ of\ words)$
in terms of Polarity Index, is in a significant relationship with the system of attitudes that the same subjects express towards European countries.

In consideration of the supposed relationship between the cultural "belonging" of the subjects interviewed (all citizens of EU-15 countries, with the exception of Tunisians) and attitudes towards European states, we conducted a Facet Analysis, according to the following Mapping Sentence, taking into account the status at the time of data collection, in 2003, as EU Member or Non-EU Member of each of the 38 European countries inserted in the Attitude Scale.

3. Results

Sample Profile: The results presented in this section refer to responses from 2228 university students (aged from 18 to 27), of which 57% were men from the above mentioned EU and non-EU countries.

The distribution of the average values calculated relative to the Polarity Indexes (P.I.), for the 10 sub-samples towards “nation”, “Europe”, “world”, shows that, independent of cultural "belongings", the attitudes towards the stimulus "world" are significantly more negative than those towards the stimuli "nation" and "Europe" (values between 2.0 and 2.6).

On the other hand, the attitudes towards “Nation” and “Europe” show average values respectively between 2.3 and 2.9, and 2.4 and 2.8.

Table I shows the average rating received by each of the 38 countries.

The highest rating was given to Italy, the lowest to Albania. More generally, we find positive attitudes towards countries from the European Mediterranean, Scandinavia and Northern Europe and negative attitudes towards Eastern Europe. The best-liked countries did not correspond to the perception of the economically more powerful countries, which even among themselves did not have homogenous results.
Table 1. Average of responses to question: “To what extent do you like each of the following countries (1 = not at all, 7 = very much)”

<table>
<thead>
<tr>
<th>Country</th>
<th>Average rating</th>
<th>Country</th>
<th>Average rating</th>
<th>Country</th>
<th>Average rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest-Rated</td>
<td></td>
<td>Mid-Rated</td>
<td></td>
<td>Lowest-Rated</td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td>5.34</td>
<td>Germany</td>
<td>4.35</td>
<td>Lithuania</td>
<td>3.42</td>
</tr>
<tr>
<td>Spain</td>
<td>4.98</td>
<td>Iceland</td>
<td>4.27</td>
<td>Romania</td>
<td>3.39</td>
</tr>
<tr>
<td>France</td>
<td>4.90</td>
<td>Belgium</td>
<td>4.00</td>
<td>Slovenia</td>
<td>3.38</td>
</tr>
<tr>
<td>Greece</td>
<td>4.84</td>
<td>Hungary</td>
<td>4.00</td>
<td>Bulgaria</td>
<td>3.36</td>
</tr>
<tr>
<td>Portugal</td>
<td>4.75</td>
<td>Austria</td>
<td>3.95</td>
<td>Slovakia</td>
<td>3.33</td>
</tr>
<tr>
<td>Netherlands</td>
<td>4.74</td>
<td>Luxembourg</td>
<td>3.91</td>
<td>Macedonia</td>
<td>3.27</td>
</tr>
<tr>
<td>Sweden</td>
<td>4.74</td>
<td>Czech Rep.</td>
<td>3.89</td>
<td>Ukraine</td>
<td>3.22</td>
</tr>
<tr>
<td>Ireland</td>
<td>4.64</td>
<td>Poland</td>
<td>3.82</td>
<td>Federal Rep. of Yugoslavia</td>
<td>3.18</td>
</tr>
<tr>
<td>Great Britain</td>
<td>4.60</td>
<td>Turkey</td>
<td>3.68</td>
<td>Moldova</td>
<td>3.15</td>
</tr>
<tr>
<td>Norway</td>
<td>4.60</td>
<td>Russia</td>
<td>3.58</td>
<td>Bosnia</td>
<td>3.05</td>
</tr>
<tr>
<td>Switzerland</td>
<td>4.54</td>
<td>Estonia</td>
<td>3.50</td>
<td>Belarus</td>
<td>2.97</td>
</tr>
<tr>
<td>Finland</td>
<td>4.46</td>
<td>Latvia</td>
<td>3.47</td>
<td>Albania</td>
<td>2.69</td>
</tr>
<tr>
<td>Denmark</td>
<td>4.44</td>
<td>Croatia</td>
<td>3.45</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In fact, Germany is the least liked among those defined as "Big Bosses" (Great Britain, France, Germany), while France has average results more in line with those of the Mediterranean countries.

Results via WSSA1: The SSA data map concerning the Attitude Scale towards European countries is shown in Fig.1. This is, at the same time, the respondents' cognitive and attitudinal map towards the various countries (EU members and Non-members). In this map we can recognize four regions that correspond to the geopolitical structural configuration of Europe: North-West, South-West, North-East and South-East. The western half of the map shows more distinction between the countries, while many of those in the North-East are grouped closely together, indicating a lack of distinction between them in the minds of the respondents. Russia is set somewhat apart from other Eastern European countries.

Turkey is isolated in the South-East region, reflecting the special role played by this country in the political discourse in media agenda setting.

Figure 2 shows the same map with the subjects' nationalities added as external variables.

We can recognize three basic attitude types: those who are located in the same region as their home country (English, Austrians, Finns and Italians), those located in a different region from their home country (Spanish, French, and Germans) and North African immigrants, located at the periphery of the map. This result would require extensive comment and theoretical discussion.

Figure 3 shows the basic map with sub-populations of subjects according to 3 Polarity Indexes (P.I.), negative, neutral and positive, related to “nation”, “Europe” and “world” introduced as external variables.

\[3\] In figure 3 IP49 = Polarity Index for Nation; IP50 = Polarity Index for Europe; IP51 = Polarity Index for World.
**Fig. 1.** SSA of the results of rating 38 European countries

**Fig. 2.** SSA of the results of rating 38 European countries with respondents' nationality as external variables
We underline that the Positive P.I. for “nation”, “Europe” and “world” are associated with the West and South on the chart, where the group of European Mediterranean countries is located.

At the edge of the South-East quadrant, where Turkey alone is positioned, only the Negative P.I. for “Europe” is shown. The countries usually defined as Eastern European are, instead, in a quadrant in which are shown the Negative P.I. for “nation”, inside the cloud of internal variables, and the Neutral P.I. for “nation” outside. The other European countries (North Central Europe) are placed in the North-West quadrant, where the Neutral P.I. are shown for “world” and “Europe” and, on the border with the North-East quadrant, the Neutral P.I. for “nation”.

**Facet Analysis:** Figure 4 presents the results of the Facet Analysis, in which, consistent with the Mapping Sentence offered, 2 facets were identified concerning attitudes expressed towards European countries: one for the countries that in 2003 were already members of the EU and one for those countries that in 2003 were not yet EU members. One year later in 2004, 10 of the latter became part of the enlarged EU.
The exceptions are Switzerland and Norway, which are found in the area of EU members even though they are not EU members. These positions can be explained by the effect of the cultural "belonging" of the subjects interviewed. All of the subjects interviewed were from countries that are geographically and culturally close to these two Non-EU states. Particularly Norway is in an area where the Scandinavian countries are closely grouped together and the subsample of Finns is shown as external variable (fig.2).

Finally, if we break down the attitudinal dimension expressed by the averages and the structural aspect of the S.R. (fig.1, 2, 3), it clearly emerges that the lowest average values are attributed to countries that make up the non-EU member facet.

4. Conclusions

Concerning the attitudes of subjects from 10 different cultural "belongings" towards European countries, the results discussed above confirm the complexity of that system of attitudes and its sensitivity to various influence factors.

On the basis of the results discussed, cultural "belonging" seems to be expressed more via identification of citizens with the block of EU member countries (even if differentiating among themselves via the North-South border) than via identification with their own country, with a few exceptions.
On one hand, the WSSA1 results in which subjects' nationality is introduced as external variable (fig. 2) in which only some cases show a significant relationship between the attitude towards the 38 Countries and the subject's nationality.

On the other hand, the results of the Facet Analysis (fig. 4) show a significant effect of EU membership on the attitude of subjects who are mainly EU citizens towards the EU.

In addition to the structure of the data concerning attitudes towards European countries, we referred to the direction of those attitudes (using the averages) that is positive towards countries of the EU member facet.

Faced with this idealized representation of Europe, one cannot say that the WSSA1 results support the representation of a strongly integrated Europe: in contrast with the region occupied by the European Mediterranean countries (delineated by the triangulation of the 3 Positive P.I., for nation, Europe and world, and the negative polarity index for world), we find those areas occupied respectively by the Eastern countries, delineated by the Negative and Neutral P.I. for nation and the Negative P.I. for Europe and those occupied by all the other European countries marked by the position of Neutral P.I. (for nation and Europe).

References


Exploring the Structure of Social Representations of the Euro via Facet Theory Approach and WSSA1 Procedure

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Abstract. This paper looks empirically at the structure of the Social Representations (SR) of the €, via the Facet theory approach. Hypotheses: 1. The flowing of Time and the subsequent growth in use frequency of the € (T/F), the Age (Ag) and the Educational level (E), determine various modalities related to the € usage (A), knowledge of € political-economic phenomena (B), exposure to various familiarization channels (C), as well as attitudes towards the € (D); 2. A, B, C, D in turn influence familiarization with the currency, operationalized in terms of recognition of banknotes and coins (E). These hypotheses were confirmed.

1. Introduction

The introduction of the € in January 2002 was an exceptional political and economic event with repercussions at the national, European and international level. For this reason the € has been the object of studies concerning cognitive implications (Legrenzi, 2001; Lemaire & Lechacheur, 2001; Mussweiler & Strack, 2004), or that deal with identity dimensions (de Rosa & Mormino, 2002).

2. Methods

A semi-structured questionnaire was administered to 239 subjects working in different contexts in Rome between March and June 2002.

The questionnaire contained the following areas: socio-demographic data, currency’s practices, political/economic knowledge about the EU and the €, familiarization agents and communication systems, attitudes towards the € and recognition of € banknotes and coins (four white sheets printed with facsimiles of the banknotes and the coins, both front and back, were shown to the subjects).
The study was based on the following hypotheses:

a. The influence of the flowing of time and the subsequent growth in the use frequency of the € (T/F), the differences between the subjects in terms of age (Ag) and education level (Ed), determine various modalities related to the use (A), the knowledge of political-economic phenomena (B), the exposure to various familiarization channels (C), as well as attitudes towards the € (D).

b. Each of those aspects (A, B, C, D), in turn, influence familiarization with the currency operationalized in terms of the interviewed subjects' ability to recognize banknotes and coins (E).

Once the Mapping Sentence was constructed (Fig. 1), the data was analyzed using the Hudap package (release 4). The following procedures and analyses were used on this occasion:

**MONCO:** it provided Guttman's Weak Monotonicity Coefficients matrix for the couples of variables under analysis. We used this matrix as input in WSSA1 procedure. Monotonicity Coefficients are non-linear type correlation coefficients that vary between −1 and +1.
**WSSA1**: is a multi-dimensional method of analysis useful for understanding the interrelational structures between variables based on the calculation of a distance index (Guttman's Coefficient of Monotonicity) then translated into spatial terms.

The WSSA1 envisages the use of *external* variables which do not take part in the determination of the data structures, but which are projected onto the “geometric” structure that is built, without altering it. To begin by Space Diagram, an output of the *WSSA1*, it was obtained a Facet Diagram.

### 3. Results

**Sampling features**: Concerning age (codified as: 18-30, 31-65, over 65): 65% of the 239 subjects were aged between 31 and 65, 92% were between 18 and 65. Concerning the level of education (primary school, secondary school, university) 66% were people who obtained a secondary school diploma. The results of the first (March-April, 57%) and second (May-June, 43%) rounds of administration were balanced.

Concerning the monotonicity coefficients for these 3 variables:

- the correlation coefficients for the variable *Age* in most cases have a negative value. In particular *Age* is correlated in a strongly negative way with *School*, the majority of the variables related to *payment systems* and to *knowledge*, all the variables of *familiarization systems* (except shopping 0 and radio .10) and the *attitudes variables*. Age is also correlated positively with the variables concerning the dimension *recognition ability*;
- the *educational level* (*School*) presents a positive trend of correlations with 18 of the 28 variables adopted in the *WSSA1* as internal variables, and a negative one with all the variables concerning to the *recognition ability* of the €, as well as some of those tied to the *knowledge*;
- *time* presents negative correlations with most of the variables concerning the *attitudes dimension, familiarization systems*, and *use practices*, and positive with those that indicate *knowledge* and *banknote recognition*, both front and back.

As it is dealing with a complex representational object, the interviewed subjects' relationship with the € (Fig. 2) is defined along various dimensions, on the theoretical level hypothesized as interdependent, such as:

- *dimension of use practices concerning the currency*: coins, banknotes, checks, debit card and direct debit;
- *knowledge dimension* (both as object and symbol): € differences among European countries, knowledge about the € banknote symbols, knowledge about the € coin symbols, knowledge about €-£ exchange, coin and banknote security features, countries that did not join the Euro-system in 2002 (Denmark, UK, Sweden);
- **transactional dimension**: communication systems (television, newspapers, radio, advertisements, Internet) and familiarization agents (shopping, bank clerks, postal clerks, everyday transactions) to which subjects are exposed;
- **attitude dimension** concerning the novelties that are introduced into the practice/economic transaction system on various levels: Changeover Perception, Advantage-Disadvantage of € introduction;
- **cognitive dimension**: Recognition of banknote front, Recognition of banknote back, Recognition of coin front, Recognition of coin back.

From the WSSA1 results a circular structure emerges in which it is possible to identify three rather distinct regions: one region where the two dimensions are mixed (the first concerning the practices dimension and the second the attitudes toward the € dimension); a region in which are located the variables concerning currency use practices and therefore the € “as a vehicle of exchange”; and a third region occupied by variables belonging to the **cognitive and the knowledge dimensions**. Considering the position of these regions in relationship to each other, emerge that: two regions are very close to each other (the region occupied by variables concerning the communication systems and the attitudes toward the change and the one which is occupied by variables related to currency practices/use), while the other region occupied by variables concerning the **cognitive and the knowledge dimensions** is clearly distanced from the previous two.

**Fig. 2.** SSA: variables concerning the subjects' relationship with the representational object, the Euro
In order to better understand the role of the socio-demographic variables (age, education level and time/use frequency of the €), it was necessary to insert them into the WSSA1 as external variables. We hypothesized that these variables can influence the dimensions of familiarization systems, the attitude towards the change and the use practices of the subjects, even if in a non-deterministic way.

These three variables behave differently in relation to the emerging data structure: two variables (education level and time passed) are projected inside the structure and the third variable, age, is projected outside that structure (in function of the negative correlation with most of the internal variables) on the boundaries of the Space Diagram.

The education level is projected in an intermediate position between the region occupied by the variables relating to exposure to various familiarization systems and the attitudes towards the currency change and the dimension containing the various kinds of practices concerning the use of money.

In accordance with the distribution of the sample frequencies (Fig. 2) the education level, is close to the variables related to concrete modalities of currency use (use of money instead of credit cards, checks, etc.), to the subjects’ exposition to € daily practices systems (as shopping), to the possibility of interpersonal relationships (as bank and public service professionals).

On the other hand, the variable time is located in the center of the region occupied by the variables concerning the cognitive dimension. This result confirms the hypothesis of a relation between the variables related to the knowledge concerning the € and the recognition ability for both coins and banknotes, and the one related to the flowing of time, as an indicator of the increase in terms of use frequency for the €.

**Facet Analysis Results**

Facet A defines the use practices dimension that runs from more concrete to more abstract modalities. As was already found in the SSA results (Fig. 2) and confirmed in those of the Facet Analysis (Fig. 3), the variables belonging to this dimension are organized in a well-delineated zone of the space.

Facet B also appears strongly coherent, with all the variables that define it organized in a well-delineated region of the space (with the single exception of the No-€-Country variable), on which was shown a modular circular process of regionality.

On the geometric as well as the conceptual plane, facet B is strictly linked to facet E (identifiable with the recognition of € coins and banknotes) containing the variables much more related to the cognitive dimension.

Also facet C, the transactional dimension, whose variables are ascribable to familiarization agents and communication systems, results relatively coherent despite the fact that in the same space are also found the facet D variables (the attitudes dimension concerning the currency changeover).
The overlap of these two facets is explained by the correlation of the two facet D variables (Changeover Perception and Advantage-Disadvantage of € introduction) with the variables that represent the communication systems of Facet C.

**Fig. 3.** Data according to different facets and their regionality coefficients
In conclusion, the organization of variables belonging to each facet, as well as their strong concentration in specific regions of the Space Diagram and the high level of regionality coefficients confirm the coherence of the construction/operationalization of each of the dimensions considered in the questionnaire.

4. Conclusions

Using the Facet Theory in tandem with the Social Representations Theory allowed us to reach the goal of unifying structural and relational complexities with a systematic treatment of the familiarization processes indicators concerning the € (Cohen, 2000).

The results of Facet Analysis showed how 5 dimensions appeared internally coherent: transactional, attitudinal dimension, use practices dimension, cognitive dimension, recognition dimension.

On the basis of the projection of the external variables, we can attribute the distinction between the two halves of the Space Diagram (on one side variables concerning the transactional, attitudinal and use practices dimensions and, on the other, the cognitive dimensions), to the fact that they are substantially different in their evolution modalities and in the influencing factors.

In the case of the first three dimensions, the effect of subjective variables seems to prevail, such as the subject's education level. However, in the case of the cognitive dimensions, it seems to prevail the context variable concerning the flowing of time and therefore, an increase in use frequency.

Age is only partially involved in the phenomenon, intervening in regulating some of the use practices of money.

The hypotheses are confirmed to the extent that the combination of effects concerning various dimensions of the relationship between the subjects and the new currency is, in turn, influenced by the interaction of different population variables attributable to the subject (education level) and the context (time passed/use frequency).

References


National Stereotypes of Slovenians and Italians by Slovene Students of Psychology

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Abstract. In the present study, we were interested into the comparisons of the perceptions of »Slovenians« and »Italians« as target nations. Fiftynine students of psychology (mostly females) from University of Ljubljana participated in the study. Three elements of the first facet were 1/respondent’s own perception, 2/his/her perception of similar perceptions form the side of the “average Slovenian” and 3/“average” Italian. The third facet is composed by five elements/evaluating attributes (agreeable, intelligent, with future, open and warm). Responses were given via 7 point bipolar evaluative scale and lower value always meant higher intensity of positive pole. A total of 30 items (structuples) was generated from the mapping sentence, which combined three facets with correspondent number of their elements (3 x 2 x 5). Axial, modular and polar solutions were tested for each facet. The first facet was confirmed only partially. Axial and polar solutions formed distinctive regional solutions only for perceptions of »Italians perceiving Italians« and for perceptions of »Slovenians perceiving Slovenians«. Only the existence of the second facet (“evaluated nation”) was completely and evidently confirmed with all three approaches. Structuples containing Italians were grouped together and separately from the group containing Slovenes as target category. The third facet was identified by no regional solution of any approach.

Key words: identity, inter–group relation, national stereotypes/perception, evaluation, facet analysis

Identity and Inter–Group Relations

Individual and Social Identity

Erikson (1950) was one of the first, who paid attention to the notion of individual identity; Henry Tajfel and John Turner in eighties (Tajfel, 1990; Tajfel, 1982) induced the term »social identity« and »social categorization«, which does not coincide completely with the notion of social categorization as process, underlining different cognitive classification processes, resulting in different cognitive categories and taxonomies of meaning. According to Tajfel,
social identity is part of the self concept, which forms his consciousness of membership in different groups, together with the values and other social orientations. From this point of view, also the »national feeling« could be partially interpreted from the aspect of »minimal paradigm« approach.

Concept of »social identity«, which is not derived only from the »minimal group paradigm«, is an interdisciplinary notion. It could be treated from the sociological, psychological, ethnological, anthropological and many other points of view.

No definition of social identity could avoid the psychological approach. It could not be separated from the individual or personal identity. National, cultural, professional and occupational identity are different categories of social identity. Actual contribution is focused on national identity and related variables.

Another central socio-psychological term, connected with the term »social/ national identity« is socialization. It can't be explained without notions of social interaction, social influence and processes of social learning. In such a framework, social/national identity is treated as result of social learning, resulting also in the collection of interiorised or internalized social roles. It is also the effect, influenced by different social agents/factors in different national and cultural context (family, school, group of friends, social institutions, church, media, organizations). Like social identity, also the national identity is the function of consistency of the influence of different social factors and of type of social learning (Rus, 1994).

Social identity is phenomena, closely related with the group structure, processes, climate and culture. Role playing is an important active aspect of social identity, expressed also »through« group processes of co-operation, competition, cohesiveness, conflicts and ways of their resolution. These processes could be characteristics of intragroup/national or intergroup/ international social dynamic.

Social identity is a dynamic psychological process, based on relevant attributes of group structure, climate and culture. Societal levels of those attributes are characteristics of national identities, which could also be analyzed as the result of social categorization, which is basic process of any cognitive function: perception, learning, thinking.

Methodology, elaborating the (psychological) field of social/national identity, could not be reduced only to laboratory experiment, even if it's validly simulated. Exclusivity of such an approach can't give satisfactory answers to the holistic answers of social identity – the shift from the narrow laboratory framework to the area of more holistic approach is needed, demanding additional domains of social knowledge. The following domains are also worth to be mentioned: knowledge about macro-social systems, about economics and knowledge, including political, cultural and national aspects of relevant
problematic. Knowledge connected with national history is an inevitable informational element for so called “social construction of reality”.

**Inter-Group Relations and Category of Nation**

We belong to different nations, races, social classes, religions or ethnic groups (Tajfel, 1990).

Relations between different large-scale groups (ethnic, racial, social, and, of course, national) are substantial for so called social conflict. They are interdisciplinar categories with significant psychological implications.

Relations between large scale social groups can take into account three complementary approaches, defined by Tajfel (1990) as cognitive aspects of intergroup relations, social psychological effects of intergroup conflict and the relationship between intergroup conflict and social identity.

Causal attributions concerning behavior of other people also belong to cognitive aspects, but the development and functioning of social categories could be perceived as cognitive and social in the same time. Cognitive aspects of intergroup relations underline also close connection between the process of categorization and stereotypes' development.

Emerson (Tajfel 1990) defines nation as a body of people, who feel, that they are a nation (tautology); he underlines the »felt« common identity of a national group as its ultimate criterion.

On the other side, it's quite unlikely, that national group could be defined only through certain similarities. Also the Lewinian criterion of the »fate interdependence« is insufficient for the definition of the nation. That's why »the most important similarity left is that the individuals concerned are consensually referred to by a common label, both by other people and by themselves, and that this common label defines at the same time their national group membership and circumscribes the variety of social situations in which they feel or behave as a function of that membership« (Tajfel, 1990, p. 425).

Nationality is only one of a number of aspects of someone identity, which could be labeled and discriminated. Racial and ethnic identity are a significant point for prejudiced attitudes. Inter-national relations are a complex level of manifestation of large scale inter–group relations.

Psychological aspects of international relations could be derived from different frames of references. Triandis (1971) theorizes about two basic and independent dimensions of human behavior: evaluation dimension and avoiding vs. approaching dimension. These two dimensions could be treated also as perceived distance between the communicators (“approaching vs. avoiding”) and as evaluation of communicational situation. When the communicator is in particular representative role (like the “representative of the nation”), inter–personal relation could be interpreted as intergroup or international relation. In
such a case, the notion of the “representative role” is very helpful for explanation of relation between social identities.

**Facet Approach and National Perceptions/ Stereotypes**

**Facet Approach**

The most prototypical data analysis technique, connected with facet theory, is SSA (Smallest Space Analysis) or MSSA (multidimensional similarity structure analysis). Guttman preferred to call MDS as SSA (Borg & Shye, 1995).

Facet diagram could be partitioned in three main ways: axial (parallel and straight lines), radial (concentric circles) and in angular (by rays, emanating from a common origin). All these ways form different geometrical forms. Combination of an angular and radial facet, having a common origin, constitutes a radex, addition of an axial facet in the third dimension renders a cylindrex etc. Guttman's radex formed a basic feature in his theoretical view of the structure of intelligence, abilities and attitudes (Lingoes, Tucker & Shye, 1988). In the case of our research, three facets were supposed to describe the possible intergroup relational “model”: reference of perceptions (evaluations), perceived (evaluated) social categories and evaluating continuums.

**Perceptions and Stereotypes**

One of psychological expressions of the social identity are attitudes toward self and toward other groups and individuals. Stereotype could be explained as special kind of attitudes, in the sense of generalization about a group of people in which the identical characteristics are assigned to virtually all members of group, regardless of actual variation among the members (Aronson, Wilson, Akert, 1999).

Instead of the people’s thinking, that they should not judge a specific person from stereotypical information only (Scadron, Yzerbit, Leyens & Rocher, 1994), stereotypical intergroup perceptions are quite often everyday psychological phenomena. According to Katz and Braly (1933, Smith & Bond, 1998), people can hold intense stereotypes about persons from other cultural and ethnic group, even if they have never met these people.

Stereotype could be treated also as the kind of social perception (categorization). »Social categorization« (Tajfel, 1979, 1982), where characteristic of the group are attributed to every member of the group results, according to Tajfel, in two contrast categories of “in-groups” and “out-groups”, with attribution of positive and negative characteristics. It also means the underestimation of the differences between »in-groups« and analogous overestimation of the differences between »outgroups«. Inter–national
perceptions could be the example of such a dichotomization, known also as ethnocentric perception.

Analysis of interpersonal and inter-group perception is connected with attempts to answer the questions: WHO, WHOM and HOW? In actual research, categories connecting the possible answers to these three questions are also »our« three facets. In this framework, the first facet is the »reference of perception«. It has three elements: respondent's own perception and her or his perception of a/ average Slovenian perception of Italians and of b/ average Italian perception of Slovenians.

**Perceived Social Categories/Nations**

Peabody (1985) discovered, that students' autostereotypes of their own nation were in average more no more positive, than their heterostereotypes of other nations, but earlier studies have almost always found in–group bias. (Peabody's results are somehow incompatible with social identity theory. Possible explanation takes into account, that nation is maybe not an important element of identity for student respondents.)

Mlicki & Ellemers (1996) found Polish students more negatively oriented towards Polish and more positively toward the Dutch. This »feeling of inferiority« of nations could generate from transitional social contexts. On the other side, there is a stereotype (in Slovenia) about Polish positive autostereotype - stereotypes about other stereotypes could be quite different perceptions and the results could be sometimes surprising. Personnaz (1996), for example, found French students identified more with Europe than with France.

Some studies do not find in–group bias in stereotyping. Where autostereotypes are negative, nation–members can choose alternative superordinate identities (Smith & Bond, 1998). Social identity and social dominance theory are in the core of explanation not only of national stereotypes, but also of some other large–scale groups. Social dominance could expect a generally accepted hierarchy of national identities.

In actual research two elements of “perceived nation” facet were chosen: »Slovenians« and »Italians«.

**Evaluating Continuums**

Most studies of national identity ask the participants to select adjectives, evaluating target nation. Buchanan (1951, Hayes, 1994)) investigated national attitudes in nine different countries and discovered a significant agreement between the evaluators: Russians were evaluated as domineering, brave, hard working, English like self–controlled, conceited and intelligent, American as practical etc.. A set of stereotypes for seven Western European nations discovered, that traits, attributed to other nations were classified in categories of
efficiency, dominance, empathy and emotionality (Linssen and Hagen-doom, 1994).

In actual research, evaluation was the third facet, having five elements, expressed as bipolar evaluating continuums (agreeable vs. non-agreeable, intelligent vs. non-intelligent, nation with Future vs. without future, open vs. closed and warm vs. cold).

**The Purpose of the Research**

In the actual research, we are interested into the question, if the SSA solution will confirm our three facet “model” of inter–national perceptions/stereotypes. We do not expect the random distribution of the points (structuples) in the SSA space. The main purpose of our research also is connected with the goal to obtain the additional “introductory” information for the further work on the studied area.

**Method**

**Participants**

Fifty-nine undergraduate students of psychology (the 3\textsuperscript{rd} year of the study – age from 20 – 21 years, six males) from the Faculty of arts (University of Ljubljana) participated in the study in the autumn 2004.

**Mapping Sentence and Applied Instruments:**

Three facets could be combined to form the following mapping sentence. Six equal semantic differentials with five bipolar continuums were constructed.

\[
\begin{array}{ll}
A & B \\
\text{Student (x) supposes, that from} & \text{(1. her/ his own side)} \quad \text{(1. Slovenians)} \\
\text{ (2. the side of average Slovenian)} & \text{(2. Italians)} \\
\text{ (3. the side of average Italian)} & \\
\text{C. (high)} & \text{are evaluated like (agreeable)} \quad \text{====> to evaluation} \\
\text{(intelligent)} & \text{(low)} \\
\text{(with future)} & \\
\text{(open)} & \\
\text{(warm)} & \\
\end{array}
\]

The following questionnaire was applied (only the first five items/structuples/ are presented as in questionnaire):
You personally think, that Slovenians are:
1/ Agreable <<< <<< < 0 > >> >>> nonagreable
2/ Intelligent <<< <<< < 0 > >> >>> nonintelligent
3/ With future <<< <<< < 0 > >> >>> without future
4/ Open <<< <<< < 0 > >> >>> closed
5/ Warm <<< <<< < 0 > >> >>> cold

You personally think, that Italians are: 6/ agreeable …, 7/ intelligent …, 8/ with future, …, 9/ open, … , 10/ warm, …

You think, that majority of Slovenians (an “average” Slovenian) evaluate Slovenians like:
11/ agreeable …, 12/ intelligent …, 13/ with future, …, 14/ open, … , 15/ warm, …

You think, that majority of Slovenians (an “average” Slovenian) evaluate Italians like:
16/ agreeable …, 17/ intelligent …, 18/ with future, …, 19/ open, … , 20/ warm, …

You think, that majority of Italians (an “average” Italian) evaluate Slovenians like:
21/ agreeable …, 22/ intelligent …, 23/ with future, …, 24/ open, … , 25/ warm, …

You think, that majority of Italians (an “average” Italian) evaluate Italians like:
26/ agreeable …, 27/ intelligent …, 28/ with future, …, 29/ open, … , 30/ warm, …

Results

Facet Solution

In the case of our research, the acceptable coefficient of alienation (= 0.17) was obtained for the 3 – dimensional solution.

Fig. 1. SSA projection showing the references of perception facet – axial solution
Fig. 2. SSA projection showing the perceived nationality facet – axial, modular and polar solution

*Note*: A = axial; P = polar solution.

Fig. 3. SSA projection showing the evaluation facet – axial solution

**Discussion**

A three dimensional solution was only partially adequate to portray the relations among the variables. The solution is based on the acceptable coefficient of alienation (= 0.17).

Although the research has demonstrated the separability of the “perceived reference of perception facet”, the elements were not separated accurately according to our expectation. In Fig. 1, there is a partition into regions in partial accordance with elements of the “perceived reference of perception” facet. Three regions correspond to “Slovenians” as “perceived perceivers”, “Italians” as “perceived perceivers” and to “Slovenians” and respondents themselves. Respondents themselves were not located in their own region. The partitioning of this facet into the parallel regions does not fully indicate, that the “perceived perceptions” are ordered along a single continuum. In the case of the first facet,
it’s just the axial solution, which better than modular or polar lightens some trends of partitioning. It’s worth mentioning, that proximity among the responses from the side of respondents and their perception of the responses form the side of Slovenians does not include “Slovenians, who evaluate Slovenians”.

In Fig. 2, all three solutions are presented together: axial, modular and polar. It could be evidently seen, that any of these three solutions confirms the facet of perceived/evaluated nations (“Slovenians” and “Italians”).

In Fig. 3, no regional solution according to five elements of the facet “evaluating continuums” could be identified. In this case, the axial solution was chosen only to illustrate the proximity’s among structuples, which evidently does not confirm our expectations. On the other side, neither modular, nor polar solutions show different image.

The results of this study support the nation as “target category of perception” facet and only partially confirms the “perceived reference of perception” facet. No support was found for the “evaluative attributes” facet. No expected differentiation was made between the different evaluative attributes (see Fig. 3). One of the explanations, offered for this finding, can maybe take into account diversity of bipolar attributes, forming different evaluative continuums. Some continuums were more, the other less similar. That’s why some of them could be classified into the separated facet. A little bit more careful insight into the Fig. 3 shows, that specially “warm – cold” and “open – closed” are more than others grouped into the same region.

Before concluding, it’s worth addressing the following methodological issue: how to select the attributes for the inter-national evaluations, specially in the case of cross-cultural researches? In our case, we’ve done it so, that we’ve compared the results of our previous researches, choosing the bipolar continuums, which seemed to be relatively most representative indicators of “national character”. They were chosen also on the basis of the simplicity and non-doubtlessly of the “foreword–backward” cross-cultural translation (contrast analysis). Anyway, it’s evident, that just this point of view of our research is the weakest one. That’s why present findings indicate, that our starting point can be reconsidered and that additional work is required specially connecting the conception of the third facet. Finally, there is a need to examine whether the manner in which up to date national perceptions/stereotypes have been relatively most frequently measured (used also in the actual research) is really the most adequate one.

It would be also needed to establish the structure of our construct also within other, specially evaluating domains, and inside other populations. It seems, according to our further pilot researches, that the reference group, used in the present study would not be completely relevant outside the university population.
References


The Underlying Dimensionality of the Survey of Cultural Attitudes and Behaviors

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Abstract. The SSA solution of the 51 items of the Survey of Cultural Attitudes and Behaviors yielded a two dimensional solution with .14 coefficient of alienation, indicating an acceptable match to the original items interpoints. The survey was administered to 873 faculty members in a U.S. national sample of teacher and counselor education institutions. The first dimension separates between items that relates to others versus items that relate to self. The second dimension relates to passive awareness (or cognitive saliency) versus action (or observations of biased behaviors). It is of interest to note that there was no distinction between attitudes and actions related to sexism, poverty, or racism, while attitudes towards sexual orientation cluster separately.

1. Survey of Cultural Attitudes and Behaviors

1.1. Framework

The Survey of Cultural Attitudes and Behaviors (SCAB) is a theoretically based questionnaire designed to investigate (a) cultural attitudes, (b) cultural behaviors, and (c) perceptions of institutional support for culture-fair policies and practices. These three categories comprise cultural dimensions. Assessment in each dimension occurs in four domains: race, sex, sexual orientation, and social class. This three dimension by four domain matrix was used for the development of survey items (see Table 1). For each dimension by domain intersect, four constructs from the multicultural literature were used to develop items across each of the four domains (e.g., an attitude item related to race, a behavior item related to race). The response format was a 7-point, Likert-type scale. The wording of items was varied to eliminate a response pattern. For some items strongly agree reflected bias, for other items strongly disagree reflected bias. Items were recoded during data analysis so that higher numbers reflected greater bias.
**Table 1. The 3 X 4 Dimension by Domain Matrix and Theoretical Constructs with Survey Items Numbers**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Attitudes</th>
<th>Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extent of the Problem</strong></td>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Awareness of existence and/or extent of the problem.</td>
<td>21</td>
<td>G</td>
</tr>
<tr>
<td>Believing the Victim</td>
<td></td>
<td>SO</td>
</tr>
<tr>
<td>Belief that the target group creates its own problems.</td>
<td>20</td>
<td>SC</td>
</tr>
<tr>
<td>Differences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief whether status as a member of group a results in differences in aptitude, ability, commitment, etc.</td>
<td>30*</td>
<td></td>
</tr>
<tr>
<td><strong>Personal Reactions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responses to “I would be offended if .......”</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td><strong>Social Distance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extent of personal involvement with members of the target group.</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Advocacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extent to which respondent supports efforts or engages in activities to rectify instances of cultural injustice.</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Teaching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extent to which respondents teach or address identified issues in their classrooms.</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td><strong>Personal Behaviors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extent to which respondents engage in behaviors related to identified cultural problems.</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td><strong>Institutional Support for Policies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commitment to Policy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceptions of institution’s commitment to enforce policies and practices designed to create a culture-fair learning environment.</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Effectiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceptions of effectiveness of training program in preparing graduates who are qualified to work with members of target groups.</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem behaviors observed in other faculty as they relate to target groups.</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Discussions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extent to which respondents perceive departmental faculty addressing and discussing specified cultural issues and their consequences.</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Notes: R = Race, G = Gender, SO = Sexual Orientation, SC = Social Class
* Reliability items: Item 4 for 30; Item 7 for 17; Item 26 for 13.
Items in the attitude dimension were constructed based on Allport’s (1954) two-component definition of prejudice: attitudes (i.e., favorableness) and beliefs (i.e., overgeneralized cognitions). These items were written to evoke responses based on such mental phenomena as inclinations and preconceived opinions as they relate to cultural issues. Constructs used to develop attitude items included extent of the problem, blaming the victim, cultural differences as the source of problems, and personal reactions to incidents of cultural bias or discrimination. The same constructs were used to create items in all four cultural domains.

The behavior dimension was designed to measure personal discrimination or behaviors that reflect different treatments of individuals based on their cultural group membership (Gollnick & Chinn, 1994, p.107). Constructs used to capture discriminatory behaviors included social distance, advocacy, classroom teaching, and personal behaviors.

The institutional support dimension was constructed as a measure of institutional cultural bias and/or discrimination. Educational institutional policies frequently create discriminatory outcomes for members of one group over another (Baruth & Manning, 1991). Constructs in the domain of institutional support included commitment to institutional policy, program effectiveness, observations of colleagues’ behaviors, and discussions of diversity.

1.2. Sampling Procedure and Sample

A cluster sampling procedure was used to select teacher education and counselor education faculty members. One state from each of 10 U.S. regions was randomly selected. The Survey of Cultural Attitudes and Behaviors (Miller & Miller, 1997) was mailed to faculty at 50% of the teacher education programs and all counselor educational programs. Eight hundred seventy three faculty responded.

Approximately the same number of male (375, 46%) and female (446, 54%) faculty responded. Most faculty participants (n = 772, 90%) were White. The remainder of the sample was comprised of 43 (5%) African-Americans, 16 (2%) Hispanic faculty, 9 (1%) Asian American faculty, and 6 (<1%) American Indian faculty. Eleven respondents (1%) reported "Other" as race. Respondents were almost equally divided across academic rank. Seventy one percent taught at public institutions. Almost half taught at institutions (public or private) with an enrollment under 15,000 students.

2. Smallest Space Analysis

Smallest space analysis was conducted to provide a richer understanding of the phenomenon under investigation. Two value-added aspects of SSA and multidimensional scaling (MDS) (L. Guttman, 1968; Kruskal, 1964) were of
interest: identification of missing variables and a multidimensional understanding of the data.

Smallest space analysis (SSA) and factor analysis are useful approaches, although their purposes differ. The purpose of SSA is to describe and represent the probable universe of items that comprise an instrument. The purpose of factor analysis is to represent the underlying structure of an instrument using given items. The value added aspect of SSA is that it can indicate missing items or variables that should be present, but are not.

Factor analysis views structure from a unidimensional perspective: variables should have high loadings on one factor and not on the remaining factors. This analytic approach can result in a one-dimensional view of the phenomenon in question, which may not be appropriate for social and psychological phenomena that are multidimensional in nature. SSA permits an understanding of multidimensional relationships. For example, a factor identified through factor analysis could be seen as end of a continuum when viewed through the lens of SSA. Smallest space analysis and multidimensional scaling present the solution as a visual representation which permits a more comprehensive perspective for interpreting data.

2.1. SSA and MDS Results

The Survey of Cultural Attitudes and Behaviors responses of all items (48 items plus 3 reliability items) were analyzed through Weighted SSA1 (WSSA1, Amar & Toledano, 2001) and its solution appears in Figure 1. This two dimensional solution was obtained with .14 coefficient of alienation, indicating an acceptable match to the original items interpoints.

On the left side of Figure 1 is a sector that includes five items relating to enforced policies on the campus in support of favorable treatment of individuals based on race, gender, sexual orientation, and social class. Moving clockwise, the next sector includes items that indicate the effectiveness of training and the assimilation of proactive attitudes toward minorities in the students’ behavior and attitude. Item #43, although written to reflect faculty behavior, appears here rather than other items of the same construct, as it addresses teaching which is consistent with the focus of the items in this region. The next sector clockwise includes items that address discussions of bias in the department. The next sector includes items that describe the faculty’s own classroom discussions of bias. The next sector (at the right side of Figure 1), includes four items that relate to the respondent’s own attitudes and behaviors towards homosexuality. The next sector, continuing clockwise and still at the right side of Figure 1, includes a large cluster encompassing all attitude items regarding the respondents’ attitudes toward individuals based on race, gender, and social class. This sector includes as well two remaining sexual orientation attitude items (#51 and #49) and three behavior items that deal with advocacy regarding race,
gender, and social class. Following this is a sector that contains additional attitude items regarding race, gender and social class. The next region includes three items that relate to the respondent’s discriminatory behaviors that may indicate race, gender and social class biases. The following sector consists of three items concerning observations of colleagues’ biased behaviors in these three domains.

2.2. Discussion

SSA yielded an overall picture of a circumplex model, which is a circle where each region is closely related to the adjacent regions and is further away and in contrast to the region that is opposite to it. One dimension of the solution seems to be self (i.e., attitudes and behaviors) versus others (i.e., campus, department, colleagues and graduates) (see the right and left sides of Figure 2). The arrangement of attitude and behaviors items on the right side and institutional factors on the left side of circumplex model suggest that faculty view themselves in some manner opposed to others and to their institutional environment (i.e., the self versus other dimension). These findings suggest a more complex arrangement of dimensions than originally proposed in the theoretical framework.

![Two-dimensional multidimensional scaling solution](image)

**Fig. 1.** Two-dimensional multidimensional scaling solution
The second dimension may be passive awareness or cognitive saliency regarding bias versus action or observations of biased behaviors in self and others. This dimension is not as clear because some items associated with passive awareness involve observations of faculty discussions (e.g., # 45, “Discussions about sexism and its implications for teaching and learning occur regularly in my department”), which are a form of behavior. In this context, however, discussion is limited to educational implications of bias, and awareness may not extend to action behaviors or other social realms. Also most of the others items relate to action (i.e., campus’ policy, graduates’ ability to respond, departmental discussions) and self relate to belief items. The only self and action items are “telling jokes”.

Other than one exception related to Sexual Orientation where four items cluster at the right of the model (i.e., # 37, #33, #34, #6), the multidimensional scaling suggests that there is no distinction among biases based on cultural group. Prejudice to gay and lesbian individuals, women, minorities, and individuals who are poor, are cast in the same mold. Results of the SSA reveal two attitude and two behavior items (advocacy and personal reaction) regarding sexual orientation clustered at the far right of circumplex model. Adjacent to these items are advocacy items related to race, gender and social class. This finding suggests that sexual orientation is an issue that separates individuals who engage in advocacy activities from those who do not. Individuals who are unbiased and who advocate for sexual orientation equity are more likely to advocate equity in other cultural domains as well.

References


Abstract. The purpose of this paper is to illustrate the utility of Facet Approach by using the example of the questionnaire design and data analysis of the International Census on Attitudes toward the Japanese Language. This census was conducted in 28 countries/areas of the world from 1997 to 1998 by the project team of the National Institute for Japanese Language, and focused primarily on how the Japanese language, Japanese people and Japan are viewed internationally in the context of globalization.

1. Questionnaire Design based on the Facet Approach

This paper addresses a methodological topic, and the International Census on Attitudes toward the Japanese Language (ICAJL) will be used to examine it. Specifically, I will attempt to illustrate the utility of the Facet Approach in the questionnaire design and data analysis of the ICAJL.

The mapping sentence of this survey is composed of six facets, but these can be further classified into the following three types of facets.

1. Facet of the attributes of the respondent (X). The ICAJL was designed to derive this information from questions regarding (1) sex, (2) age, (3) occupation, (4) education, (5) country of origin, (6) ethnicity, and (7) country of residence.

2. The five facets marked by the symbols A, B, C, D, and E are all facets for categorizing question content. Facet A, to use Guttman's expression, is related to the type -- major elements, major components -- of human behavior (here meaning the human behavior of orientation) that can be derived from the questionnaire survey. These types are attitude, norm, intelligence, and involvement. Previous research indicates that these four aspects are especially important when looking at the topic of "attitudes toward the Japanese language". Facet B is likewise related to the modality of human behavior, and makes four operational distinctions between the (1) cognitive, (2) affective, (3) evaluative, and (4) behavioral modalities.

Facet C is also a theme of the current survey, and refers to the object/referent of the individual's orientation. The six objects/referents are:

Facet D distinguishes between whether a person's orientation is toward the "general aspects" of the object or toward its "specific aspects". For example, if the survey asks "Do you think that exchange between your country and Japan should be encouraged?" then the term "Japan" refers to "Japan in general". However, if the question asks about exchange in specific fields, about, for example, "economic exchange", "cultural exchange", or "political exchange", the objects of the respondent's orientation are now the specific aspects of the general object, Japan.

Facet makes a distinction between the "spoken/heard" and "written/read" aspects of language, here referring to native language, foreign language, English, and Japanese.

3. The final facet, represented by the symbol R, refers to the response scale range for each type of human behavior derived from facet A. For attitude and norm, the range is from negative to positive, and for intelligence and involvement, the range is from low to high.

Now I have discussed the facets and related elements that compose the theoretical framework, or hypothetical diagram, of the ICAJL, as well as the reasons for scientific interest in proposing those facets and their elements. Next I would like to look at what kinds of facet element combinations are used as the basis for developing the actual questions.

Returning to the mapping sentence, facet A has 4 elements, facet B has 4 elements, facet C has 6 elements, facet D has 2 elements, and facet E has 4 elements. These individual elements are called structs. Based on the "Law of Analysis" of René Descartes, the combination sets of the elements in A-E are called "Cartesian sets". Mathematically, there are $4 \times 4 \times 6 \times 2 \times 4 = 768$ such sets. Each of these 768 combinations comprises a "structuple". However, because combinations that include "unspecified" and "inapplicable" responses are meaningless, and the questionnaire can only include a limited number of question items, usually several combinations from that universe of potential combinations are deliberately (strategically) sampled in the actual process of questionnaire development.

Below we will focus our attention on the elements of facet C, select several question items, and identify what kinds of structuples these create. I would then like to use a sample question to explain how the structuple derived from that information is expressed. The question we will examine here is Q40.1, which asks "What is your image or feeling of Japanese as a spoken language"?
Under the Semantic Differential method, respondents are asked to indicate their response on a scale from "beautiful" to "ugly" (in adjective form) using the following five response categories: "very", "somewhat", "neutral (can’t say one way or the other) "," somewhat", and "very". Thus, this question has a structuple of $a_1b_3c_4d_1e_1$. The first struct (facet element) of this structuple is $a_1$, attitude. This is the first element of the facet related to the "type" of human behavior derived from the questionnaire survey. This struct applies because a rating on the scale of "beautiful" to "ugly" indicates the respondent's orientation "attitude" (positive $\Rightarrow$ negative). The second struct is $b_3$, evaluative. The third element of facet B with regard to the "modality" of the behavior applies to this question because the judgment of whether something is beautiful or ugly is an "evaluative judgment". The third struct is $c_4$, Japanese.

This is the fourth element of facet C, the object (referent) of orientation. The fourth struct is $d_1$, general. This is the first element of facet D, which distinguishes between whether the question is about the "general aspects" or "specific aspects" of the object. This struct applies because the question is not about specific aspects of Japanese, such as male word/phrase, the dialect of a particular region, or a specific level of speech, but about the Japanese language in general. Finally, the fifth struct is $e_1$, "spoken/heard". This is the first element of facet E, which distinguishes between whether the Japanese is "spoken/heard", "read/written", "both", or "inapplicable".

This shows how question item Q40.1 breaks down into a combination of the elements in each facet. However, while this example has been expedient for explaining the Facet Approach, the structuples are not derived from the questions in the actual development of questionnaires. In reality, the process works in the exact opposite direction, with each question item developed on the idea of experimental design based on the mapping sentence, which depicts a hypothetical diagram of the survey, and is shown above.

2. Data Analysis Based on the Facet Approach: Analysis of the Relationship between Question Items with the Same Object and Component – Image of the Japanese Language –

As mentioned in the section on questionnaire design, this survey used the Semantic Differential method to ask respondents to indicate their "image or feeling of Japanese [as a spoken language]" on five response scales ranging from "beautiful" to "ugly", "easy" to "difficult", "cheerful" to "gloomy", "clear and distinct" to "unclear and indistinct," and "like" to "dislike". Table 2 (USA)
and Table 3 (South Korea) show the correlation coefficients between these five response scales by Pearson correlation coefficients. The similarities and differences are visible in these two correlation matrices. The similarities can be derived from an examination of the signs of the correlation coefficients. Generally, if \( n \) = the number of items (variables) shown in a correlation matrix, the number of total combinations is \( \frac{n(n-1)}{2} \). Because there are five items (variables) in this example, there are 10 combinations. An inspection of the matrices shows that in both the US and South Korea, all 10 correlation coeffi-
<table>
<thead>
<tr>
<th>Question Item</th>
<th>Structuple</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ASK ALL)</td>
<td></td>
</tr>
<tr>
<td>Q23 Have you learnt Japanese in the past or are you now learning it? (SA)</td>
<td>a4 b4 c4 d1 e3</td>
</tr>
<tr>
<td>1. Yes</td>
<td></td>
</tr>
<tr>
<td>2. No → SKIP TO Q27</td>
<td></td>
</tr>
<tr>
<td>(ASK THOSE WHO ANSWERED “YES” IN Q23)</td>
<td></td>
</tr>
<tr>
<td>Q26 Altogether, how long have you learnt / studied Japanese? (SA)</td>
<td>a4 b4 c4 d1 e3</td>
</tr>
<tr>
<td>□□ years □□ months</td>
<td></td>
</tr>
<tr>
<td>(ASK ALL)</td>
<td></td>
</tr>
<tr>
<td>Q27 How much would you like to learn / continue to learn Japanese in the future? (SA)</td>
<td>a1 b4 c4 d1 e3</td>
</tr>
<tr>
<td>1. Very much</td>
<td></td>
</tr>
<tr>
<td>2. Somewhat</td>
<td></td>
</tr>
<tr>
<td>3. Not very much → SKIP TO Q30</td>
<td></td>
</tr>
<tr>
<td>4. Not at all</td>
<td></td>
</tr>
<tr>
<td>(ASK ALL)</td>
<td></td>
</tr>
<tr>
<td>Q30 How useful do you think the study of Japanese is for you? (SA)</td>
<td>a1 b3 c4 d1 e3</td>
</tr>
<tr>
<td>1. Very useful</td>
<td></td>
</tr>
<tr>
<td>2. Somewhat useful</td>
<td></td>
</tr>
<tr>
<td>3. Not very useful</td>
<td></td>
</tr>
<tr>
<td>4. Not use at all</td>
<td></td>
</tr>
<tr>
<td>(ASK ALL)</td>
<td></td>
</tr>
<tr>
<td>Q34 What is the level of your Japanese language ability? Please read off the applicable number. (Hand Card 34.1)</td>
<td></td>
</tr>
<tr>
<td>Q34.1 Reading (SA)</td>
<td>a3 b1 c4 d1 e2</td>
</tr>
<tr>
<td>1. None / not at all</td>
<td></td>
</tr>
<tr>
<td>2. Enough to understand signboards, product labels, etc.</td>
<td></td>
</tr>
<tr>
<td>3. Enough to understand basic expressions required in daily life</td>
<td></td>
</tr>
<tr>
<td>4. Enough to understand the general meaning of what is written</td>
<td></td>
</tr>
<tr>
<td>5. Enough to read books with ease</td>
<td></td>
</tr>
<tr>
<td>6. Native fluency</td>
<td></td>
</tr>
<tr>
<td>(Hand Card 34.2)</td>
<td></td>
</tr>
<tr>
<td>Q34.2 Speaking (SA)</td>
<td>a3 b1 c4 d1 e1</td>
</tr>
<tr>
<td>1. None/ not at all</td>
<td></td>
</tr>
<tr>
<td>2. Enough to exchange greetings</td>
<td></td>
</tr>
<tr>
<td>3. Enough to use basic expressions required in daily life</td>
<td></td>
</tr>
<tr>
<td>4. Enough to engage in routine conversation</td>
<td></td>
</tr>
<tr>
<td>5. Enough to be comfortable in any situation</td>
<td></td>
</tr>
<tr>
<td>6. Native fluency</td>
<td></td>
</tr>
<tr>
<td>(ASK ALL)</td>
<td></td>
</tr>
<tr>
<td>Q40 What is your image or feeling of Japanese as a spoken language? (Hand Card 40)</td>
<td></td>
</tr>
<tr>
<td>For each pair, please read off the number from 1 to 5 that most closely reflects your feeling. (SA for each item)</td>
<td></td>
</tr>
<tr>
<td>Beautiful</td>
<td>Very 1 Somewhat 2 Neutral 3 Somewhat 4 Very 5 Ugly</td>
</tr>
<tr>
<td>Easy</td>
<td>Very 1 Somewhat 2 Neutral 3 Somewhat 4 Very 5 Difficult</td>
</tr>
<tr>
<td>Cheerful</td>
<td>Very 1 Somewhat 2 Neutral 3 Somewhat 4 Very 5 Gloomy</td>
</tr>
<tr>
<td>Clear and distinct</td>
<td>Very 1 Somewhat 2 Neutral 3 Somewhat 4 Very 5 Unclear and indistinct</td>
</tr>
<tr>
<td>(The sounds are easy to distinguish)</td>
<td>(The sounds are not easy to distinguish)</td>
</tr>
<tr>
<td>Do you like the Japanese language?</td>
<td>Very 1 Somewhat 2 Neutral 3 Somewhat 4 Very 5 Dislike</td>
</tr>
<tr>
<td>Like</td>
<td>Very 1 Somewhat 2 Neutral 3 Somewhat 4 Very 5 Dislike</td>
</tr>
</tbody>
</table>
cient are positive. This shows that in both countries, in spite of large differences in terms of "studying Japanese", "Japanese skills", and "the Japanese language environment", Guttman's First Law applies to the image of the Japanese language derived from these response scales. This indicates that the various aspects of the images of the Japanese language are cumulative rather than mutually exclusive. That is, even a respondent who indicates a positive (or negative) attitude on the scale of "beautiful" to "ugly" may indicate a different attitude, that is, a negative (or positive) attitude on another scale, for example, the scale of "cheerful" to "gloomy". However, while some such individual respondents likely exist, the aggregate trend indicates a consistency among the responses. That is, respondents who indicate positive (or negative) responses on one scale are likely to indicate positive (or negative) responses on the other scales.

The First Law suggests that as long as the population observed is randomly selected, the relationship between question items on the same object are expected to be monotone and the signs of the correlations are expected to be positive or zero, not negative. This phenomenon has been repeatedly examined in various experimental studies on people's attitudes. The relationships between items used in attitude surveys and public opinion polls usually produce positive or zero correlation coefficients. However, no attempt had been made to raise this well observed phenomenon to the level of a law until Guttman's formulation. Using large-scale questionnaire survey data, Guttman has promoted the investigation of the kinds of human behavior to which this law applies. His results have verified the applicability of the law not only to "attitudes", but also to "involvement", and also to special cases of "attitudes", such as intelligence, values, happiness, and norms. He has formulated these into the "First Law of Involvement", the "First Law of Intelligence", and so on.

The verification of the applicability of the First Law to the special attitude case of "image" in the ICAJL suggests that the "First Law of the Image of the Japanese Language" can be formulated.

Next, we can identify the differences in the trends between the US and South Korea by individually comparing the figures in the two correlation matrices. While this is a significant analysis in its own right, there are also some inherent problems in this kind of analysis. That is, because the figures shown in the correlation matrix are no more than measurements of the correlation between a pair of items (variables), an investigation of the size of the correlation coefficients can do no more than provide information on each individual relationship.
Thus, methods have been developed for diagramming the structure of the overall relationship between several items (variables) within a given space so that it can be intuitively and visually understood, and for extracting the fundamental aspects that construct the underlying relationships between the individual items. This is the "Smallest Space Analysis: SSA-1" developed by

Table 2. Image of the Japanese Language (USA)

<table>
<thead>
<tr>
<th>Q40.1</th>
<th>Q40.2</th>
<th>Q40.3</th>
<th>Q40.4</th>
<th>Q40.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful ↔ Ugly</td>
<td>Pearson coefficient</td>
<td>-</td>
<td>.205**</td>
<td>.581**</td>
</tr>
<tr>
<td>Significance</td>
<td></td>
<td>000</td>
<td>000</td>
<td>000</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>964</td>
<td>965</td>
<td>960</td>
</tr>
<tr>
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<td>Pearson coefficient</td>
<td>.205**</td>
<td>-</td>
</tr>
<tr>
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<td></td>
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</tr>
<tr>
<td>Q40.3</td>
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<td>Pearson coefficient</td>
<td>.581**</td>
<td>.239**</td>
</tr>
<tr>
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<tr>
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<td></td>
<td>965</td>
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<td>956</td>
</tr>
<tr>
<td>Q40.4</td>
<td>Clear and ↔ Unclear and distinct undistinct</td>
<td>Pearson coefficient</td>
<td>.285**</td>
<td>.484**</td>
</tr>
<tr>
<td>Significance</td>
<td></td>
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<td>0.00</td>
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<tr>
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<td></td>
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</tr>
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<td>.256**</td>
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</table>

**P < .01

Table 3. Image of the Japanese Language (South Korea)

<table>
<thead>
<tr>
<th>Q40.1</th>
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<th>Q40.3</th>
<th>Q40.4</th>
<th>Q40.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beautiful ↔ Ugly</td>
<td>Pearson coefficient</td>
<td>-</td>
<td>.235**</td>
<td>.451**</td>
</tr>
<tr>
<td>Significance</td>
<td></td>
<td>000</td>
<td>000</td>
<td>000</td>
</tr>
<tr>
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<td></td>
<td>994</td>
<td>990</td>
<td>989</td>
</tr>
<tr>
<td>Q40.2</td>
<td>Easy ↔ Difficult</td>
<td>Pearson coefficient</td>
<td>.235**</td>
<td>-</td>
</tr>
<tr>
<td>Significance</td>
<td></td>
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<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
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<td></td>
<td>994</td>
<td>991</td>
<td>990</td>
</tr>
<tr>
<td>Q40.3</td>
<td>Cheerful ↔ Gloomy</td>
<td>Pearson coefficient</td>
<td>.451**</td>
<td>.342**</td>
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<tr>
<td>N</td>
<td></td>
<td>990</td>
<td>991</td>
<td>988</td>
</tr>
<tr>
<td>Q40.4</td>
<td>Clear and ↔ Unclear and distinct undistinct</td>
<td>Pearson coefficient</td>
<td>.276**</td>
<td>.263**</td>
</tr>
<tr>
<td>Significance</td>
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<td>Q40.5</td>
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<td>0.00</td>
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<tr>
<td>N</td>
<td></td>
<td>994</td>
<td>997</td>
<td>991</td>
</tr>
</tbody>
</table>

**P < .01
Guttman and Lingoes (Guttman theoretically constructed the analytical idea and Lingoes created the computer program).

SSA falls within the category of multidimensional scaling, and is a method of expressing the relationship between $n$ items shown in a correlation matrix by the size of the distance between $n$ points in an $m$-dimensional ($m<n$) spatial partition. The higher the correlation, the smaller the distance, and the lower the correlation, the larger the distance. Usually a 2-dimensional (2D plane) or 3-dimensional (3D cube) spatial partition is used to visually depict the relationship between items.

Applying SSA-I to the correlation matrices shown above (Tables 2 and 3) produces the 2D maps (vector 1 × vector 2) shown in Figure 1 (USA) and Figure 2 (South Korea). The vertical lines drawn through these maps are a result of efforts to apply meaning to the spatial partition of the items. The SSA map is a rectangular diagram, but it is divided from right to left into three small rectangles that contain each of these items. The overall structure is approximately the same shape for both the US and South Korea. That is, item 2 is on the right end, items 1 and 5 are on the left end, and item 4 is in the middle. However, the position of item 3 is slightly different in the two countries. In the US, item 3 is located in the leftmost rectangle along with items 1 and 5, while in South Korea, it is located in the middle rectangle with item 4. As already mentioned, the distance between the items in the space indicates the proximity of the significance between those items. These results have the following implications.

1. "Like", "beautiful", and "easy" are located at the poles in both countries, but in the initial hypothesis (the hypotheses indicated by the mapping sentence and structuples), "like" is affective while "beautiful" and "easy" are evaluative. However, based on the data shown here, "beautiful" seems to be more affective since it is close to "like", while "easy" seems to be more cognitive because of its distance from the other two.

2. "Clear and distinct" is located in the middle in both countries, indicating that it is evaluative, between affective and cognitive.

3. The difference in the position of "cheerful" in the US and South Korea suggests that it tends to be affective in the US and cognitive in South Korea. It would be very interesting to conduct an analysis of the differences in the image of the Japanese language by looking at linguistic differences and similarities, such as differences between English and Japanese on the one hand, and differences between Korean and Japanese on the other. Here, however, I am limited to simply identifying this issue.
**Fig. 1.** SSA Map of the Image of the Japanese Language: (US)

**Fig. 2.** SSA Map of the Image of the Japanese Language: (South Korea)
Chapter 4.

Self and Emotion
The Wellbeing of the Self's Personality: A Structural Facet Analysis

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¹Hebrew University of Jerusalem, Institute for Contemporary Jewry, Mount Scopus, Jerusalem 91905, Israel
²University of Haifa, Faculty of Education, Mount Carmel Haifa 31905, Israel

Abstract. Leaning on the formal faceted definition of wellbeing (Levy and Guttman 1975), the current study examines the structure of the wellbeing of the self’s personality. One facet, playing a modulating role, distinguishes between self’s state of wellbeing (e.g. satisfaction with self, happiness) and self’s wellbeing regarding possession of resources (e.g. traits, physical appearance). The second facet, also a modulating one, specifies the modality (cognitive, affective, instrumental) of self’s wellbeing. The third facet, playing a polarizing role, specifies the life domain that applies to personal wellbeing. Results replicated the hypothesized radex structure expanding on personalized aspects with a rationale for the circular order of the life domains.

1. Introduction: Definition of Wellbeing

Kurt Levin's seminal "life space" theory suggests that behavior derives from interaction of the person and his/her environment. Specifically, people perceive objectively defined environment in a psychologically subjective form. In the current study we examine this psychological and complex response with respect to wellbeing (see also Campbell, 1976). Accordingly, a definition of the concept of wellbeing must refer to its multivariate nature on the one hand, and to the commonality that holds its various aspects together on the other hand. Most attempts at a definition of wellbeing relate mostly to its common meaning in the sense of life satisfaction (Abrams, 1973; Andrews, 1974; Diener, 1994; Hall, 1973; Vanhoven, 1991). However, Facet theory suggests defining social concepts by their universe of observations, referring both to the multivariate contents and to the commonality of these contents as expressed in the extent of satisfaction. We adopt the faceted definition of wellbeing first suggested by Levy and Guttman (1975). This definition specifies the psychological response in terms of the self's (or any social group's) satisfaction with a situation (or treatment thereof) in a variety of life domains (e.g. family, health, economy, religion etc.) that are assessed in different behavioral modalities (i.e., cognitive, affective and instrumental) (see also discussion in Andrews, 1974; Andrews &
McKennell, 1980; Andrews & Withey, 1976; Bradburn, 1969; Campbell, 1976; Wilkening, 1982). The formal faceted definition reads as follows:

"An item belongs to the universe of well-being items if and only if its domain asks for a {cognitive, affective instrumental} assessment of {level treatment} of the state of a social group in some life area, and the range is ordered from 'very satisfactory' to 'very unsatisfactory' according to the normative criterion of the respondent for that area of life". (Levy & Guttman, 1975, p. 364).

For the purposes of theory construction and research design, it has been found useful to define concepts through the universe of items with which the theory is concerned (Guttman, 1982). Moreover, this definitional framework also serves as a guide for item construction. The above definition implies that the universe of wellbeing items is a subuniverse of attitudinal items. Wellbeing items fulfill the condition of having a range ordered from positive to negative towards an object, and therefore they automatically belong to the universe of attitude items (see discussion in Levy & Guttman, 1975, p. 369). This concept of wellbeing as an attitude is also stated by different authors such as Andrews and Mckennel (1980, p. 127) who stress that "measures of perceived ('subjective') wellbeing…are fundamentally measures of attitudes." Similarly Vanhoven (1991, p. 2) suggests in his discussion on the concept of happiness that we can speak of happiness as an "attitude towards one's life". However, these authors do not offer any systematic examination of their proposition, as suggested by Levy and Guttman (1975) (see above).

In the current study we focus on personal wellbeing as pertaining to the personality of the self. By doing so, we go beyond earlier studies on wellbeing by illuminating detailed personalized aspects of the self’s wellbeing.

2. The Wellbeing Facets of Self’s Personality

The universe of the observations of the personality’s self can be defined by means of at least three content facets. Facet A distinguishes between (a1) the self’s state of wellbeing (e.g. satisfaction with self, happiness, feeling valued as a person) and (a2) the self’s wellbeing regarding the possession of resources (e.g. traits, talents, physical appearance, assertiveness). Facet B specifies the modality of the state of wellbeing and self’s possession of resources according to three modalities: (b1) cognitive, (b2) affective, and (b3) instrumental. For instance, ‘satisfied with self or with the situation of self’ are cognitive states of wellbeing, while ‘happiness’ is an affective state of wellbeing. This emotional aspect of wellbeing is widely discussed in the literature by authors such as Diener (1994), Myers and Diener (1995) and Vanhoven (1991). ‘Satisfaction with talents, traits or education’ are cognitive resources that individuals possess, while ‘satisfaction with appearance, physical aptitudes, income or residence’ are instrumental
resources, partly in the sense of extrovert behavior (Andrews & McKennell, 1980; Campbell, Converse, & Rodgers, 1976; Ostrom, 1969). Facet C specifies the life domains of the self’s well-being. We distinguished between four main life domains: (c1) the interpersonal domain which distinguishes between the relation of others towards the self and relation of the self towards others. Relation of the self toward others can be understood as an aspect of the self's personal competence in the sense of having control over one's life rather than being controlled by others. For example, 'ability to influence others', 'initiative in contact with others' etc.; (c2) personal competence which refers to the self's ability to influence his or her life by possessing attributes such as character traits, talents, physical aptitudes and attractiveness; (c3) the vast social environment domain that includes areas such as education, work, income, family, leisure etc. and (c4) 'on the whole' – includes unspecified domains such as the general situation or happiness. These three facets are incorporated in the mapping sentence below to define the observations pertaining to the wellbeing of the personality's self.

3. The Mapping Sentence

A simultaneous definition of wellbeing items is made possible by the use of a mapping sentence (see below). Each of the three facets described above appears in the mapping sentence as a set of elements listed in bracketed columnar form. The name of each facet (in italics face) may appear right before or after its list of elements, depending on the verbal structure of the sentence. Verbal connectives are added to the facets to make the mapping readable in ordinary language (Guttman & Levy, 1991; Levy, 1985, 2005).

As discussed above, wellbeing items have a common range, namely the level of satisfaction. This common range is expressed in the range facet (Facet R) after the arrow in the mapping sentence. In this study the answer categories for most of the variables are ordered explicitly from 'very satisfactory' to 'very unsatisfactory' with respect to the self’s personality. Furthermore the wellbeing items share a common object, namely self’s personality. Hence as discussed above well-being items are attitudinal.

The mapping sentence also designates the population being researched, symbolized by the (X) facet in the following mapping sentence. Thus the definitional framework expressed by the mapping sentence serves as a guide for actual item construction. Accordingly each respondent (x) has one and only one response in the range (R) for each question defined by three elements, one from each of the three content facets (ABC) discussed above.
Mapping sentence for defining the observation on self's personality wellbeing

The extent of satisfaction of respondent (x) with the

<table>
<thead>
<tr>
<th>facet A</th>
<th>facet B</th>
</tr>
</thead>
<tbody>
<tr>
<td>( state of</td>
<td>( cognitive</td>
</tr>
<tr>
<td>resources for</td>
<td>) affective</td>
</tr>
<tr>
<td>) ( resources for</td>
<td>) ( instrumental</td>
</tr>
<tr>
<td>)</td>
<td></td>
</tr>
</tbody>
</table>

Facet C:

<table>
<thead>
<tr>
<th>modality in</th>
<th>life domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interpersonal</td>
<td>Range</td>
</tr>
<tr>
<td>- self to others</td>
<td>very satisfactory</td>
</tr>
<tr>
<td>- others to self</td>
<td>to</td>
</tr>
<tr>
<td>2. Personal competence</td>
<td>very unsatisfactory</td>
</tr>
<tr>
<td>- character traits</td>
<td></td>
</tr>
<tr>
<td>- talents</td>
<td></td>
</tr>
<tr>
<td>- physical</td>
<td></td>
</tr>
<tr>
<td>- attractiveness</td>
<td></td>
</tr>
<tr>
<td>3. Social environment</td>
<td></td>
</tr>
<tr>
<td>- education</td>
<td></td>
</tr>
<tr>
<td>- work</td>
<td></td>
</tr>
<tr>
<td>- income</td>
<td></td>
</tr>
<tr>
<td>- residence</td>
<td></td>
</tr>
<tr>
<td>- family</td>
<td></td>
</tr>
<tr>
<td>- leisure</td>
<td></td>
</tr>
<tr>
<td>4. On the whole</td>
<td></td>
</tr>
</tbody>
</table>

With respect to the self's personality.

Since the items' construction in the current study focuses on the personality aspects of self, the operationalization of life domain (Facet C) mainly included items that pertain to interpersonal (c₁) and personal competence (c₂). The social environment domain, which in this case relates only to primary environment, is composed of several sub-environment domains which are represented by one or two items. This allows us to examine more comprehensively the structural interrelations between the personal competence aspects of the self and the more environmental ones.

4. Method

4.1 Sample and Procedure

The data are part of a comprehensive study on wellbeing that was undertaken in 1995 in the framework of a graduate research seminar in the School of Social
Work at the Hebrew University of Jerusalem. The sample, which was convenient, consists of 176 adult residents (20 years old and over, adequately distributed across age groups) from all parts of Jerusalem. The sample included 84 (48%) men and 92 (52%) women.

Fieldwork took place in Spring 1995. Respondents were interviewed face-to-face by means of a closed questionnaire that was structured according to the mapping sentence specified above. The interviews were conducted at the respondents' home and lasted about 20 minutes.

4.2 Analysis

In order to arrive at an understanding of the perceptual structure of the wellbeing of the self-personality, we employed the technique of Similarity Structure Analysis (SSA). SSA is an intrinsic geometrical technique for analysing multivariate data which emphasizes regions in the space of variables rather than the coordinates. In this technique each variable is treated as a point in a Euclidean space in such a way that the higher the correlation between two variables, the closer they are in the space. The space used is of the smallest dimensionality that allows such an inverse relationship between all the pairs of observed correlations and the observed geometric distances. Only the relative sizes of coefficients and the relative distances are of concern (Borg & Lingoes, 1987; Guttman, 1968; Lingoes, 1968).

5. Results

In order to study the perceptual structure of the self's personality, intercorrelations (for description of weak monotonicity coefficients (μ) see Guttman, 1986; Levy, 2005) were calculated among the 23 wellbeing items. Inspection of the intercorrelations reveals that all the coefficients are positive or zero, ranging from μ = .00 to μ = .91. This may be expected since the rationale is the same for the Positive Monotonicity Law (First Law) of attitude (Guttman, 1982; Levy & Guttman, 1975, 1989).

The main part of the theory, however, concerns the relative sizes of the correlation coefficients. Our general hypothesis is that the domain facets of the definitional system will help indicate which items should be more highly intercorrelated and which should be less intercorrelated. More specifically, we hypothesized correspondence between the elements of the three domain facets and the regions of the SSA. Furthermore the several facets should play certain roles that gives this correspondence a radex interpretation. The SSA, which geometrically presents the intercorrelations among the items of wellbeing of the self's personality fits this hypothesis (Figure 1).
Fig. 1. The Radex of the Wellbeing of Self's Personality

5.1 The Radex Theory of Self's Personality Wellbeing

The hypothesis of a radex on the basis of the definitional system requires that the content facets play two roles: modulating and polarizing. The dichotomous Facet A - state vs resources – plays a modulating role. It corresponds to distance from the origin of the SSA space and divides the space into two concentric belts. This partition indicates that the smaller the circle, the larger the average correlation among items, because the size of correlation is related inversely to distance (Sabbagh, Dar & Resh, 1994). The innermost circle, marked by the solid line, constitutes the state of the personality’s wellbeing, and includes variables such as ‘satisfied with one's self,’ ‘satisfied with the situation’, ‘happiness’ or ‘feeling that one is a person of value’. The resources possessed for the self’s wellbeing are located in the outer circle, spreading towards the periphery. Thus, respondents' evaluations are closer to each other (or generalized) regarding the state of personality's wellbeing, whereas their evaluation pertaining to possession of resources for wellbeing is more differentiated. The distance from the origin is further modulated by the modality facet (Facet B). This partition applies only to the belt of resources (marked by the broken line) since the state of wellbeing’s belt is only of the cognitive-
affective modality. The modality facet distinguishes between cognitive-affective resources such as talents, character traits, clarity of opinions or trust of others, and instrumental resources such as residence, income, health, physical aptitude or physical appearance.

As expected, the unordered life domain facet (Facet C) plays a polarizing role in partitioning the space into four wedglike regions (marked by solid lines), one for each life domain, that stem from a common origin. Going clockwise, the right-upper section of the circle is the interpersonal region that can be partitioned into two sub-regions (marked by a dotted line). One sub-region includes items that refer to the relation of others to the self, such as respected or trusted by friends. The other sub-region includes items that refer to the relation of the self to others, such as having influence on others, initiative taken with others and assertiveness. This subregion which, as discussed above, relates to interpersonal competence, borders on the region of personal competence attributes of the self (located in the right-lower region) which can also be partitioned into three clear sub-regions (marked by dotted lines). One subregion includes items that relate to ‘traits and opinions’, and a ‘feeling of being a valued person’. Another includes ‘talents or abilities.’ The third subregion relates to physical traits of the personality such as ‘attractiveness,’ ‘physical aptitudes’ and health. It is worth noting that all the regions, which are located on the right side of the circle, refer to personal or intimate features of the self’s personality.

In contrast, the next large area – namely the left part of the circle – includes several life domains (subregions marked by dotted lines) that refer to the self’s social-primary environment. Moving from the lower to the upper part of the circle are located the domains of education, work, income, residence, family, and leisure which leads back to the interpersonal region. Items that do not relate to a specific life domain (i.e., happiness and general satisfaction with life) are located in the inner circle and between the life domains of work and income.

6. Discussion

The current study adopted the formal definition of wellbeing first suggested by Levy and Guttman (1975). Expanding on this definition, it specifies a framework for conceptualizing the universe of wellbeing that emphasizes the distinction between the personality and the social environment of the self. This aspect of wellbeing goes beyond existing research which stresses the self's primary and secondary social environment (e.g. work, family, education or economy). In other words, it assumed that the addition of the personality aspects of wellbeing do not challenge earlier conceptualizations of wellbeing but rather enhance them.
Since we refer only to the self's wellbeing, we expected a radex structure with the facets playing two roles: polarizing (life domains) and modulating (state vs resources and modality). Findings in this study corroborated the radex hypothesis. The life domains facet specified a circular order of the SSA space by partitioning it into wedglike regions steming from a common origin. This partition was obtained in prior studies on the structure of wellbeing in different countries (see for example Bilsky & Wetzels, 1993; Cohen & Sabbagh, 1999; Levy, 1976, 1990; Levy & Guttman, 1975, 1989). Moreover, the partitioning of the SSA space splits the circular order into two clearly distinguished regions: one part of the circular order includes all the domains referring to the intimate, more personal aspects of self (personal and interpersonal competence) while the other included all the self's social-environment domains.

A similar distinction between the inner aspects and outer aspects of the self's wellbeing was found previously by Campbell and his colleagues (1976), though these aspects were represented by different domains including secondary environment. This distinction, which was obtained in different countries at different points of time, contributes to a more comprehensive understanding of the self's wellbeing and its interaction with the social environment (primary or secondary). Hence we can speak of at least a general rationale for the circular order of the wellbeing domains: inner intimate domains vis-à-vis outer domains.

The state vs resources' facet played a modulating role that partitioned the SSA into two concentric belts: the innermost circle constitutes the state of personality's wellbeing (e.g. ‘happiness’ or ‘feeling that one is a person of value’). The resources possessed for the self’s wellbeing were located in the outer circle, spreading towards the periphery. This distinction replicates earlier findings for wellbeing in Israel and the USA (Levy, 1976). The rationale for this facet comes in part from the fact that it is a stem facet that modifies directly the name of the range. In other words, the range of the mapping sentence refers back directly to facet A since what is being assessed from ‘satisfactory’ to ‘unsatisfactory’, is the self’s personality state or the self’s possession of resources for well-being. This facet plays a modulating role also because it shares a common origin with a polarizing facet (life domains, Facet C). The modality facet further distinguishes between cognitive-affective resources (e.g. talents and character traits), and instrumental resources (e.g. residence and income).

In the center of the inner circle of the state of wellbeing lies the assessment of the respondents' feeling of 'happiness'. It is of interest to ask which items are more closely correlated with happiness? Technically, since happiness is located at the center of the inner circle, it correlates moderately or highly with all other items (coefficient correlations range between .40 and .91). It is worth noting that for any other variables which are not at the central region, there is at least one other variable which is farther from it than the central ones. For instance, satisfaction with income has a zero correlation with satisfaction of clarity of one's opinions.
Happiness is closest to variables referring to the state of wellbeing which deal with both the inner (personality) and outer (social-primary environment) aspects of wellbeing. Among the inner (personality) items, the feeling of happiness is most closely correlated with the 'feeling of being a person of value' and 'satisfaction with one's self'. Regarding the outer (social-primary environment), assessment of happiness is most closely correlated with satisfaction with family life and leisure. Moreover, the items least related to happiness are instrumental resources, such as income, residence or physical aptitudes. In other words, the feeling of wellbeing in physical instrumental aspects of life can not predict happiness as well as personality and interpersonal aspects of wellbeing.

To conclude, the current study expands prior studies on wellbeing and shows how the basic structure underlying wellbeing is replicated again and again across countries, subpopulations and instruments. Moreover, the use of facet theory enables the understanding of basic lawfulness in human behavior. For that matter let us conclude by citing from Campbell and colleagues (1976, p. 72) study on the structure of wellbeing in the USA: "The radiation of the map... from a central core... seems so basic to the structure of human life that it is hard to imagine that it would not be characteristic of any segment of the population, or for that matter, populations outside the United States". Unfortunately it seems that not much progress has been done in this direction of searching for lawfulness in human behavior.

References


The Structure of Feminine Self-Concept of Preadolescent Religious Girls in Israel

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²The Hebrew University of Jerusalem, Israel

Abstract. The purpose of the present study is to identify the underlying structure of a self-concept scale for young women. A 24 items scale was administered to 377 Israeli young women and was analyzed by SSA yielding a cylindrical structure. The stem facet divided the cylinder into positive versus negative items. The modulating facet ranged from general items at the origin to specific at the periphery. The circular base of the cylinder was divided into five domains. Three of these domains were of intrapersonal nature: Gender, physical self, and personal self and two had interpersonal characteristics: Social self, and family self.

The manner in which a person relates to himself has been named in various terms such as “self image,” “self attitude,” “self esteem,” or “self evaluation.” One of the most common term for this concept is “self-concept.” It is defined as the overall perceptions of a person about himself – all the characteristics and behavior that the individual attributes to himself. In addition, the self-concept is a frame of reference through which a person interacts with his world (Coopersmith, 1967; Wylie, 1974). This frame of reference is both intrapersonal and interpersonal and relates to the social environment as well. Indeed, it has development characteristics. It starts to develop in early childhood and it crystallizes through the interactions of the child with his parents, family, and significant figures in his social environment.

Many scholars and researchers in this domain have acknowledged the multidimensional and multifaceted nature of the self-concept (Markus & Norius, 1987; McGuire & McGuire, 1981). One of the most thorough attempts in this line or research is that of Fitts (1970).

Fitts identified in the self-concept two dimensions. The first dimension relates to the modalities of the self. The first modality is a cognitive one. It deals with the question “who am I.” The second modality focuses on the person behavior and responds to the question “how do I act.” The final modality deals with the emotional modality and relates to self-satisfaction or to “how I feel about myself.” The second dimension in Fitts conceptualization of the self-concept focuses on self domains, such as personal self, social self, morel self, physical self and familial self (Fitts, 1970, p. 20). Fitts (1965) applied all these concepts into the Tennessee Self Concept Scale (TSCS). The scale included
3x5x2 cells; three related to the modality, five to the self-domains and two to the items valance – positive or negative. Thus the item “I despise myself” represent an item that relates to the emotional modality related to personal self, stated in a negative form. In this manner, Fitts obtained 30 cells representing all possible combinations and by assigning three items to each combination, he obtained 90 items that constitute the full scale. Levin, Karni and Frenkel (1978) attempted to identify the underlying structure of the TSCS by submitting its composite scores to Smallest Space Analysis (SSA; Borg & Lingoes, 1987; Guttman, 1968) and were able to identify only two facets – internal vs. external frame of reference. Ganor (1991) analyzed the TSCS at the item level through the SSA and supported the original structure suggested by Fitts (1965). Further support for the importance of the item valance in measuring self-concept has been offered by Dancer (1985). These findings on the self-concept have been obtained on the general population without distinction between males and females. Nevertheless, several studies have indicated that there are some differences between the general self-concept and the feminine self-concept (Giligan, Lyons & Hammer, 1990). Thus, the purpose of the present study is to explore the feminine self-concept by applying Fitts (1965) conceptualization of the self-concept to facet theory. In addition, we would like to add the specificity-generality dimension to Fitts conceptualization and to combine all these facets into a mapping sentence (Guttman, 1982, 1991; Levy, 1985, 2005; Shye 1978). Thus, we obtain four facets as follows: A – The valance of the statement (positive or negative), B – The orientation of the statement (intrapersonal or interpersonal), C – The aspect (general or specific), D – The domain of the self (gender, physical, personal, social, and familial).

The combination of the four content facets are thus constitute the following mapping sentence:
A female respondent (x) self-concept is expressed in a [A] valance about herself in regard to [B] orientation from:

1. Intrapersonal
2. Interpersonal

{C} 1. General
2. Specific

aspect and in the {D} domain:

1. Gender
2. Physical
3. Personal
4. Family
5. Social

Very high

>>>>

self concept in sense of facet A.

Very low

The above mapping sentence defines 40 possible structuples (types) of self-statements (2x2x2x5) that each may represent many items. Thus, the item “I would rather be a boy” is defined by the following structuple A1B1C2D1 [negative view (A1) from intrapersonal orientation (B1) and specific aspect (C2) within the gender domain (D1)]. Table 1 presents all possible structuples and the item numbers that represent them.

On the basis of these various structuples 24 statements were constructed that constitute the Young Woman Self-Concept Scale (YWSCS).

**Table 1. Classification of the YWSCS items by facets**

<table>
<thead>
<tr>
<th>valance</th>
<th>orient</th>
<th>gender</th>
<th>Physical</th>
<th>Personal</th>
<th>Familial</th>
<th>social</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pos</td>
<td>Intra</td>
<td>G</td>
<td>S</td>
<td>G</td>
<td>S</td>
<td>G</td>
</tr>
<tr>
<td>extra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>neg</td>
<td>Intra</td>
<td>11</td>
<td>2</td>
<td>123,4,8,9</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>extra</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thus, the specific goal of the present study is to examine the feminine self-concept among young women by pursuing the underlying structure of the YWSCS through SSA. It is hypothesized that the SSA solution would correspond with the mapping sentence.

Table 2 includes 24 statements that relates to the feminine self-concepts and represent different structuples.

<table>
<thead>
<tr>
<th>1. I like my name</th>
<th>15. I’d like to be like my mother.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. I’d rather be a boy</td>
<td>16. I’d like to get married the same age my mother did</td>
</tr>
<tr>
<td>3. I’d like to change</td>
<td>17. I’d like my children to have the same number of siblings that I have</td>
</tr>
<tr>
<td>4. I’d have done better had I been prettier</td>
<td></td>
</tr>
<tr>
<td>5. I’m not understood</td>
<td>18. My parents have positive view of me</td>
</tr>
<tr>
<td>6. I like who I am</td>
<td>19. I’m willing to make a presentation in public</td>
</tr>
<tr>
<td>7. I’m not appreciated</td>
<td>20. I believe others know me well</td>
</tr>
<tr>
<td>8. I would like to have different face and body</td>
<td>21. I have no problem asking questions in public</td>
</tr>
<tr>
<td>9. I’d like to be born into a different family</td>
<td>22. I’m willing to defend what I believe to be right</td>
</tr>
<tr>
<td>10. I like my ethnic background</td>
<td>23. I have self confidence</td>
</tr>
<tr>
<td>11. I’m sorry to be a girl</td>
<td>24. I have no problems when others decide for me</td>
</tr>
<tr>
<td>12. I’m worried that I’m not prettier</td>
<td></td>
</tr>
<tr>
<td>13. I have a positive view of myself</td>
<td></td>
</tr>
<tr>
<td>14. I’d raise my children differently than the way I was raised</td>
<td></td>
</tr>
</tbody>
</table>

Method

A convenient sample of 377 Israeli female participants has been identified and were administered the YWSCS. The participants were students at the sixth grade (between the age of 11 and 12) from 31 schools in six cities. All schools were part of the national-religious school administration. Following the recoding of items with negative valance (where “very high” implies a low self-concept), the data were submitted to WSSA (Amar & Toledano, 2001).

Results

The 24 items of the YWSCS were submitted to SSA and yielded a three dimensional cylindrical solution with a coefficient of alienation of .175.

The first dimension of a cylinder structure divided the items into those with positive valance, and those with negative valance. The items valance is represented in Figure 1 by small arrows. Upward arrows indicate positive valance while downward arrows indicate negative valance.
The Structure of Feminine Self-Concept of Pre-Adolescent Religious Girls in Israel

Fig 1. A two dimensional projection of a cylindrical structure of the YWSCS. Please note that only item number 2 appears with a positive valance while a negative valance was predicted. All others items have the predicted valance.

The next two dimensions constructed a radex (Guttman, 1954) structure (see Figure 1). The polarizing facet (facet D in the mapping sentence) divides the circle into five sectors. The “gender” domain appears at the top, and then going clockwise appears the “physical” domain and then the “personal” domain. These three domains constitute the intrapersonal aspects in facet C. The next two domains – “social” and “family” constitute the “interpersonal” aspects in facet C. The modulating facet in Figure 1 divides the figures into two circles and represents facet C. The internal circle contains items that relates to general characteristics, like item 12 “I like who I am.” The external circle contains items of specific nature such as item 4 “I’d have done better had I been prettier.”

Discussion

The findings of the current study demonstrate several aspects of facet theory. The obtain cylinder structure supports the predicted structure of the mapping sentence and indicates the importance of its various facets in the self-concept construct.

The polarizing facet in the mapping sentence (facet D) divides the SSA map into five sectors that represents the self-concept domains. Four of these domains – physical, personal, social, and family – were also built-in in the
structure of the TSCS (Fitts, 1965). However, the present scale adds the gender domain to the self-concept structure. Indeed, gender is an important aspect in the personal development of young females – as well as in young boys – and should be included when measuring self-concept.

It is of interest to note that the five domains in the present solution were sub-divided into two broader categories – intrapersonal and interpersonal (facet B). This broader division of the self-concept characteristics has been observed in the TSCS (Levin et al., 1978), as well as in the California Personality inventory (Farley & Cohen, 1974; Karni & Levin, 1972). This distinction between the self relating to “self” vs. the self relating to “others” further supports the claim that the self-concept is a social construct and it is influenced by the manner in which a person interacts with his social environment as well as by the manner that he assumes his social environment perceives him (Coopersmith, 1967).

Of special interest in the SSA map of the self-concept is the role of the modulating facet – facet C. This facet differentiates between general characteristics of the self vs. its specific aspects. This distinction has never been applied in studies of self-concept. Nevertheless, the global-specific dimension is an important aspect in the casual attribution theory that predicts positive self-concept and susceptibility to depression (Abramson, Seligman & Teasdale, 1978). Obviously, a positive self-concept, which relates to general aspects of the individual, is more influential than a positive self-concept, which relates to specific aspects of the self.

In addition to the contribution of facet C - generality vs. specificity – to our conceptualization of the self-concept, it has a structural relevance to facet theory in general. In the present SSA map, facet C serves as a modulating facet, where general aspects of the self-concept cluster around the origin of the map and specific aspects scatter at the periphery. This phenomenon has been observed in many radex solutions of SSA and in many different measures (Cohen, Sonne, & Zvilna, 2003; Gutman & Levy, 1991; Levy & Guttman, 1975).

Another contribution of the present solution that relates both to self-concept and facet theory is the role of facet A - the valance facet. Facet A divides the cylinder into two separate parts – items with a positive valance and items with negative valance. The above distinction suggests that in order to have well-organized self-concept, it is not enough to know who are you, and what you can do. You also need to know who you are not, and what you cannot do. Attention to the items valance has been taken into consideration in the development of the TSCS (Fitts, 1965) and its validity was supported in several empirical studies of the TSCS (Ganor, 1991; Levin et al., 1978), as well as in studies of other self-concept measures (Dancer, 1985; Levy, 1996). Another specific attribute of facet A is that it serves as a stem facet, namely an order facet that describes only the range facet and does not modify any other facet.
The Structure of Feminine Self-Concept of Pre-Adolescent Religious Girls in Israel

(Levy, 2005; Levy & Guttman, 1975). According to Guttman’s assertion, “a stem facet should partition the space orthogonally (In Levy, 2005; p. 183),” and indeed, facet A appears as the perpendicular axis of the cylindrical structure of the current SSA solution.

The limitations and delimitations of the present study should be explicated. The present study relates only to young women who belong to the religious sector of the Israeli society. Furthermore, not all structuples of the mapping sentence are represented in the YWSCS. Furthermore, the item distribution is not well balanced among the structuples. On the other hand, the present solution supports the importance the distinction of the various domains of the self-concept and offers additional domain – the gender domain. In addition, the present findings support the distinction between intrapersonal vs. interpersonal orientation, between general vs. specific characteristics, and demonstrates the relationship between structural aspects of a mapping sentence its SSA spatial representation.

References


The Structure of Emotions in Learning Situations

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Abstract. Two studies are reported that investigate the structure of emotions in learning situations at the university. A mapping sentence relates the three facets of ‘learning situation’ (Facet A: in class, independent studies alone, in groups, examinations), ‘type of emotion’ (Facet B: current, retrospective, prospective), and ‘valence of emotion’ (Facet C: positive, negative) to an evaluation range facet. Participants evaluated the degree to which a specific emotion type with a specific valence typically arises in a specific learning situation. In both studies, Facets A and C yield clear regional patterns in Smallest Space Analyses, whereas Facet B emerges only for positive emotions.

1. Introduction

The present paper is concerned with the role of emotions in learning situations. Emotions arise from very diverse sources and may influence learning processes in various ways. For instance: (a) Emotions occur as reactions to events or achievement outcomes, e.g., pride or disappointment, (b) the anticipation of future achievement situations or outcomes may elicit intense emotions such as fear or excitement, (c) numerous cognitive processes are affected by emotions, such as creativity in problem solving, (d) emotions guide motivation and perseverance, and (e) emotions influence self perception as well as perception of others.

However, emotions have not been extensively investigated in learning and achievement contexts (Jerusalem & Pekrun, 1999). A few approaches exist that try to classify achievement-relevant emotions (Pekrun, 1998) or analyze the impact of emotions on cognitive performance (Bless & Fiedler, 1999). These approaches, however, deal with mood and general affect rather than with concrete emotions such as anger or disappointment. The relationship between concrete emotions and learning has rarely been investigated. There are two exceptions (Pekrun, Goetz, Titz & Perry, 2002): (a) test anxiety is an achievement-related emotion that has received ample attention, and (b) Weiner’s (1986, 1995) attributional theory of emotion specifies the cognitive appraisal patterns that lead to achievement-related emotions such as pride, guilt, anger or resignation.
1.1. Emotions in Learning Situations

We will focus on the question which emotions are relevant in learning and achievement situations. We will draw on earlier work (Böhm & Pfister, 1996; 2005; Rhein & Böhm, 2002; Pfister & Böhm, 1992) in which we analyzed emotions in behavioral decisions. We classified emotions according to the point in time during the decision process at which they occur: when the decision is made, when it is implemented, and when the consequences of the decision occur. At the point of the decision, the decision maker is required to anticipate the consequences of the decision options. Imagine a student who wants to decide whether she should spend the evening studying for an exam or going out with friends. The process of anticipating the consequences, e.g., failing the exam, may elicit fear. The implementation of the decision implies some behavior to achieve the consequences. Our decision maker may have decided to study for the exam. The behavior itself may elicit positive or negative emotions; our student may enjoy or abhor studying. Finally, when the consequences occur, they arouse emotions as well. Our student may be proud of a good grade in the exam. As the example suggests, during the course of a behavioral sequence quite complex and contradicting emotional patterns may be experienced.

1.2. A Classification of Emotions

In applying this line of argument to learning and achievement situations, we adopt the temporal structure as a classifying dimension and propose the following three-fold distinction of emotions: (a) **Current** emotions are emotions that are experienced during the performance of a task. Examples are enjoyment or boredom. Current emotions have a strong impact on both motivation and performance. For instance, Sansone and Harackiewicz (1996) argue that behavior, even if it is directed towards some positive goal, is difficult to maintain if it is not in itself pleasurable. (b) **Prospective** emotions are emotions that result from the anticipation of some future event or outcome. Examples are hope, fear or despair. Prospective emotions may foster or hinder achievement outcomes. (c) **Retrospective** emotions are reactions to events or outcomes that have taken place. Their quality often results from two aspects, a comparison of the actual performance with a standard of comparison on the one hand, e.g., the achievement that is expected or hoped for, and a causal attribution of the outcome on the other hand. Examples are pride, relief, anger or disappointment.

Each of these three emotion types can be **positive** or **negative**. The valence of emotions is generally considered to be their most fundamental aspect (Ortony, Clore & Collins, 1988). The valence of an affective state informs the organism about its relationship to its environment. The basic motivating force of the valence of an affective state is its orienting function in guiding behavior. Affect also signals the speed of goal attainment: Fast and unexpected goal attainment
generates positive affect, whereas goal attainment that is slower than expected arouses negative affect (Carver & Scheier, 1990). A similar classification of achievement-related emotions has been proposed by Pekrun (1998).

### 1.3. A Classification of Learning Situations

Pekrun (1998; Pekrun et al., 2002) demonstrated that different learning situations are associated with different emotional patterns. For instance, emotions that indicate personal responsibility (e.g., guilt) were more frequent when studying at home than in the classroom, whereas during class the current emotion boredom was relatively frequent. We therefore distinguish different learning situations as an additional facet. The literature on educational science suggests that the amount of self-regulation and the amount of social interaction are important dimensions of learning situations. Self-guided learning – in contrast to a passive reception of knowledge in a lecture-style class – is considered to be the superior way of learning, because it integrates the acquired knowledge into action plans and relates it to self-relevant goals, which enhances its emotional significance (Hänze, 2000). These results suggest that the amount of self-regulation correlates with emotional intensity and should therefore be considered when distinguishing learning situations. The second aspect, amount of social interaction, is suggested by the attribution and achievement motivation literature that has identified control and ascription of responsibility as the relevant aspects that discriminate between different concrete emotions (e.g., Weiner, 1986). For instance, pride or guilt result if the self is held responsible for an achievement outcome, whereas anger or gratitude follows from ascription of responsibility to somebody else. Presumably, the possibility of assigning responsibility to others varies with the number of other people who are involved in the situation and with the intensity of the social interaction. We distinguish four learning situations as elements of the facet ‘situation‘ that differ with respect to the two aspects self-regulation and social interaction: attending classes, independent studies alone, learning in groups, and taking examinations.

### 1.4. A Mapping Sentence

The three aspects of valence, situation type and emotion type are captured in the mapping sentence (Shye, Elizur & Hoffman, 1994) shown in Figure 1. This mapping sentence was applied in two analogous studies, each study with a different sample and a slightly different approach in defining the structuples. Study 1 was conducted at the University of Dortmund using a sample of students of different faculties, Study 2 was conducted at the University of Lüneburg with students from the department of business psychology as participants.
2. Study 1

Forty eight students at the University of Dortmund, most of them from the department for educational studies, participated as volunteers in the study (56.3% female, 43.7% male, mean age 24.5 years). They received 10 € for participation. Filling out the questionnaire took about one hour.

2.1. Material and Procedure

A questionnaire was constructed as part of a larger study which included for each of thirteen learning situations (attending a seminar, attending a lecture, preparing for courses alone at home, writing a presentation alone at home, discussing in a study group, doing research in the library or the internet, being with other students in the cafeteria, talking with friends about one’s studies, attending office hours, preparing for exams alone at home, taking oral exam, taking a written exam, announcement of exam grades) a list of thirty specific emotions. For each situation and emotion, participants indicated the degree to which they usually experienced the emotion on a seven-point rating scale from “not at all” (1) to “very strong” (7). From these ratings, all 24 possible structuples were constructed as aggregated variables, i.e., for each structuple two equivalent situation items and two equivalent emotions were selected and the four ratings were

![Fig. 1. Mapping sentence of emotional reactions to learning situations](image)
For example, for the structuple “class (situation facet) x current (emotion facet) x positive (valence facet)” the ratings of the following four items were added: feeling joy in a seminar, feeling content in a seminar, feeling joy during a lecture, feeling content during a lecture.

2.2. Results

The set of 24 structuples was submitted to a SSA analysis using the monotonicity coefficients among all structuples (computed by the HUDAP program; Amar & Toledano, 2001) as input. The two-dimensional solution, with a coefficient of alienation of .185, is shown in Figure 1. Positive and negative emotions can be perfectly separated. However, the situation facet and the emotion type facet do not yield a consistent overall regional pattern; also, with higher dimensional SSA analyses the picture remains basically unchanged. A closer look reveals that within the positive and negative regions, the situation facet elements can be identified as separate polar regions (see dotted lines in Figure 1). Therefore, the positive and negative items were analyzed separately.

Fig. 2. Plot of Dimensions 1 and 2 (Study 1)
Positive Emotions. The twelve structuples of positive valence were submitted to a SSA analysis based on the monotonicity coefficients. Figure 2 shows dimensions 1 and 3 from the three-dimensional solution (coefficient of alienation = .111). Facet A (situations) yields a clear polar pattern (separation index = .936) with only one mislocation (‘Exam retrospective’); as can be seen in Figure 2, the polar regions are constituted by the situation types ‘group’, ‘class’, ‘alone’, and ‘exam’ from left to right. Facet B (emotion types) yields a modular pattern (separation index = .917) with the current emotions located in the center, and the prospective and retrospective emotions in the periphery. Again, only the ‘Exam retrospective’ structuple is mislocated. Together, both patterns generate a radex structure with the situation facet playing a polar role and the emotion type facet playing a modular role.

![Fig. 3. Plot of Dimensions 1 and 3, positive valence only (Study 1)](image)

Negative Emotions. Analogous to the positively valenced items, the twelve structuples with negative valence were analyzed via SSA. Figure 4 shows dimensions 1 and 2 from the two-dimensional solution (coefficient of alienation = .159). The elements of the situation facet can be perfectly separated by a polar partitioning. However, contrary to the positively valenced items, no clear-cut separation is possible for the emotion type facet.

In sum, the facet analysis confirms the usefulness of Facet A (situations) and Facet C (valence) to model the structure of emotional reactions in learning situations. Facet B (emotion type) is less clear; only with positive emotional valence items a modular pattern emerges, suggesting a gradient from current emotions via prospective to retrospective emotions.
3. Study 2

Study 2 was largely equivalent to Study 1, with the important exceptions that a different sample was used and that questionnaire items were constructed specifically as one-item structuples. Seventy-eight students from the faculty of business psychology at the University of Lüneburg participated as part of their course requirements (74.4 % female, 25.6 % male, mean age 24.5 years). It took about half an hour to fill out the questionnaire.

3.1. Material and Procedure

The questionnaire included one item for each structuple. Each item represented a statement of the form “Whenever I am in <situation> I usually feel <emotion>”, for which participants indicated on a seven-point rating scale how strongly the statement applies (from “does not apply” (1) to “applies” (7)). The elements of the situation facet (in class, alone, in a group, during an exam) and the elements of the emotion type facet (current, prospective, retrospective) constituted the respective concepts in the questionnaire items. For each emotion type, two variants according to the valence facet (positive, negative) were chosen: content/discontent as a current positive/negative emotion, anticipation/apprehension as a positive/negative prospective emotion, and relieve/disappointment as a positive/negative retrospective emotion. For example,
the item “In lectures or seminars, I usually feel content” asked for the degree of a positive current emotion in a class situation. Taking all combinations of facet elements, the questionnaire consisted of twenty-four items.

3.2. Results

A Smallest Space Analysis was computed on the weak monotonicity coefficients among all twenty-four items simultaneously. In dimensions 1 and 2, a perfect separation of positively and negatively valenced items was found (CoA = .195 for the two-dimensional solution); however, as in study one no overall partitions for the situation and the emotion facet could be identified. However, within the partitions of positively and negatively valenced items, regions according to the situation facet emerge. We assume that the difficulty to separate situation and emotion type regions consistently is most likely due to the strong impact of the valence facet. The positive and the negative items were therefore analyzed separately.

Positive Emotions. The twelve positively valenced structuples were submitted to SSA based on their monotonicity coefficients. With a three-dimensional solution (coefficient of alienation = .085), a perfect partitioning along a polar facet was obtained with respect to the situation facet (Figure 5); a similar pattern but with one misplacement could be obtained by the two-dimensional solution (coefficient of alienation = .168). However, no clear-cut pattern emerged with respect to the emotion type facet. An inspection of dimensions 2 and 3 shows a propensity to show a polar pattern (separation index = .701), but even a four-dimensional solution (which is somewhat trivial with only twelve data points) does not yield a consistent separation.

Negative Emotions. Parallel to Study 1 and to the analysis of positive items in Study 2, a two-dimensional solution of the SSA (coefficient of alienation = .127) yields a perfect separation of Facet A elements, depicting a polar pattern. Again, with respect to Facet B, no regular partitioning could be obtained.

In sum, the findings from Study 2 are highly similar to Study 1, replicating the basic results. Not surprisingly, the valence facet (Facet C) splits the set of items into two entirely distinct regions without overlap. Within each region of positive and negative valence, substructures of the situation facet (Facet A) emerge; however, since the impact of the valence facet is particularly strong, a consistent partitioning according to Facet A elements can only be obtained via separate analyses of positive and negative items. For each valence, we find Facet A playing a polar role, separating the situation elements into non-overlapping regions of ‘learning in class’, ‘learning alone’, ‘learning in a group’, and ‘having an exam’ items. For Facet B, no consistent pattern could be obtained.
4. Discussion

We suggest that emotional reactions in learning situations are systematically related to the kind of situation (Facet A), to the type of emotion (Facet B), and to the valence of the emotion (Facet C). Findings from two studies based on the mapping sentence proposed in section two, indicate that Facet C plays a dominant role, and that Facet A consistently partitions the space of emotion items into separate regions according to the facet elements ‘class’, ‘alone’, ‘in a group’, and ‘exam’. With respect to Facet B, the picture is less clear; looking at positively valenced emotions only, the three elements of Facet B seem to play a modulating role, but this finding could not be replicated consistently. Taking up the research question formulated by Pekrun et al. (2002) “Which emotions do students experience in academic settings ... and how are they structured?” our findings indicate that academic emotions (i) show a rich diversity that goes far beyond test anxiety and achievement emotions, and (ii) can be structured according to the situation they are experienced in, and (iii) might be modulated by the temporal direction of the emotion (current, pro- and retrospective).
The regionality we obtained from Smallest Space Analyses gives rise to some speculations and suggestions for further studies. The configuration in Figure 2 shows that within the regions of positive and negative valence, the situation types are well separated and even generate a directional gradient from ‘exam’ via ‘alone’ and ‘class’ to ‘group’. This dimension, which could be called a loneliness gradient, is also confirmed when analyzing positive emotions only (Figure 3 and Figure 5). Whereas learning in a group is characterized by much social interaction, taking an exam is a condition of tremendous loneliness, at least from the perspective of the examination candidate. Taking an exam or learning alone require a high degree of self-control, whereas learning in a group or attending a class allows for lesser self-control. Interestingly, this loneliness gradient runs in opposite directions if positive and negative emotions are analyzed simultaneously (Figure 2).

Only one analysis points towards a consistent pattern of emotion types as postulated in Facet B. There might be a gradient from current via prospective to retrospective positive emotions, possibly indicating the degree of temporal proximity. However, we do not know if prospective or retrospective emotions differ in temporal closeness, and if the qualities of pro- and retrospective emotions can be mapped onto a temporal dimension. Finally, it should be emphasized that our emotion typology is certainly incomplete; the inconsistency in our findings indicates that maybe some important emotional categories are missing, such as social emotions (Hareli & Weiner, 2002; Pekrun et al., 2002). Structural studies such as this one lay the ground for reasonable interventions in applied settings. It is well known that emotions affect motivation, self-concept, cognitive performance and achievement of students. In order to influence these emotional mediators differentially, we need to know which kind of distinct situations give rise to which kind of discrete emotions, and how these emotional reactions are related. Furthermore, a valid structural description provides cues where to look for general characteristics that shape the emotional repertoire of students, such as the degree of social interaction, self-regulation, and temporal proximity.

References


Chapter 5.

FT in Work and Organizational Research
Ten Answers in Search of a Question

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Abstract. Facet Theory provides a structure for asking questions in murky domains. In the past, and to some extent even now, applied psychology has been characterized by rampant empiricism at the expense of coherent theory, plausible inferences, and practical implications. In this paper, I identify three general areas for the application of the discipline of Facet Theory. These areas include assessment, organizational dynamics, and policy formulation. First, I identify ten “answers” in need of rigorous “questions.” Then I present exemplars of mapping sentences to show how the rigor of Facet Theory can help articulate the underlying structure of some commonly accepted “answers” to important questions in applied psychology.

Introduction

An examination of the long and rich history of Facet Theory suggests that Facet Theory itself might profit from a Facet analysis. It is many things to many people. To some, it is a rigorous approach to hypothesis formulation. To others, it is a method for developing both an experimental design and a method for testing hypotheses. It can also be seen as a series of specification statements for multivariate analyses confirming the existence of constructs as well as any dependencies among those constructs.

I will not expose my ignorance by attempting a review of Facet Theory since I came so late to the domain. Many good reviews exist and will be summarized better than I might in other papers at the current conference. Nevertheless, on a personal and scientific level, I can describe why I am drawn to Facet Theory. In its simplest form, Facet Theory represents discipline. As a consumer of research in applied psychology (and as a journal reviewer), I can attest to the scarcity of discipline in the formulation and analysis of research questions. This lack of discipline leads directly to useless research outcomes and questionable inferences. In the United States, the period between 1940 and 1960 (although it might very well have been extended to include 1920-1970) was known as the period of “dustbowl empiricism” in applied psychology. Loose collections of variables were included in a research study and the resulting intercorrelation matrix was “mined” for significant results. These results were then extracted and post-hoc theories were built around them, much like putting a bullet hole in a wall and drawing a bulls-eye around it. This should not be
particularly surprising given that the foundation of applied psychology was laid, at least in part, by incomplete inductionists such as James McKeen Cattell, who believed that structure would magically emerge from data. He gathered a broad range of psychometric data on entering college students at the University of Pennsylvania and Columbia Teacher’s college, confident that the eventual intercorrelation matrix would not only “reveal” the structure of “mental ability” but also that this new intelligence would predict school success. After more than 10 years of gathering data, his efforts turned out to be fruitless. There was no emerging structure, nor could there be any predictive value in the data (Landy, 1997). He might have been one of the first and most prominent dustbowl empiricists. Had he only been presented with the power of Facet Theory in formulating his research questions, things might have been very different.

In the spirit of acceptance and reconciliation, I might accept the possibility that the newer analytic methods practiced by applied psychologists – e.g. meta-analysis, confirmatory factor analysis, and path analysis – are movements away from blind induction and ingenuous “Cattell-ian faith,” but in darker moments, I think we applied psychologists have not traveled as far as we might like to believe in the last 100 years. Multivariate analyses are seductive. It is tempting to substitute results for logic or theory building. It is easier - and the bar is set very low on editors. Rigorous and high powered analyses are substituted for thoughtful research design. As researchers, we are simply expected to identify at least one competing hypothesis for our favored explanation. There is considerably less attention paid to where those competing hypotheses came from in the first place. Facet Theory requires that we pay closer attention to extant data and theory by requiring a mapping sentence.

**Successful Applications of Facet Theory to the Workplace**

There are, of course, exceptions to this general indictment of applied psychology, particularly when one looks at examples of applied domains “exposed” to facet theory. Some of these examples include the following:

- The study of work values (Elizur, Borg, Hunt & Beck, 1991)
- The study of leadership styles (Shapira, 1976)
- The examination of performance appraisal rating behavior (Tziner, Murphy, Cleveland & Levy, 2004)
- The manner by which organizations process information (Yaniv & Elizur, 2004)
- The structure of organizational culture (Sternberg, Elizur & Carmeli, 2005)
- The measurement of self-efficacy (Martincevic, Potocnik, Tacer & Podlesek, 2004)
- The dimensionality of the psychological contract in the workplace (Setter, 2004)
- The dynamics of corporate change (Solomon, 2004).

An examination of these applications of facet theory to the consideration of real-world scenarios shows the clear value in the specification of theory before the fact. But, as the saying goes, so many bad ideas and so few days. These are merely drops in an ocean of undisciplined thinking. What I would like to do today is “nominate” some poorly thought out ideas (and research paradigms) in applied psychology in the workplace, and show how the simplest “tool” of facet theory – the mapping sentence – could shed light where narrowness and contradiction now prevail.

**Answers in Search of Questions**

In this section, I will present ten “answers” in search of questions. These are neither the only answers that need questions, nor are they the most important answers in search of a question. Nevertheless, they do represent mainstream research design, inference, and often prescriptions for application. These “answers” will be rendered in their simplest forms to facilitate the creation of a mapping sentence. To be sure, many researchers have examined one or more facets that will be illuminated in the mapping section of the paper. But these “one-off” examinations of boundary conditions for findings have seldom had a lasting effect on the generally accepted notion that will be demonstrated by the “answer”. First, I will identify the ten answers, and very generally, the research domain that “supports” them. In the subsequent section, I will present the argument for a broad mapping sentence as a foundation and pathway for more credible research into each of these “answers”. I will also suggest a rudimentary “research design” for examining several of these questions.

**Some Assessment “Answers”**

**Answer #1: Employment interviews are valid.** There is a rich literature that pits one type of assessment information against another in the hope of capturing “more” criterion variance than the competing type of information. With respect to the interview, there are two common “competitions” – one is between the interview and a paper and pencil test of cognitive ability, while the other is between a structured and unstructured interview (Landy & Conte, 2004). Some studies show that the interview demonstrates incremental validity; others show that it does not; some studies show that the structured interview is “more” valid than the unstructured; others do not – or show the opposite.

**Answer #2: Emotional intelligence is as important, if not more important than academic intelligence in the real world.** In 1983, Howard Gardner
introduced the notion of multiple intelligences (Gardner, 1983). Two of these intelligences included intrapersonal intelligence and interpersonal intelligence. Goleman (1995; 1998) latched on to the concept and began making increasingly grand claims for the importance of emotional intelligence in predicting school and work success. There is a great deal of debate about these claims (Landy, 2005a; 2005b).

**Answer #3: Academic Intelligence predicts work performance:** The first mental test was introduced by Cattell in 1888 as a way of helping Francis Galton demonstrate the credibility of Charles Darwin’s principles of evolution. Since that time, there has been an unbroken string of research devoted to showing that general mental ability predicts work performance Landy & Conte, 2004; Schmidt & Hunter, 1998). The typical criterion in this research has been overall ratings of job performance.

**Some Organizational Answers**

**Answer #4: Leaders should empower followers.** Many if not most modern theories of leadership suggest that the role of the leader is to transfer power to followers. It is assumed that such a transfer increases job satisfaction, work motivation and effectiveness among followers. Most theories of leadership emerge from the United States.

**Answer #5: Job Satisfaction is good and job dissatisfaction is bad.** Since the pioneering work by Mayo (1924) and DeMan (1929), followed by the work of Herzberg (1966), it has been assumed that increased job satisfaction would lead to increases in worker motivation, worker effectiveness and commitment, while decreased job satisfaction would lead to absenteeism, turnover, and decreased productivity. The theories of the 1960’s considered job satisfaction to be the weighted sum of individual “satisfactions” (Porter & Lawler, 1968).

**Answer #6: Organizational Safety is best accomplished through training.** Both the safety of workers and the safety of the public has been a major focus for applied psychologists for well over 60 years. Common commercial sectors include the nuclear industry, mining, transport, and heavy manufacturing. A common response to unsafe behavior on the part of workers is to initiate individual worker training programs.

**Answer #7: Socialization of new hires will improve the person-environment fit.** It is commonly assumed that socialization programs for new hires will help that new hire to adapt to an extant organizational culture, and that the extant organizational culture flows from a strategically constructed vision of senior leaders, responding to global competitive challenge.
Some Policy Answers

Answer #8: Organizational Bullies are not tolerated. In the United States, and to a certain extent in other industrialized nations, there is a general assumption that bullying at the workplace is uncommon, and mitigated by co-worker intervention. Everyone agrees that bullying is bad and that bullying is the result of personality flaws in the bully.

Answer #9: 360 degree feedback is desirable. In the last decade, more and more organizations are moving toward the gathering of performance information from many different sources, including the observations of subordinates about managers. It is believed that the greater the number of sources of information, the more reliable and credible that information will be.

Answer #10: Adverse Impact is a sign of unfairness in an organization. Adverse impact in an organization is defined as the disproportionate distribution of rewards to members of minority and majority groups. It is assumed that rewards should go to those most likely to further the commercial interests of the organization and not to individuals simply based on demographic characteristics.

Mapping Sentences

In this section, I will generate mapping sentences for the one “answer” in each of the three distinct sections listed above. I will also suggest some broad ways in which the sentence might be investigated. By doing this, I hope to demonstrate how the discipline imposed by facet theory produces credible “answers” to replace their less comprehensible counterparts. Although in this abstract, I will only present three examples, in my full paper, I will present mapping sentences for each of the 10 “answers.”

#1: Assessment Answers: Employment Interviews. There are at least two continua on which employment interviews might differ – they may differ in structure and they may differ in content. As an example, Huffcutt and his colleagues (Huffcutt, Roth & McDaniel, 1996; Huffcutt & Arthur, 1994) have illustrated that one might consider both the structure of the stimulus elements in an interview as well as the scoring scheme. Similarly, employment interviews may vary in the content of the stimulus elements (Harris, 1998; Landy & Conte, 2004). In addition, there are multiple additional assessment devices with which interviews might be combined. Finally, there are multiple criteria which might be the object of prediction. The following mapping sentence captures these varying facets to the employment interview and the complex relationship of the interview to various criteria:
An employment interview with

Facet A: Stimulus Questions
- Structured
- Unstructured

And with

Facet B: Scoring Format
- Structured
- Unstructured

And with

Facet C: Stimulus Content
- General mental ability
- Personality

will demonstrate incremental validity when combined with

Facet D: Alternate Predictor
- Paper and pencil test of mental ability
- Paper and pencil test of personality

Facet E: Performance Domain
- Contextual performance
- Technical performance

Thus, one may only assert that the employment interview demonstrates unique or incremental validity by specifying the boundary conditions described above. The research design is complex, and requires the administration of interviews with varying levels of structure in both content and scoring and varying in nature of content. It also suggests the administration of paper and pencil tests of both general mental ability and personality. As an example, one might hypothesize that an interview structured with respect to both content and scoring, with a technical knowledge or reasoning substance, paired with a paper and pencil test of general mental ability, would add little incremental validity to the prediction of any form of performance. In contrast, an unstructured interview with a personality-based content, paired with a paper and pencil test of general
mental ability might demonstrate considerable incremental validity in the prediction of contextual performance. One might also hypothesize that the greatest threat to demonstrating any incremental validity in the interview is the lack of structure in the scoring format.

#5: Organizational Issues: Job Satisfaction. In most orthodox treatments of job satisfaction, although it is acknowledged that a final affective state (overall job satisfaction) may result from the combination of several sub-states (e.g. satisfaction with pay, satisfaction with co-workers, etc.), it is still generally assumed that there can be only one affective state called job satisfaction which results in some weighted average of the sub-states. Bruggeman and her colleagues (Bruggemann, Groskurth & Ulich, 1975; Bussing, 1992) have proposed six types of job satisfaction that might result from various combinations of outcomes, perceptions and changing levels of aspiration. Further, they suggest that each of these types of satisfaction might lead to very different work behaviors. They suggest a feedback loop connecting outcomes, to perceptions of control, to adjustments of aspiration, and ultimately one of six potential “states” of satisfaction. In this example, I will ignore the possible behavioral outcomes of the state of satisfaction and concentrate on the evolution of the six unique states of job satisfaction. Thus in a given workforce,

An individual will recognize

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<th>Facet A: Outcome Comparison</th>
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<td>Outcomes congruent with aspirations</td>
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<td>Outcomes discrepant with aspirations</td>
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And will estimate

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<th>Facet B: Controllability of the work situation</th>
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<td>Controllable work situation</td>
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<td>Uncontrollable work situation</td>
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And in turn

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<th>Facet C: level of Aspiration</th>
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<td>Increase level</td>
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<td>Maintain Level</td>
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<td>Decrease level</td>
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Resulting in

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<th>Facet D: Type of Job satisfaction/dissatisfaction</th>
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<td>Progressive work satisfaction</td>
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<td>Stabilized work satisfaction</td>
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<td>Resigned work satisfaction</td>
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<td>Pseudo work satisfaction</td>
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<td>Fixated work dissatisfaction</td>
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<td>Constructive work dissatisfaction</td>
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The research design necessary to examine this structure would need to be dynamic in order to examine reactions to outcomes and changes in level of aspiration. This suggests a longitudinal design with both within- and between-subjects elements. Pre-measures would include initial aspirations. Dynamic measures would include perceptions of controllability and changing levels of aspiration subsequent to outcomes.

#9: Policy Issues: 360 degree feedback. It is becoming almost axiomatic in HR circles that increasing the scope of performance feedback is good for the individual and for the organization. When the term 360 degree feedback is used, the implication is that subordinates will comment on the effectiveness of a supervisor’s behavior. Nevertheless, the acceptance and accuracy of that system for gathering information feedback is likely to depend on several factors including the national culture of the organization and how the information will be used. Hofstede (2001) has identified several national cultural dimensions that will affect both the accuracy and the acceptability of the 360 degree feedback process. Most relevant of these factors are Power Distance, Individualism, and Masculinity. In high power distance cultures, the gap between a manager and a subordinate is substantial and acceptable to both parties. The implication is that a subordinate would never imagine commenting on the effectiveness of a manager, and more importantly, would not have critically observed or retained such information. This suggests that not only might the collection of information from a subordinate regarding a manager be considered inappropriate by both parties, but more importantly, that any response from the subordinate would be unreliable since appropriate information was not available for the rating process.

Feminine cultures emphasize interaction and process, reducing the importance of competition. In contrast, masculine cultures emphasize production, goal attainment, and interpersonal competition. As a result, one might expect that affective reactions to feedback regarding technical success might be received differently in feminine than masculine cultures.

Finally, time orientation can be a potent variable in the acceptability of feedback. Long-term time orientation cultures are oriented more toward career development and long term goals, while short-term time orientation cultures are oriented more toward concrete short term goals and accomplishments. Thus, the national culture will affect both the rater and the ratee. From the rater’s perspective, he or she might be asked to provide information incompatible with cultural dimensions. From the ratee’s perspective, he or she may be provided with information that he or she feels is inappropriate and/or lacking in credibility or accuracy.
The acceptability of 360 degree feedback will be affected by

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<th>Facet A: Power Distance Accepted by National Culture</th>
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<td>Low Power Distance</td>
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<td>High Power Distance</td>
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<th>Facet B: Masculinity/Femininity of the National Culture</th>
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<td>Feedback Process</td>
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<td>Outcome Feedback</td>
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<th>Facet C: Time Orientation of the National Culture</th>
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<td>Short-term Orientation</td>
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<td>Long-term Orientation</td>
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<th>Facet D: Consequences of the Process</th>
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<td>Reward Distribution</td>
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<td>Individual/Career Development</td>
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Two types of design suggest themselves. The first is a multinational environment where the corporate headquarter's HR has decided to roll out a 360 degree feedback system globally. One can anticipate some resistance in high power distance cultures (as identified in the work of Hofstede). If the system is directed toward goal accomplishment, one might expect resistance from feminine cultures (as identified in the work of Hofstede). If the system emphasizes short term goal accomplishment (e.g. fiscal or calendar year), one might expect resistance from long-term time orientation cultures (as identified in the work of Hofstede). A second design would ask respondents in various cultures to react to a proposed 360 degree feedback system with systematically varied parameters.

Summary and Conclusions

There are many important constructs in applied psychology that require careful articulation. These constructs include incremental validity, intelligence, job satisfaction, person-environment fit, leadership styles, and organizational
fairness. The disciplined approach afforded by Facet theory provides a foundation for theory building and theory testing in these areas.

References


Organizational Culture: A Facet Analysis

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Abstract. Organizational culture (OC) is one of the most prominent concepts in organizational science. Despite its prominence, this concept is in debate and does not load into a single definition (Ott, 1989) and is yet to be evaluated systematically. By applying Facet Theory, the present study suggested a formal definitional framework for the OC domain including three facets: behavior modality, referent, and object. Based on data collected from 230 employees in the financial industry the hypotheses were tested and supported. A radex structure was obtained for each of the objects: work and IT, when one facet, behavior modality, ordered the space center to periphery, and the other facet, referents, relates to the direction away from the origin.

1. Introduction

Organizational culture is one of the most prominent concepts in organizational science for which scholars and practitioners have directed considerable attention. The conceptualization of this construct has been evolved during the 1980s and 1990s (e.g. Denison, 1990; Hofstede, Neuijen, Ohayv & Sanders, 1990; Katz & Kahn, 1978; Pettigrew, 1979; Schein, 1985, 1990; Schneider, 1987, 1990).

Despite these considerable efforts, and the fact that many use this term on a regular basis, “it is still far from being interpreted universally” (Carmeli, 2005). As Schein (1990, p. 109) put it, “each culture researcher develops explicit or implicit paradigms that bias not only definitions of key concepts but the whole approach to the study of the phenomenon”. In specific, organizational culture is, though its wide use, a concept in debate which does not load into a single definition (Ott, 1989) and is yet to be evaluated systematically.

Carmeli’s (2005) review of the literature revealed different approaches and definitions of organizational culture. Rousseau (1990) suggested that we might consider the following major components of culture in organization, organized on the continuum line from readily assessable to difficult to assess (e.g. material artifacts, patterns of activities, behavioral norms, values, and fundamental assumptions). In the absence of a consensus about the definition of
organizational culture, Hofstede, Neuijen, Ohayv & Sanders (1990; p. 286) proposed that most scholars would not dispute that the construct is: (1) holistic, (2) historically determined, (3) related to anthropological concepts, (4) socially constructed, (5) soft, and (6) difficult to change. Using the term organizational culture, Denison (1996, p. 624) refers “to the deep structure of organizations, which is rooted in the values, beliefs, and assumptions held by organizational members”. Pettigrew (1979, p. 574) embraced a more broadly approach suggesting that we should “regard culture as the source of family of concepts” (i.e. symbol, language, ritual and myth).

Surprisingly, therefore, a major problem with the study of organizational culture is the absence of an explicit conceptualization of this construct and its meaning. This clearly has implications for our inability to deepen our understanding in this research subject and therefore lacking the necessary basis for valuable measurements. Xenikou and Furnham’s (1996) study demonstrated this concern. These scholars have empirically tested four measures of organizational culture [organizational culture inventory (Cooke & Lafferty, 1989), culture-gap survey (Kilman & Saxton, 1983), organizational beliefs questionnaire (Sashkin, 1984), and the corporate culture survey (Glaser, 1983)] that Rousseau (1990) considered as the most established measures of organizational culture. Their findings indicated an overlap between the subscales of the four measures examined (Xenikou & Furnham, 1996).

In an attempt to address this difficulty, we used a facet analysis to explore the structure of the organizational culture domain as defined by the mapping sentence (below), and to see whether or not the internal structure of the definition would be confirmed by an appropriate structural analysis of empirical data.

### 2. Defining the Facets of Organizational Culture and IT Utilization

Content analysis of the literature and examination of items included in previous research led to the delineation and classification of content areas that constitute the conceptual space of corporate culture. Three basic facets could be distinguished and defined: behavior modality (cognitive, affective, instrumental, value, and norm), referent (employee, colleagues, supervisor, and management), and object (work, and IT).

**Facet A - Behavior Modality**

The behavior modality facet is a general facet relevant to a great variety of studies in the behavioral sciences. In previous studies usually three basic elements were identified: cognitive, affective and instrumental (Elizur et al. 1991, Elizur & Guttman 1976, Elizur 1970, Elizur & Sagie 1997, Levy 1985). According to the above suggested definition of corporate culture that includes the values, norms, and attitudes perceived by the individual as prevalent within
the organization, we extended this facet to include also values and norms. Thus, Facet A, Behavior Modality includes five elements: cognitive, affective, and instrumental behavior, values and norms. The fact that this facet has been included in many investigations in the behavioral sciences will enable us to compare the results of this study with previous research.

**Facet B - Referent**

The behavior of an individual is determined not only by his own perceptions, feelings and other intrapersonal processes. From early childhood a person learns by experience what kind of behavior is acceptable to other people and is effective for the achievement of his goals. Every person has his own social environment and certain groups to which he belongs (family, work, hobbies etc.). In these environments, certain individuals or groups exist whose behavior and opinions are especially significant to an individual (Elizur, 1970). In the work environment the employee is usually in close interaction with his co-workers and direct supervisor. Considerably fewer opportunities for interaction with management usually exist for the individual employee. The situation may be different in smaller organizations, or in the case of large scale changes that require involvement of management. Accordingly we included four elements of the referent facet: the employee, co-workers or colleagues, supervisor and management.

**Facet C – Object**

Organizations hire people to do the work necessary to reach their goals. Employees spend the major part of the day doing their work. The jobs, conditions and relationships may be considered as a basic element of OC. Previous studies have focused on attitudes directly related toward IT and their influence on the individual’s usage. We suggest that attitudes toward work, not directly related to the change (IT), may affect the behavior IT usage as well. An additional basic element of the OC domain appears to concern the attitudes, values and norms related to the organization itself. This element was not included in the present study. The object facet will, therefore, include three elements: work, change and organization. The present study covered the first two elements only.

**The Mapping Sentence**

A mapping sentence is a verbal statement of the domain and of the range. The mapping sentence consists of the three basic constituents of the problem under study: respondents, stimuli, and responses, which are the population facet, the content facets and the response facet respectively (Shye & Elizur 1994). Based on the previously defined facets, the following mapping sentence is proposed as a definitional framework for analyzing the content universe of organizational culture.
3. Research Hypotheses

The main objective of the present study was to analyze the structure of the organizational culture domain as defined by the above mapping sentence, and to see whether or not the internal structure of the definition would be confirmed by an appropriate structural analysis of empirical data.

It was hypothesized that such an analysis would reflect the facets as independent classifications. As to the order between the elements of the facets, the modalities facet, Facet A, being a general facet precludes a general order specification independent of the other facets of the study. When the order of the modality facet relates to other facets, without having the same meaning of direction, it may be expected to play a modulating role. In such a case the instrumental modality being in the outer band, and the affective and cognitive in the inner band near the origin (Levy, 1985). Since our study includes two additional elements, values and norms, which are basically cognitive, they may be expected to be located in the inner band near the cognitive region.

As to the order of the elements of the referent facet, Facet B, it has no a-priory ordering. Thus the facet is expected to be polarizing where each of the referents corresponds to a different angle away from the origin. The rational for this hypothesis is that the study sample is based on relatively small organizations, and in such organizations a closer relationship between the referents may be expected.

The total structure of the domain is expected to be that of a Radex structure. This is a radial distribution of the items as points where one facet corresponds to
the axial direction from center to periphery and the second facet relates to the
direction angles around the axis.

Facet C presents the two objects of behavior addressed in this study: work
and IT. Based on previous research (Elizur & Guttman, 1976) it may be
expected that the two universes will provide each a distinct radex structure.

4. Method

4.1. Subjects

The empirical study included 230 respondents from six firms within the Israeli
financial industry. All of the organizations use Local Area Networks and use
varied types of computer software. Five of the six organizations have less than
100 employees, and one organization has approximately 1,300 employees.

The sample was chosen based on cluster sampling. In smaller
organizations, the whole company was included in the study, while in larger
organizations all the employees in a number of departments were included. The
total number of respondents participating in the study was 230. 51% of the
respondents were female, and the average age of the respondents was 42.
Respondents were in their organization for an average of 10 years and in their
respective positions for an average of 5 years when the study was conducted.
91% of the respondents had at least a high school education and 42% had
academic degrees. 8% of the respondents were middle managers (of 6 –
40 workers) and the remaining 92% were employees or managers of small work
groups (of up to 5 workers).

4.2. The questionnaire

Based on the theoretical analysis and previous studies a 31 items questionnaire
for observing the behavior of the referents toward work and the computer was
constructed.

5. Results

Smallest space analysis was found appropriate for analyzing the empirical
structure of the domain, and to test the hypotheses related to the internal
structure of the facets defined. In order to analyze the structure of the behavior
toward work, the correlations between the items were calculated and submitted
to an FSSA computer program (see Table 1).

The results of the FSSA (Faceted SSA) computer program in the form of
a map are reproduced in Figure 1. The partitioning of the space was performed
by the computer program itself without further intervention. The results show
that there are distinct regions for each of the facet elements.
Table 1. Correlation Matrix of Referent Behavior toward Work (Creativity)

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Fig. 1. The empirical structure of the Behavior toward Work. A two Dimensional SSA, separation index= 0.95, coefficient of alienation = 0.14

In the SSA map, each item is represented by a point. The distance between the points is based on the correlation between each individual item and the remaining items. The higher the correlation between the items, the smaller the distance between the points representing them should be.

The separation index, ranging from 0 to 1, assesses the extent to which the conceptual space could be partitioned into regions according to the different facets and their elements. The closer this coefficient is to 1, the better the fit.
The separation index of 0.952, indicates a very good fit between the data and the hypothesized definitional framework of the content universe. The coefficient of alienation, estimating the goodness of fit between the correlation matrix and the geometric solution obtained was 0.14.

Observing the map in Figure 1, which presents the structure of behavior toward work, one sees that the empirical results support the hypotheses. The space is clearly partitioned into regions according to the behavior modality and referent facets as defined. Facet A, concerning the behavior modalities, could be partitioned into modular regions, ordering the conceptual space from center to periphery, as hypothesized. Norms are nearer to the origin in the central region of the map, surrounded by values, by the cognitive, affective, and instrumental modalities, located in the more peripheral regions of the map. The referent facet, Facet B, was found to be polarizing, with each referent corresponding to a different direction.

The total structure obtained is that of a Radex Structure, where one of the facets, behavior modality, is modulating, and the other facet, referents, is polarizing.

Let us consider now the structure of the behavior toward IT. The correlation coefficients for the behavior toward the computer are presented in Table 2. Figure 2 presents the results of a two dimensional FSSA computer program in the form of a map, regarding the behavior toward IT. The separation index obtained was 0.88 which indicates a good fit between the SSA solution and the definitional framework suggested. The coefficient of alienation was 0.05. Observing the map in Figure 2 one sees that the empirical results support the hypotheses. The structure obtained in this analysis is similar to that obtained in the analysis of behavior toward work.

Facet A, concerning the behavior toward the computer, can be partitioned into modular regions, ordering the conceptual space from the center to the periphery. Values are nearer to the origin in the central region of the map, surrounded by the cognitive, affective, and instrumental regions more in the periphery. The referent facet, Facet B, was found to be polarizing, with each referent corresponding to a different direction as hypothesized. The total structure obtained is similarly a Radex Structure, where the referent facet is polarizing and the behavior facet is modulating. This result further supports the definitional framework suggested for the corporate culture and IT usage domain.

In order to analyze the relations between the two universes of behavior toward work and toward the computer (IT), the correlations between them were calculated and submitted to an SSA computer program. In Figure 3 we can see the two radex structures side by side. They are nearer to each other at the instrumental and affective regions for Facet A - behavior modality; and at the worker and colleagues regions for the referent facet, Facet B.
Table 2. Correlation Matrix of Referent Behavior toward IT

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Fig. 2. The empirical structure of the Behavior toward IT. A two Dimensional SSA, separation index= 0.88, coefficient of alienation = 0.05

5. Discussion and Conclusions

The main objective of the present study was to analyze the structure of the corporate culture and use of IT domain. A definitional framework based on two facets: behavior modality and referent was suggested and tested. The structure obtained, which describes the two universes of behavior toward work and to the computer, seems to support the hypotheses that the two basic facets: behavior and referent, play different roles in creating contiguity. The behavior modality facet orders the sub-universes from general values and norms to more specific cognitive, affective and instrumental behavior. The referent facet, as hypothesized, tends to be polarizing rather than modulating in this context. The total structure obtained is that of a radial distribution of the variables, a radex
# Questionnaire Item Mapping

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<td>16-27</td>
<td>Items 16-27 refer to the variables related to behavior toward IT (items 1-12 in Figure 2).</td>
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**Fig. 3.** The empirical structure of the Behavior toward work and IT. A Two Dimensional SSA, coefficient of alienation = 0.173

structure, when one facet, behavior modality, is ordered from the center to the periphery, and the other facet, referents, relates to the direction away from the origin. The kind of lawfulness found to relate the definitional system to the empirical structure is that of a Radex. The rationale for this lawfulness comes from consideration of order between the elements of the facets concerned.

The behavior modality facet consists usually of three elements: affective, cognitive, and instrumental. In the present study we extended the facet by adding two elements: values and norms in order to cover the definition of corporate culture suggested. In the literature there is a dispute whether values are attitudes or not. Some authors suggest to distinguish between attitudes and values (Rokeach, 1973), whereas others consider values as a subset of attitudes (Levy and Guttman, 1976). The results of this study show that both values and norms are elements of the behavior modality facet which is a basic component of attitudes.

The structure of both of these facets, behavior and referent, has been previously investigated in various studies. Several studies (Elizur 1979, 1986; Elizur & Tziner, 1985; Stashevski & Elizur, 1999) have found that the behavior facet played a modulating role, while other studies have found an axial (Levy, 1985), or polar (Elizur 1970, 1976) role played by the behavior facet. Because of the universal nature of the behavior facet no general order can be specified. The different roles played by the modality facet are a result of the different contexts of the studies.

Similar to the behavior modality facet, various empirical studies have found different roles played by the referent facet. In addition to the modular and polar roles, in some studies it played an axial role (Elizur & Guttman 1976). The
different roles played by the referent facet result from different referent relations. A modular and axial ordering imply that the colleagues, who are in close interaction with the employee, are nearer to the employee whereas supervisors and management are more remote. A polar representation implies that no specific order can be observed, and that each referent goes off to a different direction away from the origin. In the present study we found a similar polar structure of the referent facet. This may be due to a more intensive involvement of management in the implementation and running of IT, similar to TQM programs, which reduces the distance between management and employees. The finding that management comes nearer to the employees may be explained also by the relatively small organizations included in the study. In such organizations, hierarchy may not be as stressed as in large organizations resulting in a closer relationship between the various referents.

The structure obtained describing the universe of behavior toward work and IT, tends to support the hypothesis that the two basic facets, behavior and referents, play different roles in influencing an individual’s usage of IT. As hypothesized, the behavior modality facet was modulating with organizational norms and values in the central region, near the origin. The perceived behavior of the different referents is positively related to that of the employee (see Tables 1 and 2), which indicates that the behavior of the individual worker seems to be affected by the perceived norms, values and attitudes prevalent in the organization. Managers need to understand that their own behavior toward work and IT may influence the extent to which workers are using IT.

It is reassuring to see that all the correlation coefficients are non-negative (see Tables 1 and 2), which lends support to Guttman's first law of attitudes (Elizur & Guttman, 1976). This law asserts that the regression between attitude items toward an object will be monotonic and with positive or zero sign.

References


The Theory of Work Commitment: A Facet Analysis

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Abstract. Multiple work commitment has been of increasing interest for their potential to explain different behavioral intentions and outcomes. Morrow’s (1983, 1993) work to structure the theory by mapping universal forms of work commitment used a descriptive way of facet theory to construct universal forms of work commitment. Since Morrow’s effort, no attempt has been done to theorize the facets of work commitment, and there is a need to delineate and classify the content areas that constitute the conceptual space of work commitment.

The present study addresses this need by applying facet design and analysis in an attempt to contribute to the construction of the theory of work commitment and meaningful measurement. Our study considered the identified forms of work commitment (Morrow, 1993), but goes beyond these forms to explore a basic conceptual structure of the domain. Three basic facets of the domain could be distinguished: attitude modality (identification, liking of, effort invested, involvement in, importance of), object (work, career, organization, job), and referent (employee and colleagues). Based on these facets and the range of the degree of importance, a systematic definition of the work commitment domain could be suggested. In the current research we examined two of the three basic facets: modality and object. These two facets were reflected as major determinant of the data, as suggested by the definitional framework of work commitment.

1. Introduction

Researchers in organizational behavior have long been interested in the theory of work commitment (Becker, 1992; Cohen, 2003; Meyer and Allen, 1997; Morrow, 1983, 1993). This interest has resulted in major efforts aimed at structuring and developing the theory and testing empirically its core propositions. Yet, since Morrow’s (1983) first attempt to use a facet analysis of work commitment, we have not seen any effort to structure the theory and mapping its universe. In addition, although Morrow’s (1983) work is valuable, it has not gone through a rigorous facet analysis to suggest a mapping sentence, an essential ingredient of the facet theory.
In this article, we strive to explore the basic conceptual structure of the domain. Although Morrow’s (1983, 1993) universal forms of work commitment are considered, our aim is to develop a rigorous analysis of the facets of work commitment. Our study suggests that three basic facets of the domain could be distinguished: attitude modality (identification, liking of, effort invested, involvement in, importance of), object (work, career, organization, job), and referent (employee and colleagues). It serves as the foundation for more meaningful future empirical studies in this area.

This study begins with the state of the theory of work commitment with a concentration on the universal forms of work commitment analyzed and suggested by Morrow (1983, 1993), and key work commitment models, and the results of empirical studies that examined the interrelationships among forms of work commitment or assessed the work commitment models. We then continue to define the facets of work commitment and develop a mapping sentence in a more rigorous way.

2. Universal Constructs of Work Commitment

Morrow (1983) argued that the increasing interest in work commitment has resulted in a concept redundancy. She indicated that about 25 commitment-related definitions and scales have been created. Furthermore, many of these definitions and measures were created without careful reliance on existing scales and definitions. Because of this, Morrow (1983, 1993) suggested directing research efforts toward establishing the empirical validity of work commitment constructs. Accordingly, Morrow (1993) argued that a better validated and generalized work commitment definition could be accomplished by concentrating on five fundamental constructs that she labeled the universal forms of work commitment. The term “universal” is meant to “identify forms of work commitment relevant to as many employees as possible” (Morrow, 1993, p. 160). The five universal constructs of work commitment were Protestant Work Ethic (work ethic endorsement), career commitment, organizational commitment (continuance and affective), and job involvement. These forms are somewhat an alteration of the five forms (Protestant Work Ethic, career salience, job involvement, organizational commitment, and union commitment) suggested by Morrow in 1983.

Protestant Work Ethic (PWE) is the extent to which one believes that hard work is important and that leisure time and excess money are detrimental (Blood, 1969; Mirels & Garrett, 1971; Morrow, 1993). PWE is considered a “relatively fixed attribute over the life course” (Morrow, 1983, p. 495). Career commitment is defined as “one’s attitude toward one’s profession or vocation” (Blau, 1985, p. 20). Career commitment does not appear to be a particularly manipulated (changeable) attitude (Morrow, 1983). Continuance commitment is defined as “the extent to which employees feel committed to their organizations
by virtue of the costs that they feel are associated with leaving” (Meyer & Allen, 1984, p. 375). In accordance with previous studies, organizational commitment is composed of two commitments, namely affective and continuance. Affective commitment is “positive feelings of identification with, attachment to, and involvement in, the work organization” (Meyer & Allen, 1984, p. 375). Employees with strong affective commitment remain because they want to. Employees with strong continuance commitment remain because they need to (Allen & Meyer, 1990). Organizational commitment may fluctuate over an employees’ lifetime (Morrow, 1983, p. 495). Job involvement is “a belief descriptive of the present job and tends to be a function of how much the job can satisfy one’s present needs” Kanungo (1982, p. 342). It appears to demonstrate a moderate level of stability (Morrow, 1983, p. 495). PWE and career commitment are also relatively stable; organizational commitment can be subject to manipulation; and job involvement is moderately changeable (Morrow, 1983).

2.1. Models of Work Commitment: Interrelationships among Commitment Constructs

Employees may develop multiple forms of work commitment. They may experience varying degrees of work commitment toward different aspects of a work setting. Efforts to understand the commitment forms an employee develops and their interrelationships can be traced to Morrow’s (1983). In an attempt to deepen the understanding of the strength and direction of the relationship between forms of work commitment, scholars (e.g., Cohen, 1999, 2003; Morrow, 1993; Randall and Cote, 1991) proposed models of work commitment. We discuss here two key work commitment models, those of Morrow (1993) and Randall and Cote (1991), that explored the interrelationships among these work commitment constructs.

Based on her facet analysis study in 1983, Morrow (1993) identified five universal forms of work commitment: PWE, career commitment, job involvement, affective organizational commitment, and continuance organizational commitment. Randall and Cote’s (1991) model examined somewhat different constructs of work commitment: PWE, work group attachment, organizational commitment (affective commitment), career salience, and job involvement. Four of these constructs (PWE, career salience, affective organizational commitment, and job involvement) correspond to four of the universal constructs of work commitment (PWE, job involvement, career commitment, and affective organizational commitment) that were suggested by Morrow (1993). In addition, Randall and Cote (1991) used only one aspect of organizational commitment, namely affective organizational commitment.
2.1.1. Morrow’s Model

Morrow’s circles-based model of work commitment contains the five distinguishable commitment constructs (see also Hackett, Lapierre, & Hausdorf, 2001) and represents different aspects of attachment. These are arranged along a continuum from a relatively fixed attribute to one that can be manipulated. In Morrow’s model, the inner circles represent the relatively fixed attributes and the outer circles the more changeable and manipulative attributes. PWE is in the inner circle because it is a relatively fixed attribute throughout the employee’s lifetime, while job involvement is in the outer of the circle as it is subjected to change through actions such as job design. Morrow (1993) suggested that the inner circles affect the outer circles, but with a decreasing magnitude of effect the further the outer circle is from the centre. For example, PWE should affect both career commitment and continuance organizational commitment; however, it is more likely to have a greater effect on career commitment than on continuance commitment. According to Morrow’s model, shown in Appendix A1, PWE is related to both career commitment and to continuance commitment; while career commitment is related to both continuance commitment and to affective commitment. The latter are, in turn, positively related to job involvement, and together mediate the relationships between PWE, career commitment, and job involvement.

2.1.2. Randall and Cote’s Model

Randall & Cote’s (1991) model is shown in Appendix A2. Randall and Cote’s model evaluates a slightly different web of work commitment. Their model employs the following forms of work commitment: work ethic endorsement, job involvement, career commitment, organizational commitment (affective) and work group attachment. Their model suggests that the relationships between PWE and work group attachment, organizational commitment, and career commitment are mediated by job involvement. Recent studies (Cohen, 1999; Hackett, Lapierre, and Hausdorf, 2001) suggested that the focus should be given to the four commitment forms that are universal; these are work ethic endorsement, job involvement, career commitment, and organizational commitment. However, as we already argued above, there is much to be done to determine what are the universal forms of work commitment, using the formalization of facet theory.

The main difference in Randall and Cote’s model is the role of job involvement. Randall and Cote (1991) attribute a “pivotal” role to job involvement as a mediator in the work ethic endorsement / work group attachment relationship, work ethic endorsement / career commitment relationship, and the work ethic endorsement / organizational commitment relationship.
3. Defining the Facets of Work Commitment

The formal approach of facet theory (Guttman, 1994; Levy, 1994; Shye & Elizur, 1994) and the associated analytical tools (e.g., Similarity Structure Analysis) were applied in the present study. Facet Theory (FT) attempts to formally define the universe of observations and to test hypotheses about the relationships between the definitional framework and the empirical observations. To analyze the commitment domain systematically an attempt was made to define its basic facets. Content analysis of the literature on commitment led to the delineation and classification of content areas that constitute the conceptual space of commitment. Three basic facets could be distinguished: modality, object, and referent

Facet A - Behavior Modality

Certain aspects of commitment are of cognitive nature, such as identifying oneself with the job, career, and organization. Similarly involvement in work or the career is also of cognitive nature. Some other aspects such as liking of, or feelings toward, are affective. Several studies include items referring to actions, effort invested, and the similar, these are instrumental. Assessing the importance of the job, career is also included in some studies it may be considered as a value. Thus the modality facet consists of four elements: Cognitive, affective, instrumental, and value.

Facet B - Referent

Commitment is an attitude of a person toward another person, group, or some other social object. Thus, the focal person in the present research is the respondent himself. The attitude of a person is considerably influenced by members of his/her close social group. In organizations these are his colleagues, the members of his team. Thus, the second facet includes two elements: the respondent herself, and her colleagues.

Facet C - Object

The third facet concerns the objects of the commitment in organizations: the job assigned to a person and his/her daily work affects his/her attitudes toward the organization. Employees usually strive for advancement in their career. Accordingly, career considerations may affect the behavior of employees in an organization. Thus facet C includes four elements: the job, the work, career and the organization.
The Mapping Sentence

The objective of this study was to analyze work commitment definitional framework. We hypothesized that the empirical data will reflect the underlying facets of the definition proposed for the work commitment domain. We analyzed two of the three facets mentioned above, namely the modality facet (A) and the object facet (C). In accordance with previous studies (Elizur, 1986; Sagie, Elizur and Yamauchi, 1996), we expected that elements of facet A, behavior modality, will be ordered from center to periphery. The instrumental modality, which has a strong affinity with the underlying action-oriented nature of work commitment, should be located in the central region of the domain. We hypothesized that facet C, object, will polarize, when its elements: job, work, career and organization, are corresponding to the different direction angles away from the origin. The total structure is expected to be that of a radex structure, when the modality facet is modulating, ordering from center to periphery, and the object facet polarizing.

4. Method

Respondents and Data Collection

The population of this study was senior managers employed as chief financial officers in the public sector in Israel. A direct-mail questionnaire was sent to 262 senior managers. The questionnaire was mailed from and returned to a university address, using a self-addressed reply envelope. Ninety-eight usable
questionnaires were returned. The respondents’ average age was 46.6 years (S.D. 9.24); 11 were women, and 79.4 percent held at least bachelor’s degree. Their average tenure in their present organization was 11.47 (S.D. 9.13).

The data used here was collected as a larger research project aiming at managers’ attitudes toward work. Therefore, the questionnaire has not been designed according to the mapping sentence. However, we’ve recognized in the questionnaire elements of two of the facets: modality and object. Most of the combinations of these two facets were found in the questionnaire.

**Variables**

We assessed work commitment foci by using well-established measures appeared in the literature. *Protestant work ethic (PWE)* was assessed by the 17-item scale developed by Mirels and Garrett (1971). Sample items are: “Most people who do not succeed in life are just plain lazy,” and “I feel uneasy when there is little work for me to do.” The measure was assessed on a five-point scale (ranging from 1 = strongly disagree, to 5 = strongly agree). *Career commitment.* This measure was assessed by a scale developed by Blau (1985). Sample items are: “I like this profession too much to give it up,” and “I am disappointed with being a CEO” (reverse scored). The measure was assessed on a five-point scale (ranging from 1 = strongly disagree, to 5 = strongly agree). *Job involvement.* This measure is based on a 10-item scale developed by Kanungo (1982). Sample items are: “The most important things that happen to me involve my present job,” and “Most of my personal life goals are job-oriented.” The measure was assessed on a seven-point scale, ranging from 1 = strongly disagree to 7 = strongly agree. *Affective organizational commitment.* This measure is based on the scale developed and validated by Allen and Meyer (1990). Sample items are: “I really feel as if this organization’s problems are my own,” and “I do not feel like ‘part of the family’ at my organization” (reversed item). The measure was assessed on a seven-point scale (ranging from 1 = strongly disagree, to 7 = strongly agree). *Continuance organizational commitment.* This measure is based on the 8-item scale developed and validated by Allen and Meyer (1990). Sample items are: “Right now, staying with my organization is a matter of necessity as much as desire,” and “Too much in my life would be disrupted if I decided I wanted to leave my organization now.” The measure was assessed on a seven-point scale (ranging from 1 = strongly disagree, to 7 = strongly agree). *Normative organizational commitment.* This measure is based on the 8-item scale developed and validated by Allen and Meyer (1990). Sample items are: “I think that people these days move from company to company too often,” and “If I got an offer for a better job elsewhere it would not feel right to leave my organization.” The measure was assessed on a seven-point scale (ranging from 1 = strongly disagree, to 7 = strongly agree).
5. Results

The structural hypotheses were tested by means of an SSA computer program, which maps the variables as points in an Euclidean space of two or more dimensions. The geometrical configuration appears in Figure 1. Observing the map, we can identify four circular areas, spread from the center to the periphery. Each number in Figure 1 represents the corresponding item in the questionnaire. For item list refer to Table 1.

<table>
<thead>
<tr>
<th>item list. Numbers correspond with the points in Figure 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>modality</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>Job</td>
</tr>
<tr>
<td>Work</td>
</tr>
<tr>
<td>Career</td>
</tr>
<tr>
<td>Organization</td>
</tr>
</tbody>
</table>

The number in every intersection is the relevant item number (i.e. combination of the two facets). The inner and smallest circle is occupied by instrumental items. This circle is surrounded by values items. The cognitive items were located in the nearby region and the outer and broader circle includes the affective items (separation index = .88). A similar circular structure of the modality facet was found in previous studies (e.g., Elizur, 1979; Sagie et al., 1996). The order exhibited was: the instrumental items occupied the central region and the affective and cognitive items the peripheral region. The instrumental items refer to specific behavior and thus have higher inter-correlation. Values are relatively more concrete while cognitive and affective items are more general, and thus have lower inter-correlation. These items can be interpreted in different ways and the implications of these thoughts or feelings are more diverse.

This 4-circle structure is divided into four wedge like regions corresponding to the direction angles, according to the four elements of the object facet: job, work, career and organization (separation index = .82). The total structure, hence, is a radex, as hypothesized.
6. Discussion

The main objective of the present study was to suggest a facet definitional framework for the work commitment domain and test it empirically. We suggested a mapping sentence that formally defines the domain and hypothesized that the total structure, as exhibited in the SSA analysis, would be a radex structure. The present study examined two of the three facets defined in the mapping sentence: modality and object. One facet specifies the four behavior modalities: instrumental, cognitive, affective, and value. The second facet describes the four types of objects the commitment is aimed at: job, work, career and organization.

The findings support the structural hypotheses. The results indicated that multiple commitment measures may provide more comprehensive information concerning individual's work commitment than a single general measure.
The findings indicate that a clear distinction should be made between four types of objects: job, work, career and organization. The commitment of individuals toward these four types of objects can be different. The elements of the modality facet were ordered from center to periphery as hypothesized. The instrumental modality, which has a strong affinity with the underlying action-oriented nature of work commitment, was located in the central region of the domain. The adjacent elements were those dealing with values. This modality has lower affinity with the action-oriented nature of work commitment than instrumental modality, but still stronger than affective and cognitive modalities that were found in the periphery.

In sum, the multifaceted approach employed in this study enables to examine a structured definitional framework of work commitment, which despite of growing interest lack such a definition.

One limitation of the study may be considered. The data used in this analysis were collected previous to the facet design. Therefore, only two of the three facets could be examined and some combinations of the two facets could not be found among the questionnaire items. The present results may stimulate further research that will use the complete mapping sentence in order to systematically develop an empirical tool that will represent all the three facets and their elements.

References


The Teacher Bi-polar Professional Self (TBPS) model consists of the following components (see Figure 1):

1. **Altruistic Aspirations Pole**
   - Expectations regarding the realization of values such as relating to students as individuals and providing them with one-on-one instruction, help, and friendly support.

2. **Narcissistic Needs Pole**
   - Hopes of possessing power and getting respect, and of significantly affecting students’ future.

3. **Intermediate Zone**
   - Hopes of acquiring and possessing the necessary educational and teaching skills to facilitate the fulfillment of the expectations encapsulated by the two poles.
Altruistic aspirations. The right hand pole concerns the teacher’s “giving” aspirations, and expresses altruistic desires. As a professional, the teacher wishes to offer students a professional and personal service. Such giving is entirely altruistic in nature and sees the student as an individual. Altruistic aspirations are fulfilled through three complementary avenues of giving:

(a) Friendship and support: being true friends with students, providing them with the warmth and affection they need, loving them, and being there for them when needed; (b) Empathy and caring: being sensitive to student needs, attentive to their problems, being able to help them, and encouraging students to believe in their own abilities; (c) Supportive teaching: to impart appropriate knowledge and skills to every student individually; to use effective teaching methods to reach everyone in the class, to meet individual children’s needs, without grasping onto preset teaching formulae.

Narcissistic needs. The left hand pole relates to the narcissistic needs, which the teacher tries to fill through professional work. It reflects the hope of receiving: the teacher hopes to gain something in return for his or her (altruistic) work. The main rewards sought are: sense of professional and personal achievement, power, respect, appreciation, and influence. The teacher relates to students as a group, an audience, and wishes to receive the following: (a) Power and influence: the teacher wishes to be a charismatic leader shaping future generations -- a role model for students, highly esteemed as an unchallenged authority and a significant person in the students lives; (b) Respect and gratitude: the teacher wishes to be regarded as a professional whose advice is important and who is justly valued by students and parents as responsible for student success.

Abilities and skills. The interim region between the two poles relates to the need to possess professional competencies and skills. The nature of these skills concern the contents of the two poles since their purpose is to facilitate the realization of the expectations entailed at either pole. The main abilities and skills are:

(a) Educational and interpersonal skills: this concerns the teacher’s ability to be amiable and sociable, to provide an aesthetic, calm environment for students, to educate students to be independent, strong, confident individuals, etc. (b) Teaching skills: knowledge of learning contents and teaching methods, including new technologies in education; (c) Classroom management skills: ability to “manage” the classroom, and control students as a group; the ability to “perform” in front of an audience, stimulate students and arouse enthusiasm and curiosity.
Fig. 1. The Teacher Bi-Polar Professional Self (TBPS) Model
Definitional Framework and Research Hypotheses

A study was conducted aimed to provide empirical evidence to corroborate the bi-polar conceptualization of the teacher’s professional self, as expressed by aspiring teachers. Aspiring teachers were the focus of this study since their professional expectations have not yet been confronted with, and affected by, school reality. Facet Theory (Guttman, 1959) provided the basis for the definitional framework for the novice teacher’s classroom expectations conceptualization.

Teacher classroom expectations were defined in terms of three facets (1) teacher’s self, (2) teacher functioning areas, and (3) teacher perception of students (as individuals or as a group). Accordingly, a mapping sentence was drafted which contained three content facets, and a range single facet (see figure 2).

Fig. 2. Mapping Sentence for Observations on Teacher Classroom Expectations

Facet A, which relates to the structure of the teacher’s professional self, is arranged in a simple order ranging from narcissistic needs through skills and abilities to altruistic aspirations. The order is polarized, since elements a1 and a3 (see Figure 2) oppose one another (Kohut, 1977), thus forming two poles of an axis. This order is expected to be evident on the SSA map as items arranged along an axis ranging from altruistic behavior variables to narcissistic behavior variables, with abilities and skills items in between. Facet B, which classifies the elements of the teacher’s role and divides them into four levels (classroom...
teaching, individual instruction, emotional support, social leadership), seems to lack an internal order, since there is no basis for defining an ordered relationship between them. As an unordered facet, it may have a polarizing effect on the deployment of sectors on the SSA map, so that each element of the facet would appear in a different region with a different direction on the SSA map space. Facet C, which classifies students as individuals or a group entity reflects a simple order, ranging from individual to group. On the SSA map, such order may involve the arrangement of items more or less linearly ranging from individual to group.

**Method**

**Subjects**

The subjects were 156 third-year students studying in a teacher training college in Israel. Students from all over the country attend this college. Their personal and demographic backgrounds are highly diversified. 150 subjects identified themselves as women and 6 failed to disclose their gender. 36.8% were training to teach in primary school, 3.9% were training for secondary school careers, 50.7% were training as special education teachers and 8.6% were training for careers in other areas of teaching.

**Instrumentation and Procedure**

The research instrument was a self-report questionnaire, titled “Personal Expectations of Teaching”, containing 56 items. The questionnaire was distributed to subjects in the final weeks of the 2003 academic year.

**Results**

The initial data processing stage involved calculating correlations (coefficients of monotonicity) between items and compiling a correlation matrix. Stage two was an SSA (Smallest Space Analysis), using FSSA (faceted SSA) software, i.e., SSA based on facets (Shye, 1991; Borg & Shye, 1995). Data deployment was examined in a two-dimensional display. The coefficient of alienation found in this display was .20, which allowed firm conclusions to be drawn regarding the deployment structure.

Figure 3 shows the deployment of variables for Facet A. The deployment of variables in Figure 3 shows an axial order, divided into segments representing the facet elements as described below (see Figure 3). The separation index for the data deployment regarding Facet A was .98. The upper region of the map contains items (designated 1 on the map) associated with narcissistic needs (or self-serving
as altruistic needs): respect, appreciation and influence. For example: “I expect the children in my class will tell their parents good things about me”; “I expect to be like a physician: an expert professional who students, parents and others turn to for help in solving their problem”; “I expect to be a role model for my students”; “I expect to be the most significant person in my students’ lives”. The middle section of the map contains items (designated 2 on the map) associated with talents and skills: performance skills, teaching and educational skills. For example, “I expect to use acting skills in teaching”; “I expect to be a teaching virtuoso”; “I expect to know a lot, much more than the students”; “I expect to be able to draw clear moral boundaries for all my students”. The lower section of the map contains items (designated 3 on the map) associated with pure altruistic aspirations: empathy and caring, friendship and support, teaching supportively. For example, “I expect I will listen to student problems and be able to help them”; “I expect to be true friends with my students”; “I expect to use effective teaching methods and reach all the students in my class”.

As expected with an angular structure, Facet B divides the map into four regions that emanate from a single point, where each region faces a different direction, away from that point, as described below (see Fig. 4). The separation
index for Facet B was 1.00. The left section of the map contains items designated 1, relating to classroom instruction: “I expect to feel that as a teacher I am the director of the classroom”. The bottom central section of the map contains items designated 2, relating to individual instruction: “I expect to spend as much time as needed with individual children in my class who are having difficulty in order to help them improve”. The bottom right section of the map contains items designated 3, relating to emotional support: “I expect the student to be in the center, not myself”. The top right section of the map contains items designated 4, relating to the social leadership aspect of the teacher’s work, stressing the teacher’s personal importance: “I expect the most significant person in my students’ lives”.

As expected with Facet C, the regions in Figure 4 which contain the items designated 1 and 4 (upper region of the map) indicate the teacher’s conceptualization of students as a collective entity. In contrast, the regions in Figure 4 which contain the items marked 2 and 3 (lower section of the map) represent a conceptualization of the student as an individual entity. We also see that the left hand region of the map (items 1 and 2) represents the task-functional aspect of the teacher’s work, while the right region of the map (items 3 and 4) represents the educational-caring and the affective aspect of the teacher’s work.

Fig. 4. Item deployment in the SSA map for Facets B: Teacher Functioning, and C: Student Entity
In the SSA map shown in Figure 4, we can see the oppositeness aspect of the regions. The emotional support region (3) is located opposite the classroom teaching region (1), encapsulating the contrast between the caring aspect of teacher’s work and the task-oriented aspect of the work. Similarly, the region representing social leadership, which emphasizes the unique role of the teacher as a leader (4) is situated opposite the region representing individual instruction, which stresses the uniqueness and individuality of the pupil.

When the data processing results for mainstream education teachers were compared with the results for special education teachers, the data deployment on the SSA map was found very similar, while the separation index for special education teachers was slightly lower than the entire sample. Figure 5 displays item deployment in the SSA map, where numbers represents questionnaire items (see appendix).

**Fig. 5.** Item deployment on the SSA map for Facets A, B, and C

**Discussion**

The bi-polar model of the teacher’s professional self is essentially a scheme for examining the complexity of teaching and teacher performance. As with every
other model, this one too, tries to expand our understanding of teacher behavior and improve behavior prediction. Teachers having differential altruistic or narcissistic inclinations may show different types of behavior and professional ambitions. It can be suggested here, as hypotheses to be tested for in future studies, that: (a) teachers with a stronger altruistic inclination will aspire to become special education teachers, will stay longer in the teaching profession, and will use more individual instruction strategies, more than “narcissistic” teachers. They will also possess a more permissive ideology toward their students. (b) teachers with a stronger narcissistic inclination may tend to aspire for managerial positions in the school, or tend to leave the teaching profession for other managerial or public positions, sooner than “altruistic” teachers. They will also tend to possess a custodial ideology towards their students.

The bi-polar conception of the teacher’s professional self is based on the teacher’s role perception as having to “teach” students, conveying knowledge that they, the teachers, possess and that the students do not. According to this role perception, teachers “distill” into their students’ heads knowledge, skills, behaviors, morals, etc., from their minds into their students’. The belief that teachers “transmit” information to students while the latter’s knowledge and ability to acquire and process information are irrelevant to the “transmitting” process, may prevent students from being thankful and appreciative toward the teacher, which is something the teacher greatly needs. Thus, an inherent contradiction exists in the frontal teaching approach, which is the subtle basis for the bi-polar model of the teacher’s professional self: the student may not react positively to the teacher’s efforts and will not provide the teacher with a proper basis for realizing his or her narcissistic needs.

References

### Appendix

#### Questionnaire Items

*Items organized by Facet A*

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Narcissistic Needs</strong></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I expect to be like a leader who shapes the future generation.</td>
</tr>
<tr>
<td>12</td>
<td>I expect to be a charismatic leader for the children.</td>
</tr>
<tr>
<td>6</td>
<td>I expect to be a role model for my students.</td>
</tr>
<tr>
<td>13</td>
<td>I expect to feel that as a teacher I am the director of the classroom.</td>
</tr>
<tr>
<td>9</td>
<td>I expect to be the teacher who makes the students remember the school fondly.</td>
</tr>
<tr>
<td>5</td>
<td>I expect that my students will be better people because of me.</td>
</tr>
<tr>
<td>4</td>
<td>I expect to be a teacher whom the children see as an authority.</td>
</tr>
<tr>
<td>7</td>
<td>I expect to be the most significant person in my students’ lives.</td>
</tr>
<tr>
<td><strong>2. Abilities and Skills</strong></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I expect to be pleasant and friendly with my students.</td>
</tr>
<tr>
<td>1</td>
<td>I expect to create an aesthetic and relaxing environment for my students.</td>
</tr>
<tr>
<td>15</td>
<td>I expect to educate my students to be independent, strong, and confident people.</td>
</tr>
<tr>
<td>14</td>
<td>I expect to be able to draw clear moral boundaries for all my students.</td>
</tr>
<tr>
<td>3</td>
<td>I expect to be a teacher who educates generations of children having high moral values.</td>
</tr>
<tr>
<td><strong>3. Altruistic Aspirations</strong></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>I expect to be true friends with my students.</td>
</tr>
<tr>
<td>21</td>
<td>I expect to provide my students from a deprived background with the warmth and affection they need.</td>
</tr>
<tr>
<td>19</td>
<td>I expect to love my students in the full sense of the word.</td>
</tr>
<tr>
<td>26</td>
<td>I expect each of my students to feel that I am always on his or her side and won’t let them down.</td>
</tr>
<tr>
<td>24</td>
<td>I expect the student to be in the center, not myself.</td>
</tr>
<tr>
<td>25</td>
<td>I expect to regard each student of mine as a unique personality with special traits and desires.</td>
</tr>
<tr>
<td>22</td>
<td>I expect to encourage each of my students to be true to his or her personality and individual skills.</td>
</tr>
<tr>
<td>Item No.</td>
<td>Empathy and Caring</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>17</td>
<td>I expect I will listen to student problems and be able to help them.</td>
</tr>
<tr>
<td>40</td>
<td>I expect I will be able to assess each student’s abilities not just through test results.</td>
</tr>
<tr>
<td>18</td>
<td>I expect to know my students as well as possible and be sensitive to their innermost needs.</td>
</tr>
<tr>
<td>11</td>
<td>I expect to radiate calm and pleasantness to my students even under pressure.</td>
</tr>
<tr>
<td>16</td>
<td>I expect to educate my students to be good people who are helpful, open-minded and courteous.</td>
</tr>
<tr>
<td>43</td>
<td>I expect to be able to encourage each of my students to believe in their own abilities.</td>
</tr>
<tr>
<td>8</td>
<td>I expect to encourage my students to see me as someone they can always turn to.</td>
</tr>
<tr>
<td>20</td>
<td>I expect to be a teacher who competently handles differences between the students.</td>
</tr>
<tr>
<td>48</td>
<td>I expect to spend as much time as needed with individual children in my class who are having difficulty, in order to help them improve.</td>
</tr>
<tr>
<td>49</td>
<td>I expect to impart the appropriate knowledge and skills to each of my students individually.</td>
</tr>
<tr>
<td>46</td>
<td>I expect to excite the curiosity of each of the students in my class and stimulate their desire to learn.</td>
</tr>
<tr>
<td>50</td>
<td>I expect all my students will understand what I teach and improve in their studies.</td>
</tr>
<tr>
<td>47</td>
<td>I expect to use effective teaching methods and reach all the students in my class.</td>
</tr>
<tr>
<td>42</td>
<td>I expect to assist the weaker students in my class and help them improve.</td>
</tr>
<tr>
<td>27</td>
<td>I expect my lessons will be experiential and that they will enthrall my students.</td>
</tr>
<tr>
<td>39</td>
<td>I expect each student in my class will leave school with a rich store of knowledge.</td>
</tr>
<tr>
<td>41</td>
<td>I expect to build my lessons to meet students’ individual needs and will not adhere to a preset formulae.</td>
</tr>
<tr>
<td>37</td>
<td>I expect that when I teach, I will know which students are with me and which are not.</td>
</tr>
</tbody>
</table>
Values of Work and Other Life Areas: A Facet Analysis

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Abstract. The objective of the present study was to analyze the structure and relative importance of personal values of work and other life areas based on samples from various cultural environments. Two facets of values were delineated: life area (work, culture, sports, religion, politics, and life in general) and value modality (instrumental, affective, and cognitive). It was hypothesized that the structure of the domain will be similar for all samples, while considerable differences in the relative importance of certain values may be expected. Based on data obtained from Brazilian (n=148), Canadian (n=199), Israeli (n=452), and Palestinian (n=597) samples of students, the hypotheses were examined and supported.

Introduction

In recent years, there has been growing interest in the analysis of personal values (Levy, 1990; Rokeach & Ball-Rokeach, 1989; Sagie, Elizur & Koslowsky, 1996; Schwartz, 1992, 1994; Triandis 1994). Personal values are desirable or important states, objects, goals, and behaviors, transcending specific situations and applied as normative standards to judge and to choose among alternative modes of behavior (Schwartz & Bilsky, 1987). According to Levy and Guttman (1976; Levy, 1990) an item belongs to the universe of value items if, and only if, its domain asks for the importance of a goal or behavior in life area (y), and the range is ordered from very important to obtain to very important to avoid. These values are relevant to various life areas, such as home and family life, work, religion, culture, sports, and politics (Guttman, 1994; Jordan, 1992; Sagie & Elizur, 1996). Guttman (1994) observed that "many previous researchers have made distinctions among values according to area of life... but few have hitherto studied the interrelations among simultaneous value behaviors in the several areas of life" (pp. 130-131). Furthermore, although much research attention is currently paid to cross-cultural analysis of personal values, a simultaneous investigation of multiple life areas in more than one culture is quite rare.

Recently, Sagie and Elizur (1996) explored personal values in six life areas, namely: work, religion, culture, sports, and politics, as well as the more inclusive domain of life in general, which primarily concerns home and family. Based on data collected from 299 Israeli high-tech employees and business
students, the authors demonstrated that parallel sets of personal values associated with the various guide people in the various life areas. However, as Sagie and Elizur (1996) concentrated in a single society, the generalizability of their findings is limited. By comparing personal values pertaining to six life areas of Canadians, Palestinians and Israelis, the present study aims to fill the gap.

**Facets of Personal Values**

In accordance with earlier research (e.g., Elizur, 1984; Elizur, Borg, Hunt & Beck, 1991), two basic facets of personal values were specified in the current study: life area and value modality. The life area facet includes life in general (home life), work, religion, culture, sports, and politics. This list is not exhaustive, and other areas (e.g., economics and education) could be added.

Home and family life and work are usually considered obligatory by people. Most of the adults are members in both, family and work groups. The activities related to culture, sports, and politics, are basically optional activities. Persons may concentrate in one or two of these areas at the expense of the other. Religion is obligatory for some people; however, it is considered to be optional by many others. Using the formal approach of facet analysis (Shye & Elizur, 1994), the similarities and differences among the life areas are considered in the following.

A second facet of personal values is the modality facet. Here, we distinguish among three modalities within each life area: instrumental, affective, and cognitive. Instrumental or material values are of direct concrete and practical consequences. For example, economic security, work benefits, and sport achievements. Affective values, such as love, friendship, spiritual or religious experiences, reflect feelings or emotions. Finally, certain values are cognitive in nature in the sense that they reflect knowledge, awareness, and cognition; e.g., meaningful life or work, contribution to society, and broadening one's horizons.

Based on the formal approach of facet theory (Shye & Elizur, 1994), and in accordance with previous research (e.g., Elizur, 1984; Elizur at.al. 1991; Sagie & Elizur, 1996), we suggested the following mapping sentence of personal values:
The assessment of respondent (x) of the importance of an

A. Value modality
   {a1 instrumental}
   {a2 affective} goal pertaining to life area
   {a3 cognitive}

B. Life area
   {b1 life in general} ) {very important}
   {b2 work} ) obligatory ( ! )
   {b3 religion} ) ===> ( ! )
   {b4 culture} ) optional ( ! )
   {b5 sports} ) {not important}
   {b6 politics }

The Structure of Personal Values

The formal approach of facet theory (Guttman, 1994; Levy, 1994; Shye & Elizur, 1994) and the associated analytical tools (e.g., Similarity Structure Analysis) enable the researcher to investigate the structure of the domain of personal values. Using Similarity Structure Analysis (SSA), a multidimensional scaling approach, the concept of values may be viewed as an entity having a physical expansion in a geometric space and each of the observational value items (or variables) is represented by a point in that space (Shye & Elizur, 1994). The distances among the points are inversely related to the observed similarities between the items as measured by the correlation coefficients. When the similarity between two items is relatively high, the distance between the points representing them should be relatively small; conversely, when the similarity between the items is low, the distance between the points is relatively large. In order to test structural hypotheses, the configuration of the points in the geometric space can be considered. It is possible to see whether the space can be partitioned into regions that reflect the elements of each of the facets.

Two life areas, life in general (home and family) and work, are usually considered to be obligatory by most people. Activities relevant to other life areas (i.e., religion, culture, sports, and politics) are interchangeable. These attributes are reflected in the distribution of time of most adults in various societies. Distinct hours are dedicated for work and family-life while the spare-time is shared among the optional life areas. Therefore, we predicted that the configurations of points associated with life in general and work will occupy a distinct layer in the geometric space. On the other hand, the optional life areas are expected to share a common layer; here, each life area will correspond to
a different direction within that layer. The overall structure of the personal values domain is expected to be that of a cone.

Will the structure of personal values vary between the Canadian, Israeli and Palestinian samples? In their cross-cultural study of work values, Elizur et al. (1991) found differences among cultural samples in the importance of certain work values. The structure of work values was, however, consistent across the samples. Similarly, we expect the above hypothesis to hold for the Brazilian, Canadian, Palestinian and Israeli respondents. Thus, although there may be considerable differences between the samples in the relative importance of the various values, the structure of the values for the three samples will be similar.

Relative Importance of Personal Values

Personal values differ from each other in the degree of their importance to the focal individual (Levy, 1986). Value sets associated with the various life areas may vary as well in their relative importance to the person. Based on an Israeli Jewish sample, Sagie and Elizur (1996) found that personal values pertaining to life in general were considered to be most important, followed by work, culture, sports, religion, and politics. The higher importance of work values, as compared to non-work values, was observed in other studies as well (England, 1991; MOW International Research Team, 1987). It could be argued, however, that the generalizability of this rank order is limited to the Israeli environment. As the contribution of cultural and religious factors is significant to the shaping of personal values (Sagie, Elizur, & Koslowsky, 1996; Schwartz, 1994), a cross-cultural validation of these findings was essential.

Method

Subjects

Four samples of undergraduate and graduate students were examined in the current study: Brazilian (n=148), Canadian (n=199), Israeli (n=452), and Palestinian (n=597).

About forty percent of the respondents studied business and the rest took various areas of study. Gender compositions of the samples varied somewhat. Whereas in the Brazilian, Canadian and Israeli samples the majority was of females (69, 58 and 51 percent respectively), in the Palestinian sample they were almost half of the sample (47 percent).

Procedure

The Sagie and Elizur’s (1996) 54-item personal value questionnaire was used in the study (see Appendix 1). Nine items represent each of the following life areas: life in general, work, religion, culture, sports, and politics. These nine
items include three cognitive, three affective, and three material items. Each respondent was asked to consider the items in every life area separately, and to mark first the single most important item and the single least important item to him or her. Then, the respondents marked each of the remaining items in the specified life area, using a scale ranging from 1 (least important) to 6 (most important). This procedure was used in order to increase the scale sensitivity (i.e., the difference between more and less important value items within each life area).

Table 1. Values of Brazilian, Canadian, Israeli, and Palestinian students: Means, Standard Deviations, Cronbach's Alpha, and Correlations. The Composite Sample (n= 1396)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life in general</td>
<td>4.86</td>
<td>0.95</td>
<td>0.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work</td>
<td>4.77</td>
<td>0.98</td>
<td>0.72</td>
<td>0.88</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Culture</td>
<td>4.28</td>
<td>1.01</td>
<td>0.45</td>
<td>0.50</td>
<td>0.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports</td>
<td>4.07</td>
<td>1.23</td>
<td>0.26</td>
<td>0.32</td>
<td>0.38</td>
<td>0.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td>3.67</td>
<td>1.18</td>
<td>0.20</td>
<td>0.30</td>
<td>0.36</td>
<td>0.34</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>Politics</td>
<td>3.59</td>
<td>1.33</td>
<td>0.19</td>
<td>0.26</td>
<td>0.40</td>
<td>0.35</td>
<td>0.28</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Alpha

Results

Table 1 presents the means, standard deviations and intercorrelations for the composite sample. All correlations between the various life areas are positive, and significant at least at the 0.01 level. The correlation between life in general and work, is pretty high (0.72). Culture with work (0.50), with life in general (0.45), and with politics (0.40) are as well quite high. All the other correlations in the table are lower.

The rank order of personal value sets in the various life areas is similar to that obtained by Sagie and Elizur (1996). Namely, the composite sample considered life in general to be the most important life area (M=4.86), followed by work (M=4.77), culture (M=4.28), sports (M= 4.07), religion (M=3.67), and politics (M=3.59).

Minor deviations from the above hierarchy were found between the samples. For the Palestinians, work preceded life in general (means were 4.60 and 4.54 respectively). Culture is much higher than sports to the Brazilians (means of 4.55 and 3.77) and the Israelis (means of 4.33 and 3.61), it is about the same for the Palestinians (4.25 and 4.24), however, sports are considerably higher than culture for the Canadians (means of 4.57 and 4.29 respectively).
Religion and politics are of about the same importance to the Israelis (means of 3.29 and 3.30) while it is considerably higher to the Brazilians (means of 3.74 and 3.41); the Palestinians (means of 3.92 and 3.82) and the Canadians (means of 3.81 and 3.61 respectively).

Analyzing the Structure of Personal Values

The structural hypotheses were tested by means of an SSA computer program. Basically, similar results were obtained for the three samples. The results of a three dimensional solution for each of the samples are reproduced in a map form in Figures 1, 2, 3 and 4. The points representing value items were classified according to the two facets of the definition. The coefficients of alienation, were 0.15 for the Israeli, 0.19 for the Brazilian, 0.16 for the Canadian, and .20 for the Palestinian sample.

Observing the maps in Figures 1, 2, 3 and 4, one may identify three circular areas perceived like a set of layers, one above the other. The widest layer of general life values was located at the bottom of each map. Work values were found next in a somewhat narrower layer. The remaining life areas occupy an even narrower circular layer. This layer included the remaining four life areas: religion, culture, sports, and politics, each of them located in a distinct wedge-like region. Thus, the life area facet ordered the map, as expected, in an axial direction, into life in general, work, and the four optional activities.

Fig. 1. The structure of Israeli values. A two-dimensional projection of a three-dimensional SSA (coefficient of alienation = .15).
Fig. 2. The structure of Palestinian values: a two-dimensional projection of a three-dimensional SSA (coefficient of alienation = .20).

Fig. 3. Structure of Canadian values: a two-dimensional projection of a three-dimensional SSA (coefficient of alienation = .16)
Each of the life areas in Figures 1, 2, 3 and 4 could be divided according to the three modalities: cognitive, affective, and material. With some exceptions, most of the regions of the different modalities are distinguishable. Overall, the total structure composed of all life areas resembles a cone, similar to conical structures obtained in previous studies (Elizur, 1991; Elizur & Shye, 1990; Sagie & Elizur, 1996). A few minor deviations from the predicted patterns were, however, observed. For example, creativity, a cultural value (item 35), somewhat penetrated into the work layer in the Palestinian sample (Figure 2). On the most part, however, the findings supported the structural hypotheses.

Discussion

The major objective of the present study was to analyze the structure of personal values for samples from various cultural environments. Based on previous research a definitional framework for personal values based on two facets was suggested. One facet specified the life areas, including life in general (home and family), work, religion, culture, sports, and politics. The other facet specified three value modalities: instrumental, affective, and cognitive.

As hypothesized, the obligatory life areas were found to order the map in an axial direction, into three circular layers: life in general, work, and optional (or free-time) activities. The four optional activities religion, culture, sports, and
politics, shared a common circular layer, each corresponding to a different
direction. It seems that these activities play alternative roles for the respondents;
one may be involved with religious affairs, someone else concentrate on sport
activities or culture, while another's interests are focused on political issues.
Hence, these can be described as optional activities in comparison to the
obligatory nature of the other life areas: home and family (having a major part in
life in general) and work. It should be noticed that the current samples differed
in this regard from Sagie and Elizur’s (1996) data indicating that for their
sample religion was considered as well to be an obligatory activity. Further
research may resolve this difference.

It is quite remarkable that the life areas facet plays a double role in this
specific case. While the facet orders the space in an axial direction into three
layers: life in general, work, and optional activities. The optional activities play
a polarizing role, when each of them corresponds to a different direction.

Some proposals for further research can be outlined. Future studies may
examine additional life areas, such as education and economy. Additional
samples varying in national affiliation, religion, culture, and occupation, may
help to enhance the generalizability of the results. Ultimately, awareness of what
are the most important values for each religious, cultural, or national group, may
enhance the mutual understanding between the different groups and improve
peace prospects.

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Chapter 6.

Managerial and Organizational Issues
The Pyramid Model of School Management

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Abstract. The main purpose of this study was to test a hypothesis, that school organizational processes have a unique pattern - that of a pyramid. Based on Facet Theory, the mapping sentence that was formulated, comprised a single range facet, one population facet and two content facets. The data deployment on the SSA map displayed a radex pattern. The important contribution of this research is acknowledging the work of the school principals as a pyramid, comprised of a base involving essential consensus procedures, and three sides representing three major school management processes: results, human resources, and financial or material resources.

1. Introduction

This paper presents an original model developed by Fisher and Friedman (2003), named “The Pyramid Model of School Management: Feedback-Based Management”, and provides an empirical data in its supports. The model serves as an effective means of integrating organizational management processes. The model is of a pyramidal shape with a triangular base representing three primary organizational management processes: resource management; processes management; and outcomes management (see Fig. 1).

Fig. 1. Organizational Pyramid Model
Conceptually, the pyramid is based on the following three principles: (1) Feedback-based management; (2) Situation-based management; (3) Managing the outcomes of organizational goals by consensus, that will be described in some detail here.

The Pyramidal Model of Management helps us to predict the behavior and reactions of school managers.

2. Method

The study used Facet Theory (Guttman, 1968). This theory was chosen as the methodological approach due to its strength in conceptualizing different phenomena. The key tool in Facet Theory is the mapping sentence, which links the facets being studied: the facet of the population under investigation (school principals in this study), two content facets (management characteristics and management tasks), and the range facet (the extent to which the school principals act to achieve the school goals). The mapping sentence classifies the research observations and provides the basis for hypotheses regarding the empirical links between the observed variables. Smallest Space Analysis (SSA) was the data processing method used for Facet Theory applications. SSA is a statistical model wherein coefficients of proximity between variables (such as correlations or monotonicity coefficients) are represented as physical distances in a two or multi-dimensional space. In this analysis, variables are shown as points in space, where the proximity of the points relates to the correlation between the variables: the greater the correlation, the closer the points in space. The spatial deployment picture (map) of the data that emerges using this method is easier to interpret than a correlation matrix, and is used to establish associations between variables that other methods cannot reveal.

Based on the above, a mapping sentence was formulated for observations of the principal’s management processes. This comprised a single range facet and two content facets as follows:

![Fig. 2. A Mapping Sentence for Observations on School Principal Administrative Processes](image-url)
In the mapping sentence, the term “school principal (X)” represents the population facet (school principals: women, men, and years of experience). Facet A, the first content facet (Agreement Processes) for achieving school goals modulates the essentiality level of school management issues and processes, is an ordered facet. As with any other hierarchically ordered facet, this facet's role is to deploy variables in the SSA map in a radial configuration forming three circles, based on the mapping sentence elements:

a₁ Essential agreement processes: these processes involve sharing management methods designed to reach consensus on core issues, in other words, to reach **core consensus** (inner circle)

a₂ Desired agreement processes: these processes involve the use of consultative management methods designed to reach agreement on supportive issues and reach **supportive agreement**. In order to achieve school goals, these processes are desired but not essential (middle circle)

a₃ Optional agreement processes: these processes involve authoritarian management methods and are designed to manage the school even without full agreement of all incumbents (outer circle)

Facet B, the second content facet (the management tasks representing school goals) is an unordered facet, as it is not necessary (or possible) to prefer one management task to another. This facet's role is to deploy the variables in an angular form, creating segments on the SSA map, based on the facet's elements:

b₁ – Managing Outcomes
b₂ – Staff Management
b₃ – Managing Financial and Material Resources

Bearing in mind that facets A and B are related, and that the three management characteristics may be used in each of the management tasks relating to the school goals: managing Outcomes, Staff Management and managing Financial and Material Resources could be acquired by using different agreement levels as shown in Facet A. Facet R is the range facet (the degree or level of the different agreement levels and management tasks).

Nine structuples were derived from the combination of the elements in facets A and B:

a₁ b₁: The school principal uses sharing management tools (a₁) in order to achieve desired outcomes (b₁)

a₁ b₂: The school principal uses sharing management tools (a₁) in order to manage the staff resources (b₂)

a₁ b₃: The school principal uses sharing management tools (a₁) to manage the school's financial and material resources (b₃)
a₂ b₁: The school principal uses consultative management tools (a₂) in order to achieve desired outcomes (b₁)

a₂ b₂: The school principal uses consultative management tools (a₂) in order to manage the staff resources (b₂)

a₂ b₃: The school principal uses consultative management tools (a₂) in order to manage the school’s financial and material resources (b₃)

a₃ b₁: The school principal uses authoritative management tools (a₃) in order to achieve desired outcomes (b₁)

a₃ b₂: The school principal uses authoritative management tools (a₃) in order to manage the staff resources (b₂)

a₃ b₃: The school principal uses authoritative management tools (a₃) in order to manage the school’s financial and material resources (b₃)

3. Sample

The study comprised two stages, and two samples were used. In the first stage the various management method components and constructing the instruments were determined (20 elementary and high school principals). In the second stage, a questionnaire was administered to 300 school principals: half the number of principals headed elementary schools and half high schools. 101 questionnaires were returned.

Instrument

The research instrument was an anonymous self-report questionnaire, “School Management Models”. The questionnaire consisted of two sections: the first section contained items pertaining to the different school management processes involving the school principal (37 items); the second section contained questions pertaining to the principal’s background variables (8 items).

Process

The study was done in three consecutive stages: (1) Defining variables and terminology; (2) A Pilot Study to confirm that the questionnaire items were clear; (3) Administering the Research Questionnaire: The questionnaire was mailed to principals who were asked to return it in a stamped, addressed envelope accompanying the form. 300 questionnaires were mailed, of which 101 questionnaires were completed, returned and processed (33% return rate).
Results

First, correlations (monotonicity coefficients) between the scale item scores were calculated and a matrix compiled. The second stage involved SSA (Smallest Space Analysis), using FSSA (faceted SSA) software, i.e., SSA based on facets (Borg & Shye, 1995; Shye, 1991) based on the calculated correlation matrix. Data deployment was examined in a two-dimensional space. The results were tested, first by applying the coefficient of alienation. The coefficient of alienation was found to be .30, and although this shows an imperfect fit between how the items are displayed on the map and their inter-correlations, it allowed definite conclusions to be drawn regarding the deployment structure and the structure of the term. The data deployment on the SSA map exhibited both radial and an angular form, in a Radex configuration.

The two deployment patterns: the radial (Fig. 3) and the angular (Fig. 4) are described below.

The Radial Aspect

![Figure 3. Radial Deployment – Consensual School Management Processes](image)

Figure 3 shows the radial aspect of the data deployment on the SSA map. The separation index was 1.000, indicative of a perfect separation. The radial nature of the deployment is indicated by the distance of the items from the points of origin. As we can see, the radial deployment forms a central circle in which the common denominator of all 13 items (items marked “1”) is essential agreement reached by sharing and full agreement \( (a_i) \) which is expressed as two parallel processes. The first process relates to measures by the school principal taken to obtain essential agreement between staff members. The second process relates to measures taken by staff and involves processes leading towards the achievement
of essential agreement. Without essential agreement, the school principal cannot manage the school properly. The second concentric circle, i.e., the middle circle (see Fig. 3), encircles the essential agreement items (items marked “2”) which express desired (but not essential) agreement processes (a₂). These processes are characterized by consultative processes expressing important, though non-essential agreement. The school principal only takes the lead in some processes; other desired agreement processes are staff-driven. The third and outermost circle (items marked “3”) relates to optional agreement processes (a₃), which are marked by the fact that they do not seek significant agreement. In these cases, the principals make the main decisions.

The three circles seen in the data deployment show that principals view the core of their management work as obtaining essential consensus regarding school goals. As we see, the items in the innermost circle are relatively close knit, whereas items situated at a distance from the center, closer to the periphery, are further apart and separated by large spaces. The proximity of items in the SSA map deployment space points to a greater agreement, and semantic and terminological unity. Conversely, distance between items shows little agreement and greater semantic differentiation. This means that regarding the essential agreement processes, there is absolute and definite agreement that requires high levels of performance, so that the schools will be managed properly. The variance of agreement is greater for desired agreement processes and greater still for authoritative agreement processes.

The Angular Aspect

![Fig. 4. Data Deployment of the Angular Facets on the SSA Map – School Management Processes](image)

The findings show a perfect fit between the empirical data and the estimated structure (the separation index: 1.00). The map clearly divided the data into a lower section (items marked “3”), and an upper section with two regions: the right hand region (items marked “1”) and the left hand region (items
marked “2”). The items in the lower section of the SSA map all share the fact that they pertain to **Financial and Material Resource Management Processes** \( (b_3) \). The items in the right hand section of the upper segment of the SSA map all share the fact that they concern **Outcomes Management Processes** \( (b_1) \). The items in the left hand section of the upper segment of the SSA map all share the fact that they concern **Staff Management Processes** \( (b_2) \).

As noted earlier, the data deployment on the SSA map displays a radex pattern. When we examine the combined radial and angular deployments seen in the two-dimensional representation of the data on the SSA map (see Fig. 4) we find that each of the essential agreement processes also forms part of one of the three School Management Process sectors (which are part of the Desired Agreement Processes). Figure 5 shows these points of proximity.

![SSA Map Diagram](image)

**Fig. 5.** Two-dimensional representation of the data deployment on the SSA map

### 4. Conclusion

The findings show that we can conceptualize something as complex as school management by these two facets, A and B. In Facet A, the essential agreement processes characteristically involve “sharing” management methods and reflect the processes used by the school principal and staff to reach agreement regarding organizational goals. These processes represent the core of the management processes and are vital to management. The core is analogous to the base of the pyramid, “The School Management Pyramid”, and the other management processes surrounding the base are analogous to the pyramid sides.
As already pointed out, the school management processes surrounding the core represent the sides of the school management pyramid, and in order to conceptualize them we must examine the process features. The unique features of the processes are shown in the angular deployment found in Figure 4.

Facet B represents the School management processes – Pyramid sides. It has three elements, each of which represents a distinct group of processes. In order to achieve school goals, however, these processes must be molded into a single weave, namely the mechanism of school management processes.

This conceptualization means that principals distinguish between three main school management processes: Outcomes Management, Staff Management and Financial and Material Resource Management. Principals also realize that their management depends on a critical element – essential agreement processes – without which their school cannot function as an organization.

This tentative conceptualization of school management processes leads to the creation of the Pyramid Model of School Management. Like commercial managers, school principals consider the craft of management as a multi-process weave. As the Fisher & Friedman (2003) pyramid model suggests, in schools as in other organizations, school management processes can be divided into three main groups, which only differ slightly from the three groups suggested in the organization management pyramid model. These principle groups consist of Managing Outcomes, Staff Management and Managing Financial and Material Resources. The three groups cluster around the management core which in fact provides the basis for the remaining management processes. This core or as we will refer to it, “the pyramid base”, is linked to every stage in the life of the organization, and to every process and result. Thus, it relates to school goals, goals for which there is a general consensus among the school staff.

![Fig. 6. The Pyramid Model of School Management](image-url)
As the study findings show, school principals can distinguish management processes, and can also divide them into three main components: Outcomes, Financial and Material Resources and Staff Resources. However, school principals must assess the “school map”, i.e., the situation of the school, and decide when to use a management process in response to real school needs. Decisions are based on the constant stream of feedback which is received during and after all management processes, and which helps principals to decide what to do at any given time. Thus, the feedback is a crucial part of the organization, and incorporates within it a variety of recognized management processes. The model offers a key to successful, flexible school management.

References

Using Smallest Space Analysis and Workplace Data for Arriving at a Structure of Knowledge for an Engineering Technology Curriculum

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Abstract. Facet Theory has been employed in order to obtain a structure of knowledge for content updating of an Electronics Engineering Technology curriculum. Two main aspects are concerned: (1) A curriculum design tool e.g., mapping sentence and data collection technique; (2) A theory construction methodology in pedagogical research domain, e.g., arriving at a structure of updated engineering knowledge to be included in the curriculum, via Smallest Space Analysis. We have arrived at a geometric polar representation, in the Euclidean space, of electronics applicative contents to be included in the updated curriculum.

1. Introduction

Several factors in engineering curriculum development have been investigated in the past by means of Facet Theory techniques, be it the categorization of technical skills required from a graduate of educational programs (Waks, 1995), or overall structure of curricular disciplines in undergraduate engineering studies (Halamish, 1992). Curriculum researchers in general and those in engineering and computer education in particular, are confronted by the accelerated rate of change in contents of the engineering professions. We can no longer look at the educational process as the one by which a person gains mainly new knowledge and relevant understanding. The problem is that the engineering educator does not know substantial portions of the knowledge his student will need in the future, even right after graduating (in some cases this knowledge does not even exist yet), so education becomes mainly a means for developing the ability for learning and understanding new knowledge subject to solving personal, social, cultural and environmental problems. How can one find his/her way in the growing "ocean" of knowledge, especially (but not only) in high-tech engineering disciplines? Can the knowledge items be grouped in categories, so that the number of information units be decreased, thus facilitating understanding, mastering and retrieving when needed?

The main aim of the studies on which this article is based was to establish a theoretical basis for engineering curriculum updating in order to enable the high-tech industry to keep on employing their workers in spite of decreasing
life-time of acquired knowledge and even some of the skills demanded on the workplace (Kleingartner, 1987).

2. Structure of Engineering-Related Skills

Facet theory has been employed to investigate the structure of engineering skills to be acquired in college studies, in a variety of dimensions: (1) Modality; (2) Time; (3) Personal versus Interpersonal functioning (Kollan, 1998); (4) Manual/Physical versus Virtual skills. In all the above mentioned four dimensions the Smallest Space Analysis (SSA) has been used to investigate the skill structure (Levy, 1985; Waks, 1995); In case one - (1) Modality – a polar structure appeared, three wedge like regions emanating from a common origin, relating to cognitive, instrumental and affective domains of skills. In case two – (2) Time dimension – a modular Euclidean structure has been obtained, where the outer ring contained skills required at present time, indicating disagreement among the respondents, whilst the inner circle included skills which will be required in the near future (three years hence) indicating quite a good consensus among the respondents. In the third case – (3) Personal versus Interpersonal functioning dimension a modular structure has been obtained, where personal skills are located in the outer ring, interpersonal skills reside in the middle ring while the functioning skills are included within the inner circle. This structure indicates that functioning skills include interpersonal skills, which in turn include the personal ones (Martin, 1993. In case four – (4) Manual/Physical versus Virtual dimension illustrated motor versus computer simulative skills presented in an axial structure of planar slices.

Might be worthwhile to mention that the two modular structures of engineering skills in cases (2) and (3) indicate the interrelationship character of the various skills: in the Time dimension future skills are based, to a certain extent, on skills required at present, and functional skills are based on interpersonal and personal skills.

On the other hand the polar structure of cognitive, instrumental and affective skills (case (1) -- Modality) have no such partial order character. Now we shall look at the structure of engineering-related knowledge, and try to discover if there exists any lawfulness and what is its character.

3. Structure of Engineering Knowledge

One can look at the structure of engineering-related knowledge or contents from two types of perspectives: (1) the theory-practice dimension and (2) across a variety of technological applications. A modular structure has been hypothesized and investigated by means of Smallest Space Analysis.
3.1. Structure of Theory-Practice Engineering Knowledge

Over fifteen hundred engineering students' achievements have been analyzed in a series of engineering-related courses. Findings showed a modular structure of contents: Mathematics and science courses resided within the inner circle of the structure; engineering theoretical courses appeared within the adjacent ring; lab experimental courses were presented in the next ring; the last/outer ring included project work (Halamish, 1992).

Basically the same modular structure has been repeatedly obtained for two groups of students in each of the two faculties, Electrical and Mechanical engineering, characterized by different high school background.

One issue concerning the structure of engineering contents still remained unanswered: What is the nature of the applicative-related engineering knowledge structure? We will try to answer this question in the following sections of this paper. The nature of the answer has some implication on curriculum design considerations in engineering disciplines, which we will analyze and discuss later on the basis of the findings.

3.2. Structure of Applicative Engineering Knowledge

On the basis of the opinions of electrical engineering technology educators and professionals in industry we have arrived at a list of content items representing required knowledge to be included across a variety of applicative courses.

Data collection from the workplace has been designed by means of a mapping sentence and a corresponding questionnaire, which was filled out by 435 industry employees: engineering technologists and their professional supervisors. One of the facets of the mapping sentence represented applicative subject matter domain of knowledge items required in industry from an engineering technology graduate. Here are the structs of this facet:

A. Telecommunication
B. Optoelectronics
C. Electronic control
D. Computer applications
E. Computer languages.

Each of the structs represents knowledge contents, which might be included in a single or in a series of engineering courses. One hypothesis of the study was that regional distinction of knowledge items, grouped according the above mentioned professional subject matter domains, A through E, will be obtained. The Smallest Space Analysis provides a geometric representation of variable points in a Euclidean space (Shapira, 1976). The distance between pairs of points in the space correspond to the correlations or monotonicity (Raveh, 1986).
coefficients $\mu_2$ between the items. Two points are closer if the correlation is higher. In General, the value of the monotonicity coefficient $\mu_2$ shows the extent to which two numerical variables $x_i$ and $y_i$ ($i=1, 2, 3, \ldots N$ pairs) vary in the same sense. In our case it will mean: 'did most of those respondents who assigned high necessity level to item $x_i$ assigned the same level to item $y_i$?' The monotonicity coefficient ranges between -1 and 1, with the extreme values occurring for perfect monotonicity (full similarity) '1' and full dissimilarity '-1'. The monotonicity coefficients were calculated by the MONCO (MONotonicity COefficient) program included in the HUDAP statistical package (Toledano and Amar, 2001).

### 3.3. Monotonicity Coefficients Matrix of Applicative Engineering Knowledge

Table 1 shows a symmetric matrix of monotonicity coefficients regarding a series of eighteen applicative content items required by 128 direct professional supervisors from their electronics engineering technologists at the workplace, as the outcome of the above mentioned MONCO program. The values in Table 1 were obtained after the original $\mu_2$ coefficients were multiplied by 100. Since the matrix is symmetrical to the diagonal the same values (not shown in Table 1) actually appear on the upper side of the diagonal.

**Table 1.** Matrix of monotonicity coefficients $\mu_2$ among necessity levels for content items as demanded from electronics engineering technologists by their professional supervisors.

<table>
<thead>
<tr>
<th>Content Item</th>
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<td>2. Comp I/O</td>
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<td>3. Prog contr</td>
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<td>71</td>
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*The original coefficient values were multiplied by 100 and rounded into integer numbers.*
Here are the full names of the content items, which appear in shortened version in Table 1: 1 – Computer graphics; 2 – Computer Input/Output devices; 3 – Program controllers; 4 – Operating systems; 5 – High-level language; 6 – Assembler (language); 7 – Machine language; 8 – Optoelectronic devices; 9 – Sensors and converters; 10 – Computerized control; 11 – Stabilizing and control systems; 12 – Fiber optics; 13 – Lasers; 14 – Satellite communication; 15 – Microwave devices; 16 – Computer communication; 17 – Digital communication; 18 – Analog communication.

As can be seen in Table 1, the lowest value of $\mu_2$ is -5 (actually -0.05 when not multiplied by 100) between content item 15 and 2. This is a very small value, indicating that according to direct professional supervisors of engineering technologists, there is no correlation between the necessity levels of mastering Microwave devices (item 15) and Computer Input/Output devices (item 2). All the other coefficients in Table 1 own positive values, showing that a positive monotone relationship of necessity has been revealed between nearly all the above content items. Matrices of similar nature (positive and mostly high values of $\mu_2$) have been found also by other groups of respondents, namely the engineering technologists as employees and engineering educators, not merely for content items needed in present but also for those which are anticipated to be required in three years ahead.

### 3.4. Regional Structure of Engineering Applicative Knowledge

The matrix shown in Table 1 has been delivered as input data to the WSSA-I procedure of the HUDAP package aiming at investigating the regional structure of the content items in regard to their necessity level on the work site, as perceived by the professional direct supervisors of engineering technologists. A polar structure has been obtained (Waks, 1995, p. 93) – projection of the WSSA-I space diagram in dimensionality 4 on axis 3 versus axis 4 plane. This plane has been partitioned into five sectors each representing one content domain of the five (A through E) mentioned above in section 3.2.

Fig. 1 shows a similar polar structure of the same engineering content items as demanded by the same professional supervisors, but relating to the future (3 years hence) rather than to the present needs. This structure has been obtained in dimensionality 2. The polar structure of engineering applicative knowledge items in Figure 1 reveals that the applicative subject domains are arranged in cyclic order sectors characterized by content-associated 'neighborhood': Telecommunication – Optoelectronics – Electronic control – Computer applications – Computer languages.
Fig. 1. Polar structure of applicative engineering knowledge items as required from technologists by their professional supervisors (3 years hence) – Smallest Space Analysis diagram in dimensionality 2

4. Discussion and Conclusion

Through a series of studies by means of Facet Theory in investigating the structure of engineering technology curriculum, three aspects have been employed: (1) Structure of engineering skills; (2) Global structure of engineering knowledge, including supporting disciplines like mathematics and sciences (Theory and Practice); (3) Structure of applicative engineering knowledge.

The main outcome of our investigation showed that applicative engineering knowledge has its particular nature characterized by the absence of inclusiveness as expressed by polar structure, demonstrated in Figure 1. This unique character is not surprising. In contrast, the structure of engineering domains and their mathematic and scientific basis, as illustrated by the modular Euclidean structure (mathematics and science centered), which lead from theory to practice, the engineering applicative knowledge has not such an attribute of inclusiveness, as illustrated by the polar structure. The sectors of this polar structure in Figure 1 are quite autonomous – each content domain can be learned without depending on another sector. That is why computer-related contents are not unique merely to the two computer regions (namely, Computer languages and Computer applications) – they exist also in other professional domains, as demonstrated, for example, by item 10 (Computerized control) residing in the
Using Smallest Space Analysis and Workplace Data for Arriving at a Structure …

Electronic control domain in Fig.1, and item 16 (Computer communication) which is located in the Telecommunication sector. We refer here to applicative computer domains, including programming, not to theoretical foundations of computer science.

Arriving at a structure of knowledge in various engineering domains and understanding its nature is vital during the decision-making process in curriculum development in general, and in deciding what engineering contents to include in the educational programs in particular. The duration of official degree studies is limited, so it is important to include those subjects which own prospective potential to become a necessary prerequisite basis for future learning and updating. Minimum time and other resources should be allocated to 'dead end' subjects, which might be obsolete in the near future. A structure of required knowledge and skills, especially the lasting ones, may help to decide which courses to include in a program and in what order, and keep proper balance between theoretical/fundamental and applicative courses. Emphasizing too much theoretical foundations may create a gap of non-relevance, thus the graduate might have difficulties in applying these theories at work. On the other hand, concentrating too much on applicative courses may cause accelerated obsolescence of the learned material, and the graduate might find him/herself unemployed.

May be that teaching 'how to learn' might be one additional way to confront the need of 'lifelong updating' – this does not lessen the importance of intelligent selection of appropriate subject matter to be included in a modern engineering educational program, which might be accomplished by means of a valid structure of knowledge as suggested in this article.

References


Congruence in Perception of Job Characteristics between Managers and Psychologists: A Basic Demand for Predictive Validity of Psychological Assessment

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Abstract. The process of psychological assessment of prospective job candidates is highly dependent on congruence of perception of job characteristics by managers and psychologists. Rapid changes in the world of occupations require a careful monitoring of such congruence in order to ensure optimal utilization of psychological tests. The current study addressed differences between psychologists' and managers' perception of job characteristics by using an SSA analysis of psychological reports and managerial appraisals. Three content facets for both managers and psychologists were obtained: aptitudes, human relations and management. Psychologists also reported personality traits, a parameter that was ignored by the managers. In addition, psychologists tended to base their final recommendations mainly on management and aptitudes facets. Manager’s intuitive appraisals related mainly to aptitudes and human relations. However, after an elaborate overall evaluation of employee characteristics, managers attributed relatively higher importance to managerial ability. The predictive validity for aptitudes and management dimensions was significant. Differences between managers and psychologists pertaining to the human relations dimension were obtained. The psychologists' final recommendations lacked an optimal integration of the test data as related to job demands. Implications of these findings are discussed.

Introduction

The increasing pace of change in the occupational world often presents the vocational psychologist with the need to develop new selection systems for new jobs or even entirely new occupations (Tofler, 1990; Wanous, 1992). This process challenges traditional modes of operation in the development of selection systems.

Traditional development of psychological tests batteries for personnel selection require the existence of test results and performance criteria for identifying the best tests (with the highest validity coefficients) for a specific job (Guion, 1965; Wanous, 1992). Development of selection systems for future jobs
can no longer follow these guidelines, as the criteria data for the selection of the relevant tests cannot be readily generated.

Contemporary validation studies indicate relatively stable correlation values in the area of the .30s to the .40s for most tests predicting actual job performance (Cook, 1991; Hunter & Hunter, 1984; Hunter, 1986; Ghiselli, 1966). The predictive validity of existing selection systems is expected to diminish due to changes in job requirements. Therefore, vocational psychologists need to reconsider the construction of existing selection systems, as well as the procedures for developing selection systems for future jobs.

The nature of future jobs will be determined, to a great extent, by the vision of managers (Hellriegel, Slocum, Woodman, 1989). In the construction of psychological selection processes, psychologists will therefore increasingly be required to base their understanding on the vision of managers. While psychologists frequently base the construction of psychological selection processes on job analysis (Guion, 1965; Wanous, 1992), job analysis techniques are inadequate for deriving those psychological factors pertaining to future jobs, no relevant data being readily available for non-existing jobs. Thus, the construction and implementation of psychological testing as a selection technique needs to be based, to a great extent, on congruence in job perceptions between psychologists and managers.

With regard to existing jobs, psychologists and managers can address existing job characteristics to develop a congruent perception. Therefore, evaluation of the congruence between managers and psychologists in their perception of existing jobs may be referred to as the optimal level of congruence expected. In this study we focus on the similarities and differences in perception between managers and psychologists with regard to existing jobs.

The congruence in perception between managers and psychologists may be explored by addressing the following two hypotheses:

1. Psychologists and managers relate to the same set of dimensions of human characteristics in their job's perception.
2. The perception of the relationships between dimensions of human characteristics is similar among managers and psychologists as related to their job perceptions.

This study addresses the above hypotheses by focusing on engineer-level technical jobs in an industrial, high-tech organization.

**Method**

The assessment of psychologists' and managers' perceptions was conducted using their assessments of employees’ characteristics, rather than using attitude questionnaires. A specific goal of the current study was to overcome the
problem of low attitude-action correlations (McGuire, 1986; Wicker, 1969),
given that relatively low attitude-behavior correlations obtain, particularly for
work processes (Six & Schmidt, 1992).

A three-part research structure was designed:

1. Mapping psychologists’ perceptions using a smallest space analysis (SSA)
of their selection reports;
2. Mapping managers' perceptions using smallest space analysis of their
employees' assessments;
3. Analysis of the relationships between psychologists' evaluations as
predictors and managers' appraisals as criteria.

As a mapping tool, Guttman's smallest space analysis was preferred to
alternative tools, such as factor analysis, for a number of reasons: the superior
graphical presentation of relationships between components of job perceptions,
it’s relative stability in data analysis for model development (Tziner & Rimmer,
1991), and the utility of facet theory in the development of conceptual systems
(Tziner, 1987).

Subjects

The subjects were 192 employees in one of the largest industrial companies in
Israel. All subjects were employed in their current job for 6 months or more.
Their mean age was 40, ranging from 29 to 58. Their mean educational level
was 13.5 years of study, ranging from 12 to 16 years.

Instruments

A manager's appraisal questionnaire was developed via a process of intensive
interviews with 12 managers at three organizational levels (4 at each level),
conducted by an experienced vocational psychologist. These structured
interviews focused on the most important assessment dimensions of employees’
work in technical jobs. The interviews were content analyzed to identify
common themes among interviewees, according to Patton's (1990) guidelines for
the content analysis of interview data (pp. 374-384). A 32-item appraisal
questionnaire was subsequently developed, representing the emergent themes
from the content analysis of all the interviews. All items comprised of
a statement, followed by a brief description. Managers were asked to rate their
employees with regard to these statements. For example:

Team work: Capability to cooperate with other employees in a small team, to
maintain good team spirit, while giving and receiving feedback productively.
The assessment scale consisted of 20 points in four categories: below average: 1 to 5; average: 6 to 10; good: 11 to 15; very good: 16 to 20. This usage of a 20-point scale (Guion, 1965) was found to be effective in previous studies conducted within this target organization (Kaplan, 1986). Two general assessment items were included – one at the beginning and one at the end of the questionnaire, to reflect the intuitive appraisal and the elaborated overall evaluation of the employee.

Psychologists' perceptions were derived from the psychological reports provided to the personnel managers in the form of summary psychologist recommendations. Reports were based upon a battery of aptitude and personality tests, interviews and simulation tests, and included 24 assessments of a subject's personality, cognitive aptitude and social behavior. The psychological reports included four categories of recommendations regarding the candidates' characteristics in terms of the respective job demands: Aptitude, Personality, Management, and Overall recommendations.

Procedure

The Manager assessment questionnaires were administered as structured interviews by a trained interviewer, who was not an employee of the organization. This ensured both an informed understanding of the assessment dimensions scoring scale, as well as the necessary confidentiality of process.

Results

Psychologists' perceptions

The Smallest Space Analysis (SSA) of the psychological reports yielded 3 content facets:

**Facet A - Aptitudes** - included the following dimensions: technical comprehension, analytical ability, learning ability, Raven progressive matrix test, mathematics and number series. The correlations between variables in Facet A ranged from $r=.42$ (technical comprehension with number series), to $r=.76$ (analytical ability with Raven progressive matrix). Sixty-six percent of the correlations between variables in Facet A were $r=.60$ or above.

**Facet B - Human Relations** - included the following dimensions: loyalty and reliability, human relations and openness. The correlations between variables in Facet B were: reliability with human relations, $r=.46$; reliability with openness, $r=.38$; human relations with openness, $r=.56$.

**Facet C - Management** - included the following dimensions: ability to withstand stress, ability to prioritize tasks, effective negotiations, ability to
motivate employees, representative appearance, leadership and decision making. The correlations between variables in Facet C ranged from $r=.46$ (ability to withstand stress with representative appearance), to $r=.80$ (ability to motivate employees with leadership). Sixty-six percent of the correlations between variables in Facet C were $r=.60$ or above.

Psychologists' job perceptions included 7 variables, 4 of them constituted the psychologists' recommendations, while 3 variables represented content facet scores. The relationships between the seven dimensions of psychologists' job perceptions were analyzed as based upon an SSA map, as presented in Table 1.

The SSA map indicates that the various variables are grouped in three content facets: management (facet C and the management recommendation, $R=.85$), aptitudes (facet A and the aptitudes recommendation, $R=.81$), and human relations (facet B and the personality recommendation, $R=.67$). The final recommendation was found to be at the center of the map at a relatively similar distance from all facets, thus indicating a similarity of influence of all facets on the psychologists' final decision.

Manager perceptions

The SSA analysis of the criteria (managers' appraisals) yielded 3 content facets:

**Facet A - Aptitudes** included the following dimensions: creativity, integration ability, abstraction ability, general intelligence, analytic ability and learning ability. The correlations between variables in Facet A ranged from $r=.74$ (integration ability with analytic ability), to $r=.90$ (abstraction ability with analytic ability). All correlations between variables in Facet A were $r=.70$ or higher.

**Facet B - Human Relations** included the following dimensions: human relations, teamwork, social sensitivity and stability. The correlations between variables in Facet B ranged from $r=.70$ (social sensitivity with stability), to $r=.81$ (human relations with sensitivity). All correlations between variables in Facet B were $r=.70$ or higher.

**Facet C - Management** included the following dimensions: authority, ability to motivate employees, initiative, negotiation skills and general managerial ability. The correlations between variables in Facet C ranged from $r=.76$ (negotiation skills with authority), to $r=.89$ (ability to motivate employees with general managerial ability). All correlations between variables in Facet C were $r=.70$ or higher.

In addition to the above three facet scores, the two general scores served as independent measurements: the intuitive appraisal and the elaborated overall evaluation scores. The relationships between the five scores were analyzed in an SSA map, as presented in Table 2.
Table 1. Smallest Space Analysis of Predictors

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The SSA map indicates that the three facets represent different contents and do not group together. Interestingly, the human relations criterion was found to be relatively distant from the other facets, particularly from management (r=.47). Regarding the general assessments, the post-hoc overall evaluation was found to be closer to the other variables than the intuitive assessment, even though the two were highly correlated (r=.83). The intuitive appraisal correlated mainly
with the aptitude facet ($r=.73$) and with the human relations facet ($r=.64$). The post-hoc overall evaluation was found to be related mainly to management ($r=.80$) and aptitudes ($r=.79$).

**Correlations between appraisals of psychologists and managers**

The correlations between all variables in this study are presented in Table 3.

The median of the correlations between psychologist assessments and manager assessments was $r=.29$. Eighty percent of the correlations between psychologist recommendations and manager assessments were statistically significant. The correlations within the aptitude and management facets were relatively high and significant ( $r=.49$ and $r=.44$ respectively), however, the correlation between managers' and psychologists' perceptions on the human relations facet was not significant.
Table 3. Correlations between appraisals of managers and psychologists

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Discussion

The comparison between both managers' and psychologists' perceptions reveals a considerable degree of agreement. Both psychologists and managers regard aptitudes to be a significant parameter of potential performance; both groups identified managerial skills as a distinctive parameter which influences potential for promotion.

In addition, they also concur on the existence of human relations as an important factor contributing to social adjustment.

Psychologists included personality recommendations as a unique contribution, a variable not taken into account by the managers. This discrepancy may be attributed to more specialized training in personality assessment which psychologists undergo, which may constitute an *a priori* bias towards personality characterization. However, with the exception of this difference, psychologists and managers refer to similar dimensions in assessing candidates and potential employee suitability for a technical job.

Both managers and psychologists rank the different facets similarly: managerial potential was found to be the most important facet, followed by aptitudes. This similarity, however, maintains only for managers' post-hoc overall evaluation after a thorough analysis of employee performance. The managers' intuitive appraisal is based predominantly on aptitudes, followed by human relations. This difference may be interpreted in terms of a bias towards interpersonal factors, which may influence intuitive appraisal.

The obtained differences between intuitive appraisal and post-hoc overall evaluation complicate the task of psychological predictions. Should the psychologist aim at predicting managers' intuitive appraisals, or their own more elaborate evaluations after reviewing all relevant factors? There appears to be no simple solution to this dilemma. Even though one may expect elaborated evaluations to be both more reliable and accurately representative of performance, managers in everyday life evaluate their workers intuitively, and their overall sense of the contribution of the selection system may also be intuitively determined.

The picture indeed assumes greater complexity when dealing with the issue of predictive validity for specific facets. The only dimension that followed the prediction hypothesis was the aptitudes facet, while the human relations predictor was not significantly correlated with the human relations criterion. Based upon this finding, one may hypothesize that in the managers' mind, human relations are more closely associated with aptitudes, whereas psychologists attribute them more readily as related to personality.

While there is some degree of similarity in the way managers and psychologists perceive management requirements - the management facet being more closely related to aptitudes than to human relations for both, the
psychologists' management recommendation was found to be far less predictive than the actual test results. This final recommendation was supposed to be an optimal integration of all predictors vis-à-vis job demands. An analysis of the correlations revealed that the final recommendation was neither the best predictor for any criterion, nor was it the best predictor in the overall comparison with the other predictors.

It is evident that psychological tests provide the vocational psychologist with relevant data for making valid predictions. However the integration of the data into final summary recommendations was not conducted according to managers' priorities. These results indicate a perceptual gap between managers and psychologists.

These complex answers to our simple hypotheses raise the question of how to deal with these perceptual gaps between psychologists and managers? One straightforward solution would be to assert that managers usually represent the focal client of our assessment, therefore requiring psychologists to change and adapt their interpretations to match those of managers.

Alternatively, the solution may be based on the assumption that vocational psychologists are experts in fields of human relations and management; accordingly, managers should undergo training to alter their observations and perceptions to fit those of the psychologists.

In view of the rapid changes in the demands of the workplace, and more specifically, the increasing demands upon managers and employees to utilize advanced management standards (e.g., ISO-9000), there appears to be a need for a new approach. Both managers and psychologists perceive a limited picture of the future workplace. More collaborative efforts at identifying the characteristics of future employees are necessary, instead of trying to repeat current successful selection modes by doing "more of the same". The development of new selection systems aiming to cope with the pace of change should be based on a decidedly "proactive" rather than "retroactive" design. Approaches such as the "low fidelity simulations" of critical elements of future tasks (e.g., Motowidlo, Dunnette & Carter, 1990) hold promise as adaptive techniques for coping with this challenge.

References


Facet Analysis in Organizational Research: Corporate Governance Applications

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Abstract. This paper presents research in corporate governance as examples of applications of facet analysis in organizational research. In most cases, facet analysis is used as part of the comprehensive methodology for theory construction and data analysis. In less conventional applications, facet analysis can be used to synthesize research results from qualitative data such as interviews, to integrate constructs from interrelated research areas, or to map a content area in a manner that identifies new issues and future directions. Such applications demonstrate how the rigor of the methodology can enhance creativity and innovative perspectives in thinking about complex research problems.

1. Introduction

Governing boards currently lead their organizations in an environment of increased scrutiny and economic turbulence. Rising concerns with issues of social responsibility and ethics in governance create a need for research answers to such important questions, requiring integration of normative with empirical concerns (Donaldson, 2003; Carroll, 1995). Researchers have recently defined corporate governance as “the structure of rights and responsibilities among the parties with a stake in the firm” (Aoki, 2000). Its functions are defined as “the determination of the broad uses to which organizational resources will be deployed and the resolution of conflicts among the myriad participants in organizations” (Daily, Dalton, Cannella, 2003). Such conceptualizations of corporate governance consider the context and institutional factors shaping the relationships, the social embeddedness of organizations, decision-making processes within the board and the dynamic interactions among parties in control of firm resources.

Earlier governance research was primarily in the context of agency theory (Eisenhardt, 1989), and focused on issues arising from the potential separation of ownership and control (Berle & Means, 1932). Governance was viewed as providing mechanisms for aligning interests of principals and agents, while the corporations is considered as a nexus of contracts (Fama & Jensen, 1983). The evolution of thinking about governance today considers more complex dynamic interactions, both within and outside the organization, requiring greater rigor in conceptualization and measurement.
1.1. The Structure of Attitudes in Organizations

Recently researchers call for increased impact from behavioral research (Bazerman, 2004; Ferraro, Pfeffer & Sutton, 2004) and for conducting studies at multiple levels of analysis (Hackman, 2005). As March (1996) observed when reviewing 50 years of research in the administrative sciences, many of the earlier research challenges in theories of organizational action remain still current.

The Louis Guttman (1959) article on “A structural theory for intergroup beliefs and action” was published about 45 years ago, and the Elizur and Guttman (1976) article on “The structure of attitudes towards work and technological change” appeared at the Administrative Science Quarterly close to 30 years ago. Yet, some of the innovations and issues addressed in these papers appear as timely today as ever. Application of facet analysis requiring rigorous definition of constructs and empirical testing to examine the lawfulness of perceptual structures at different levels of analysis appears a very desirable prescription for current and future organizational research.

The methodology of Facet analysis can facilitate the “careful integration of theory and empirical study” in corporate governance (Daily, Dalton & Cannella, 2003). It is also proposed that Facet analysis may enable links between pure theory and philosophical theorizing, incorporating ethical and moral perspectives with economic and legal considerations (Donaldson, 2003). Their integration into research designs could lead to systematic study and theory building facilitating governance research and practice.

2. Governance Research: Examples of Possible Applications

Research and theorizing using the facet analysis in specific aspects of organizational research are numerous and have made significant contributions. In order to demonstrate possibilities for future applications of the methodology, including less conventional ones, this paper describes different examples of facet theory applications in governance research. Due to space constraints, and to include all three examples, this paper presents abbreviated versions of each research project.

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1 Most references to Facet analysis applications are omitted from the bibliography in this article, due to space limitations. Research contributions are numerous and diverse, rendering it impossible to fairly represent here in a cursory way.
2.1. Governance Example\textsuperscript{2} I: Perceptual Structures of Trustees regarding Changes in Subsidiary Boards of Multinationals

This first example is a study on corporate governance in multinational corporations. Facet analysis was applied as the comprehensive methodology for theory construction and data analysis. Research on multinationals has increasingly focused on the creation and coordination of global strategies, as well as on the role of their foreign subsidiaries in implementing their own strategies responsive to their unique host country realities. Organizations operating in complex global and local environments need to develop a transnational mentality that encourages flexibility, global efficiency and worldwide learning (Bartlett & Ghoshal, 1989).

Subsidiary boards are viewed as a link for communicating with headquarters and influencing regional policies responsive to local social, political and business realities. Studies have indicated that perceptions of procedural justice between headquarters and subsidiaries have implications for subsidiary performance (Kim & Mauborgne, 1993). Relevant characteristics include head office knowledge about local situation in the subsidiary units, two-way communication in the strategy making process, and subsidiary unit ability to legitimately challenge the views of the head office. Cross-cultural differences among multinationals headquartered in different countries resulted from this project regarding autonomy of subsidiaries and local country strategies (Kriger & Solomon, 1992) possibly attributable to institutional variations (Aguilera & Jackson, 2003).

Methods. The sample consisted of 110 senior executives and board members from a variety of multinational corporations, at both the headquarter and subsidiary levels. Participants came from multinationals headquartered in the United States, Sweden, and Japan. The instruments consisted of a set of two eight-item questionnaires, assessing the importance of changes in the role of subsidiary boards for each of two time periods: during the past and during the future five to ten years, respectively.

Facet analysis in this research was part of an effort to formalize a framework for studying perceptions of the role of subsidiary boards in multinational corporations. Facet analysis, a formal approach to theory construction and data analysis originally developed by Guttman (1959, 1971) can help integrate theory construction and empirical research in this area. The formalization of hypotheses relating to perceived changes in the role of subsidiary Boards is expressed in terms of the mapping sentence presented in Table 1. It includes the facets defining the population, the content of the questionnaire items, and the range common among all items - from high to low.

\textsuperscript{2} Earlier or more detailed versions of some of these studies have been presented at conferences of the Academy of Management or of the Facet Theory Association.
Table 1. Mapping Sentence of Perceptions of Change in the Role of Subsidiary Boards of Multinational Corporations

<table>
<thead>
<tr>
<th>Respondent (x) who is member of the Governing Board of a subsidiary</th>
</tr>
</thead>
<tbody>
<tr>
<td>a1 parent</td>
</tr>
<tr>
<td>a2 subsidiary</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multinational Corporation headquartered in perceives the factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>b1 the USA</td>
</tr>
<tr>
<td>b2 Europe</td>
</tr>
<tr>
<td>b3 Japan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time Frame role of subsidiary boards as attributable</th>
</tr>
</thead>
<tbody>
<tr>
<td>c1 Past</td>
</tr>
<tr>
<td>c2 future</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Initiator of Action leading to changes in</th>
</tr>
</thead>
<tbody>
<tr>
<td>d1 MNC Headquarters</td>
</tr>
<tr>
<td>d2 Subsidiary</td>
</tr>
<tr>
<td>d3 Host country</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intensity impacts the</th>
</tr>
</thead>
<tbody>
<tr>
<td>f1 Optional</td>
</tr>
<tr>
<td>f2 Required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Range of importance in terms of importance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
</tr>
<tr>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>g1 local directors</td>
</tr>
<tr>
<td>g2 company in general</td>
</tr>
</tbody>
</table>

Table 2. Facet Profiles of Questionnaire Items on Perceived Changes in the Role of Subsidiary Boards

<table>
<thead>
<tr>
<th>Item</th>
<th>Item Content</th>
<th>Facet Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Directors liabilities</td>
<td>d3e1f2g1</td>
</tr>
<tr>
<td>2</td>
<td>Understanding local situation by all managers</td>
<td>d3e1f1g2</td>
</tr>
<tr>
<td>3</td>
<td>Local legal and regulatory pressures</td>
<td>d3e1f2g2</td>
</tr>
<tr>
<td>4</td>
<td>Requests by local directors</td>
<td>d2e2f1g2</td>
</tr>
<tr>
<td>5</td>
<td>Decrease parent co concern re subsidiary interf.</td>
<td>d1e1f2g1</td>
</tr>
<tr>
<td>6</td>
<td>Policy decision by parent company</td>
<td>d1e2f2g2</td>
</tr>
<tr>
<td>7</td>
<td>Pressure from public interest groups</td>
<td>d3e1f2g2</td>
</tr>
<tr>
<td>8</td>
<td>Corporate recognition that change beneficial</td>
<td>d1e1f2g2</td>
</tr>
</tbody>
</table>

degree of importance. The mapping sentence guided the development of profiles for each item of the research. Table 2 represents the questionnaire items on subsidiary board changes, as Facet profiles classified by Facets D, E, F, and G.

The facet definitions and specifications regarding order relations among their facet elements provided the rationale for the structural hypotheses of the research. The elements of the “initiator of action” Facet D were expected to
order responses according to their distance from the individual, in terms of the degree of control. The order among the three elements was specified according to the locus of control (internal versus external) in the order of $d_1 > d_2 > d_3$. Similarly, the elements of the “intensity” facet $F$, distinguishing forces leading to change between those to which response is optional $f_1$ rather than required $f_2$ were expected to partition the space by the intensity of the need for change, $f_2 > f_1$. The unordered elements of the “modality” facet $E$ were expected to play a polarizing role.

The correspondence between the definitional framework and the empirical data is examined by the use of the multivariate procedure of Smallest Space Analysis. (Guttman, 1968; Lingoes, 1973). In testing the validity of the proposed design, it was hypothesized that regional partitioning of the SSA space would correspond to the conceptual distinctions reflected in the facet design, and the order specification among the facet elements. A three-dimensional solution was required to represent the data, for both headquarters and subsidiary responses. The structure of the data reflected the lawfulness of cylinderexes, consisting of the combination of a radex and an orthogonal linear partitioning (Elizur & Guttman, 1976; Solomon, 1986, 2003). Such research confirming equivalent lawfulness of perceptual structures at various levels of analysis, or in different fields and contexts, may ultimately contribute to cumulative organizational research.

2.2. Governance Example II: Facet Analysis for Capturing Key Themes from Interviews with Hospital Trustees

The second example of governance research focuses on perceptions by hospital trustees regarding the board’s role in the evolving healthcare environment. Increased competition, restructuring and the emergence of new inter hospital alliances, changing demographics and disease patterns, changing reimbursement patterns, and a new regulatory environment have led to a transformation of the US health care landscape.

Members of the governing bodies of three major New York hospitals were interviewed for this study. The interviews were conducted in a semi-structured format grounded in an interview protocol. The complexity of issues and the qualitative nature of the interview data required a structured framework to summarize and effectively communicate the common themes that emerged. Facet Analysis was the methodology that helped define the universe of content, facilitate comparisons among the approaches to governance issues, and offer multiple classifications of the interview content in a manner conducive to generating hypotheses for future research.

Table 3 below presents an abbreviated version of the mapping sentence. It includes one population facet, five facets defining the interviews’ universe of content relating to healthcare governance, and the range.
Table 3. Mapping Sentence on Interviews with Hospital Trustees

Respondent (X) hospital trustee whose personal background / career is in

A. Trustee Background

- a. business
- b. law
- c. government
- d. other

indicates that effectiveness of the governing board for a hospital/healthcare system depends on whether it is composed of individuals possessing

B. Requisite Board Resources

- b1. leadership abilities
- b2. diversity of expertise
- b3. commitment / involvement
- b4. fund-raising capabilities
- b5. business experience
- b6. compassion / integrity

instrumental in fulfilling the key board responsibilities of overseeing the hospital's pursuit of that can be accomplished by development of systems and structures facilitating the.

C. Organizational Prerogatives

- c1. quality of care
- c2. fiscal viability of the system

of overseeing the hospital's pursuit of that can be accomplished by development of systems and structures facilitating the.

D. Process requirements

- d1. exchange of valid information
- d2. independence of decision making
- d3. conflict resolution

where board performance could be improved by

Recommended Board Changes

- e1. increased involvement
- e2. education and training
- e3. evaluation of performance
- e4. term limits in membership
- e5. empowered committees

resulting in governance assessed as resulting in governance assessed as

Very effective

Very ineffective

The population facet designates the participating board member's background and career. The remaining four facets define: the requisite board resources as qualities that trustees should possess, the prerogatives for healthcare facilities, the process requirements for board decision making, and recommended structure or process changes.

The interviews with the hospital trustees reveal some of the key issues that hospital boards must address, particularly in New York State where the sample was drawn from. The facet definitional framework can facilitate communication of the interview findings, and possibly study the impact of change implementation consistent with trustee suggestions on improving the governance of healthcare organizations. Due to the complexities involved and the dynamic nature of the healthcare environment, facet analysis can be particularly useful for generating hypotheses to be systematically tested by future research in healthcare governance.
2.3. Governance Example III: Governance Processes for Stakeholder Integration and Board Learning

The third example presents a facet design aiming at future research based on synthesis of concepts, research and theory on corporate governance processes, an evolving field. An abbreviated form of this project is presented as well, to illustrate an alternative use of facet analytic methodology for theory development and research design.

Context: Evolution of Governance Research from Structure to Process. There has been a gradual shift in emphasis in the corporate governance literature from the structure paradigm in traditional industrial organizational economics to the internal resources of the organization’s primary determinants of firm performance (Teece, Pisano & Shuan 1997). There are two branches of inquiry in the internally focused resource based view. The first addresses an exploration of how valued resources may be created and developed (Dierickx & Cool, 1989; Teece, Pisano & Shuan, 1997; Amit & Shoemaker, 1993; Galunic & Eisenhardt, 2001). The second examines the reasons for which resources are valuable or scarce (Wernerfelt, 1984; Barney, 1991).

This paper focuses on the former, which is the creation and development of resources and capabilities through processes that create value by resource combinations, transfers, and knowledge accumulation. The model proposes a reconceptualization of corporate governance as a set of processes, developing into dynamic capabilities (Teece et. al 1997; Winter, 2000; Eisenhardt & Martin, 2000; Raff, 2000), which can enhance the board’s ability to fulfill its fiduciary duties for oversight and strategic advice. Based on a comparative analysis of the literature, the key issues or dimensions of differentiation for governance processes were defined and expressed as facets. Table 4 presents the mapping sentence for this research, including a total of three facets. This model is consistent with the paradigm shift in corporate governance, from a focus on content to consideration of processes, and systems of interorganizational networks. It maps out major components as facets, each of which can be further amplified, and identifies key variables that require consideration in research. As depicted in the Mapping sentence, the three processes and their mutual interactions are hypothesized to jointly contribute to board performance, and could potentially lead to the development of dynamic capabilities. The common range of the facets expresses the degree of the board's proactive orientation is reflected in the relationships among pairs of elements in each facet, where \( a_1 > a_2, b_1 > b_2 \) and \( c_1 > c_2 \). Although all facets are expressed as dichotomous, they each represent a continuum. The impact of each dimension on governance may be reinforced by existence of other dimensions or may be modified in a countervailing fashion.
Table 4. Mapping Sentence on Governance Processes

The governing body of organization (x) in performing its fiduciary duties pursues policies focusing on

A. Balance of Criteria

\[ \begin{align*}
  a_1 & \text{ integration of multiple requirements} \\
  a_2 & \text{ short term financial indicators}
\end{align*} \]

by relying on

\[ \begin{align*}
  b_1 & \text{ structured decision processes} \\
  b_2 & \text{ unstructured influences}
\end{align*} \]

B. Discipline in Decision Methods

to take action, whose outcomes the board subsequently

\[ \begin{align*}
  c_1 & \text{ reviews to expand board capabilities} \\
  c_2 & \text{ does not consider as feedback}
\end{align*} \]

C. Orientation to Learning

\[ \begin{align*}
  \text{Range} \\
  \quad \text{Proactive} \\
  \quad \text{Reactive}
\end{align*} \]

thus reflecting a

orientation to enhancing board learning and adaptation.

In these examples, facet analysis serves as an integrative method facilitating systematic analysis and meaningful conceptual synthesis in broad and interrelated areas of study. Integrating constructs from interrelated research areas, it helps compare and communicate previous research findings from a broad range of empirical studies, and to map a content area in a manner that identifies new issues and future directions for research. Such applications of facet analysis and the mapping sentence rely on the rigor and discipline of the methodology as a means of unleashing creativity and an innovative perspective in thinking about complex research problems.

References


A Differentiation between Reported Computer Security Incidents Directed towards the Bank/Finance Sector

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Abstract. The current exploratory study analyses recorded cyber incidents towards the bank/finance sector. The intrusions were categorized in terms of the facets Method of Operation (MO), Impact, Source and Other Sector. Smallest Space Analysis (SSA) was used to correlate the 13 variables within the facets. The attacks that clustered were international root attacks at one side of the plot and unknown denial-of-service attacks at another. It was found that the international attacks most commonly were related to more severe file change, whereas the unknown DoS attacks were related to the less severe access change. The implications of these exploratory findings are discussed.

1. Introduction

It is generally believed that the cyber threats faced by the bank/finance sector are the same as within other critical infrastructures. Such threats include attacks from individuals and groups with malicious intent, such as crime, terrorism, and foreign intelligence. The potential for monetary gains and economic disruptions may, however, increase its attractiveness as a target (United States General Accounting Office 2003). Financial services institutions have experienced cyber incidents that have had some impact on their operations, which demonstrates a continuing threat to the industry. According to the report ‘Banking and Finance Sector: National Strategy for Critical Infrastructure Assurance’, cyber threats and vulnerabilities are among the biggest challenges facing the sector and this trend will increase in proportion to the reliance placed on technology (Goetz, 2003).

For the period of January 1, 2002 to June 30, 2002 a report on Internet security threats by a private-sector managed security firm concluded that based on their clients’ experience, companies in the financial services industry, along with energy and high-tech companies, experienced the highest rate of attack activity. According to the study, financial service firms received an average of 1,018 attacks per company, and 46 percent of these firms had at least one severe attack during the period studied (Riptech Incorporated 2000). The fact that there is only reported 13 incidents from bank/finance sectors to CERT/CC in the periods July 2000- February 2001 and September 2001- February 2002, from the
total incident number of 2755 in the same period, may indicate a certain reluctance to report incidents in a branch that is very dependent upon trust from its customers.

In order to identify, assess, and respond to sector wide threats, information must be shared so as to gain a better picture of the threats experienced by the bank/finance sector. The private sector’s Financial Services Information Sharing and Analysis Center has thereby been formed to facilitate the sharing of cyber-related information. Another example of a reporting organ, is the UK National High-Tech Crime Unit (NHTCU) that has created a Confidentiality Charter that permits businesses to provide information about security breaches for intelligence purposes only (Casey 2004).

1.1. Theory and the Current Study

As shown in analysis on other types of criminal offences, such as arson (Canter & Fritzon, 1998), terrorism (Fritzon et al, 2000) and burglary (Bennell & Canter, 2002), analysis of behaviours and characteristics may assist in differentiating between offences. Analysis of the relationships and differences between different types of attacks with regards to Method of Operation (MO), the Impact it has on the organization, as well as the Source of attack, is increasingly useful if one take into account the different types of Targets (victims). Through looking at attacks towards different types of targets, Howard’s (1997) taxonomy may be further developed. Howard (1997)’s categories are: Attackers, Tools, Access, Results, and Objectives.

The current study is starting with the available data about the attackers, Method of Operation (MO), Source, Other Sector, and the Impact of the attack. This attack data is then used to explore the relationships between the variables and set an example for categorizing cyber intrusion data directed towards different types of targets. The results may later be utilised when proposing hypothesizes about the severity and impact of an attack, as well for gaining more insight into those attacking for financial gain, the type of tools and access points they use and the results they achieve.

2. Methodology

2.1. Design

An exploratory design study is chosen for the research on cyber attacks towards the bank/finance sector in the US. The facets included are ‘Impact’ with the categories ‘Disrupt’, ‘Distort’, ‘Disclosure’ and ‘Unknown’. The attacks will also be analyzed with regards to ‘Method of Operation (MO)’ with the categories ‘Root Compromise’, ‘Virus’, ‘Worm’, ‘Recon’, and ‘Denial of Service’. ‘Other sectors’ which in the ‘Spreadsheets Data Dictionary’ is defined as ‘sectors used
as intermediary site in the incident’ is included in the analysis. The variables within the facets ‘Impact’, ‘MO’, ‘Source Sector’ and ‘Other Sector’ give a total of 13 variables. Note that ‘Other Sector’ is categorized in accordance with whether the incident does or does not contain the variable.

2.2. Sample and Procedure

The thirteen incidents directed towards the bank/finance sector were extracted from 2755 CERT/CC incidents from the periods July 2000-February 2001 and September 2001-February 2002. The current study uses the profiling aspects ‘MO’, ‘Impact’, ‘Source Sector’, and ‘Other Sector’ for all finance/banking institutions. These facets are seen to be mutually exclusive as described and logged by CERT/CC. Every incident is only recorded on one variable within each facet. Smallest Space Analysis (SSA) was used in the current study to explore the nature of the data set. The statistical program Lifa 2000 was used for the SSA analysis and SPSS was used for conducting the descriptive statistics.

2.3. Facet Theory and Multidimensional Scaling (MDS)

Facet theory is philosophically based on hierarchical Guttman scaling. Facet theory defines three related areas of research (Canter 1993): 1. The formal definition of the concepts and variables examined, that is the definitional system. 2. A stated hypothesis of the relationship expected between the concept being examined and the empirical observations, that is the observational structure. 3. A rational for the correspondence between the definitional system and the observational structure.

The definitional system is divided into coherent facets. A facet is “a conceptual categorization underlying a group of observations” (Brown 1985). The domain of research should be exhausted by the facets. Each facet in turn will contain a number of elements, each of which will be mutually exclusive and the elements will exhaustively describe the facet. Thus, the facets and their elements will fully define and account for the entire research domain and the range of relationships expected. Facet theory is generally used in association with multidimensional scaling techniques for the analysis of data.

2.4. Smallest Space Analysis (SSA)

One of the aims of empirical research is to understand the relationships between variables. Shapira (1976:26) describes the result of a Smallest Space Analysis (SSA) as: "[...] a geometric representation of the different variables as points in an Euclidean space. The distances between pairs of points in the space correspond to the correlations of the variables. Hence two points are closer if the correlation between the corresponding variables is higher.” Once the SSA
plot has been produced, categorization of the types of variables that appear close
together allows for an explanation of the major differences that exist between
variables. The SSA, as well as being used to confirm the facets and elements of
a content universe, can also be used in an explanatory manner when a subject is
not well featured in the literature and is in the early stages of research.

3. Results

The data in the current study were analyzed using SSA (please see Figure 1 for
the SSA plot with the regional divisions). The coefficient of alienation gives an
indication of the extent to which the correlations between the variables are
represented by the corresponding spatial distances. The smaller the coefficient
of alienation the better the representation (or ‘fit’). Generally a coefficient of
alienation smaller than 0.2 or 0.15 represents a good fit. The current SSA gave
a Jaccard’s coefficient of 0.05 in 22 iterations in two dimensions, which
represents a good fit for the current dataset.

‘Unkno.imp’ and ‘Virus’ are located close to each other which means that
a relatively large amount of virus attacks have an unknown impact. Further,
‘Disclosure’ and ‘Com’ are located far from each other, which means that an
attack from a com source seldom leads to disclosure of information in this
sample set.

![SSA plot](image)

Fig. 1. SSA Showing Partitioning According to Impact Level, Method of Operation and Source
Please note the division lines used for partitioning in accordance to the severity level of the attacks towards bank/finance institutions. The ‘Core Variables’ in the center are ‘Unknown’, ‘Disrupt’ and ‘DoS’. The ‘Low Severity’ section contains the variables ‘Recon’ and ‘Com’. The ‘Undefined Severity’ section contains the variables ‘Virus’ and ‘Unknown Importance’, whereas the ‘Moderate Severity Level’ contains the variables ‘Root’, ‘Other’, ‘International’, ‘Distort’, ‘Worm’ and ‘Disclosure’.

3.1. Frequencies

The frequencies and percentages of the variables in the SSA may help understanding the relationships between the variables. The frequencies of the ‘Source’ variables show that the most common source variable is ‘Unknown’ (53.8%). ‘Intl’ is the second most occurring source (30.8%), and ‘Com’ the least common source; occurring in two incidents of thirteen (15.5%). ‘Other Sector’ (30.8%) is included in four of thirteen incidents. Within the ‘MO’ category, the most commonly used methods are ‘Root’ (30.8%) and ‘Denial of Service’ (30.8%). Both of these methods are occurring in four out of thirteen incidents each, giving a total of eight of thirteen incidents portraying these types of methods. ‘Recon’ is also quite common (23.1%), and is existent in three of thirteen incidents. ‘Virus’ (7.7%) and ‘Worm’ (7.7%) are only occurring in one incident each. With regards to the ‘Impact’ of the attack, the most common effect is ‘Disrupt’ (61.5%) which is occurring in eight of thirteen incidents. ‘Distort’ (23.1%) is occurring in three of thirteen incidents, and ‘Disclosure’ (7.7%) and ‘Unknown’ (7.7%) are occurring in one incident each. Please note the percentages are taken from the totality of all included variables.

The SSA plot is shown with frequencies in Figure 2. The SSA is here divided into three regions, with the outer region representing variables that have less than 8% occurrence. These variables are ‘Unknown.Imp’ (7.7%), ‘Virus’ (7.7%), ‘Disclosure’ (7.7%), and ‘Worm’ (7.7%). The variables in the region of 8-31% are ‘Com’ (15.4%), ‘Distort’ (23.1%), ‘Recon’ (23.1%), ‘International’ (30.8%), ‘Other Sector’ (30.8%), ‘DoS’ (30.8%), and ‘Root’ (30.8%). Finally, the variables within the inner circle of 31-62% are ‘Unknown’ (53.8%) and ‘Disrupt’ (61.5%). Note that this inner circle excludes ‘DoS’ (30.8%) as ‘Root’ (30.8%) is equally often occurring.

3.2. Interpretation of the Results

That the most common source variable is ‘Unknown’ (53.8%) reflects that bank/finance institutions have to a larger degree identified the source of the attack (53.8% versus 65.5% identified as ‘unknown source’ in Kjaereland, 2005). ‘Intl’ (30.8%) is the second most frequently occurring source both within this
sample and within the overall sample. The fact that ‘Other Sector’ (30.8%) is included within four of thirteen incidents, shows the complexity of Internet security attacks. Another indication of the sophistication, is based on the fact that the Source was not identified in most of these incidents (three of five cases). ‘Root’ (30.8%) and ‘Denial of Service (DoS)’ (30.8%) are as in Kjaerland (2005) common methods of attacks. ‘Root’ is the highest level of access in a system, and suggests that the attacker is able to perform much of his/her intended actions. That ‘Recon’ is quite common (23.1%) reflects that searching for vulnerabilities is a preface for attacking machines. Thus, ‘Recon’ activity is most commonly not targeted, but a method for randomly searching for security holes. This may also suggest that the victim security is not updated on applying new patches for security vulnerabilities. That there are not many ‘Virus’ (7.7%) and ‘Worm’ (7.7%) suggests that the organizations have good virus-scanners in place. ‘Worm’ is also a pretty new tool in the time-period from which the incidents are taken. With regards to the ‘Impact’ of the attack, the most common effect is as in the overall sample ‘Disrupt’ (61.5%). This is the least invasive form of attack, and occurs more commonly than ‘Distort’ (23.1%), which is the second least severe form of attack.
3.3. Sophistication and Severity of Attacks

The cross-tabulations further showed that when the ‘MO’ was ‘Root’ the most common ‘Source’ was ‘Intl’. With regards to ‘Worm’, the incident was also committed by ‘Intl’. Thus, in general it seems like both ‘Root’ and ‘Worm’ were most commonly executed by ‘Intl’ sources. The one ‘Virus’ incident that was ‘Unknown’, is not a surprise as 67% of the ‘Virus’ attempts in the overall sample are unknown. This shows us that even though there are sophisticated virus-programs for detecting the attacks, there is not the same level of knowledge when it comes to finding the source of the virus. This is also the case for ‘Denial of Service (DoS)’ attacks. The fact that the ‘Recon’ had one source for each of the three attacks (‘unknown’, ‘com’ and ‘intl’), reflects the random nature of ‘recon’.

Both ‘Root’ attacks and ‘Worm’ do most commonly lead to ‘Distort’. This suggests that these types of attacks had more severe implications than ‘Denial of Service (DoS)’ and ‘Recon’ that always lead to ‘Disrupt’. With regard to the ‘Impact’ of ‘Com’ versus ‘Intl’ attacks, all lead to ‘Disrupt’ for ‘Com’ and ‘Distort’ for ‘Intl’. These findings may have implications for the seriousness of attacks, where we may see that when the highest level of access is achieved it often also involves ‘Other Sector’ and comes from an ‘International’ source. The effect is most grave, as ‘Distort’ includes: “File change, modification of information from victim. This is a change to data within files”, whereas ‘Disrupt’ includes: “Access change, removal of access to victim or to information. Manipulate permission. Ex. Denial of Service attack or Trojan horse.” ‘Disrupt’ is here defined by CERT/CC to be the least invasive nature of attack.

The implications drawn from these results is that incidents within the bank/finance sector, have different levels of severity. The most common variables are as noted ‘Unknown’ and ‘Disrupt’. The ‘Low Severity’ section contains the variables ‘Recon’ and ‘Com’. The ‘Undefined Severity’ contains the variables ‘Virus’ and ‘Unknown Importance’, whereas the ‘Moderate Severity Level’ contains the variables ‘Root’, ‘Other’, ‘International’, ‘Distort’, ‘Worm’ and ‘Disclosure’. It is believed that these results may give important guidelines with regards to the direction and focus the branch may take with regards to logging, analyzing and responding to attacks. More data is needed to get an indication whether these results are valid. The results may still be used as an example of implications and applications of SSA.

4. Discussion and Conclusion

The results show that ‘Root’ incidents towards the bank/finance branch are the most severe attacks, causing ‘Distort’ or file change. These attacks are most
commonly executed by ‘International’ sources, involving ‘Other Sectors’. This ‘Moderate Severity Level’ also contains the MO ‘Worm’, which at the time of the reported incidents were new types of tools that have expanded increasingly in later years. The results further show that the ‘Low Severity’ section contains the ‘Impact’ factor; ‘Disrupt’ which according to CERT/CC classifications means access change, and is the least invasive form of attack. This section also includes the MO ‘Denial of Service (DoS)’ and ‘Recon’. Finally, the ‘Undefined Severity’ section contains the variables of ‘Unknown Impact’ as well as ‘Virus’, indicating that virus attacks do most generally not have a known source in attacks towards the bank/finance institutions. Moreover, the results show what types of attacks are similar to each other, and may help linking incidents across institutions to a common offender(s). This is based on the hypothesis that humans behave according to certain consistent patterns (Canter 1993). It must be emphasized that the availability of only 13 incidents implies that the study is exploratory, and that the results must be carefully interpreted.

The implications of ‘Unknown’ file change or ‘DoS’ (‘Distort’), and ‘International’ access change or ‘Root’ (‘Disrupt’) may be further drawn on if future cases support the underlying structures. The discrepancies between this branch and other branches, such as the medical branch may give further indications about branch-specific variations. These types of differentiations may be based on hypotheses that targeted attacks towards the financial branch may be executed for monetary gains, whereas targeted attacks towards the medical branch may be based on other motives, such as looking for personal information. In order to get more valuable data and fruitful analyses, additional data should be collected and shared on a large-scale basis. For the future, more cases are needed and the results may be compared to non-profit organizations, military branches, public branches in general, etc. These future studies may look into the opportunities for attacks and thereby profiling the target. This may have direct implications for how organizations may change their exposure for being attacked. In terms of future studies it would also be interesting to relate data from Intrusion Detection Systems (IDS) and Internet traffic activity data to the historical cases. As such, it may be possible to say something about the link between historical and future cases. These efforts may assist early warning initiatives across branches, something that will also benefit the work on protection of the critical infrastructure.

References


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Appendix I: Cyber Incident Variables

Variable 1. Com (Source Sector) 0=No 1= Yes
Commercial (including consumer products, industry, small business)

Variable 2. Intl (Source Sector) 0=No 1= Yes
Non-US source

Variable 3. Unknown (Source Sector) 0=No 1= Yes
Unknown source

Variable 4. Root Compromise (Method of Operation) 0=No 1= Yes
Perpetrator gains unauthorized administrator privileges on a host.

Variable 5. Virus (Method of Operation) 0=No 1= Yes
A virus is a piece of code that, when run, will attach itself to other programs, which will again run when those programs are run.

Variable 6. Worm (Method of Operation) 0=No 1= Yes
A program that propagates itself by attacking other machines and copying itself to them.

Variable 7. Disrupt (Impact) 0=No 1= Yes
Access change, removal of access to victim or to information. Manipulate permissions. Ex. Denial of Service attack or Trojan horse. ‘Disrupt’ would be the least invasive nature of attack.

Variable 8. Distort (Impact) 0=No 1= Yes
File change, modification of information from victim. This is a change to data within files.

Variable 9. Disclosure (Impact) 0=No 1= Yes
Unauthorized exposure of information, other than in support of one of the above. Disclose would imply disclosure of information that may lead to further compromises. Ex. Download of password file.

Variable 10. Unknown Impact (Impact) 0=No 1= Yes
Insufficient information to classify.

Variable 11. Reconn (Method of Operation) 0=No 1= Yes
Scanning/probing site to see what services are available. Determining what vulnerabilities exist that may be exploited.

Variable 12. Denial of Service (DoS) (Method of Operation) 0=No 1= Yes
An exploit whose purpose is to deny somebody the use of the service: namely to crash or hang a program or entire system.

Variable 13. Other (Other Sector) 0=No 1= Yes
Sectors used as intermediary site in the incident.
Chapter 7.

Methodology
External Variables: Some Novelties and Applications

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Abstract. The authors have previously presented a method they developed for integrating “external” variables (EV) into the SSA map while leaving the internal structure unchanged (Cohen & Amar, 1993, 1999, 2002). This paper details a number of innovative modifications and adaptions to the EV procedure including: detailed instructions for the calculation of dummy variables to be introduced as EV and for performing the SSA procedure with EV in the most recent Hudap program, verifying and interpreting the coefficient of alienation of EV on the SSA map, introducing positive and negative EV and introducing dummy variables as new original variables.

1. Dummy Variables as EV in Hudap

Our presentations at past Facet Theory Conferences have initiated the External Variable procedure. Over the decade since we developed this procedure it has been used in numerous studies (See for instance Amar and Levy 1995; Ben-Shalom & Horenczyk 2003; Cohen 2004; DellaPergola and Rebhun 1997; Levy, Levinsohn, and Katz 1997; Lyra, Roazzi and Cohen 2001). Several improvements and new techniques developed recently will be presented here. The specific program adopted for the analysis is WSSA1, with “W” indicating “weighted” and “1” for the symmetric matrix. The first is the use of dummy variables as EV. To demonstrate the computation of dummy variables in the Hudap program, we will consider nationality as an example of a socio-demographic item to be introduced into an SSA map. The nationality of respondents in a survey may be coded with a number assigned to each country as: 0. Uruguay, 1. Argentina, 2. Brazil, 3. Canada etc. However, the data cannot be considered for insertion into the SSA map in this form, as it is not ranged. In this case, 2 is not greater than 1, it is a simple convention to code the nationality of the respondent. Thus, we will 'create' new items, called dummies, one for each nationality.

The new version, Hudap 5, displays the user data in a grid. There are various ways to load the data. The purpose of the present article is not to show how to read data. Rather, we will concentrate on specific features of Hudap 5 used for computation of dummy variables or processing of SSA with external variables. The following figure shows an example of data loaded into the program.
A very useful utility to get a single frequency table is available. From "Utilities" menu, choose "Instant Frequency Table". The following window appears:

In the example presented here, "f7" is the country variable from which dummy variables will be computed. Clicking on "f7" gives the following table:

As we see this variable has seven categories, each corresponding to a specific country. They are coded from 0 to 6 -- 0 for Uruguay, 1 for Argentina, 2 for Brazil, and so on. From the single variable “country”, we can build seven dichotomous dummy variables. For example, variable “uruguay” is a copy of the source variable “country,” in which category 0 (Uruguay) is replaced by 2 (yes), and the remaining categories 1,2,3,4,5 and 6 (all the other countries) are replaced by 1 (no). The same process applies in computing the variables
“argentini,” “brazil,” and so forth. The choice of this notation (2 for “yes,” 1 for “no”) is coherent with the response categories of the content variables (4 for “completely involved” to 1 for “not involved at all”). As a rule, “yes” in the dummy external variable corresponds to “high” in the content variable.

To compute these dummy variables, from "Utilities" menu, choose "Dummy Variables" and select "f7" as "Source variable". The default dummy variable name "f7_1" is generated as shown in the following window:

Fig. 4. Window for computing "dummy variables"

The first dummy variable to compute is for "Uruguay". Therefore, in "Yes" category of source variable cell we type "0". We can also change the default name "f7_1" to "uruguay" as shown in the following window:

Fig. 5. Definition of first dummy variable (uruguay)

Clicking on the "Add" button will generate other dummy variables based on the same source:

Fig. 6. Definition of subsequent dummy variables
Click on "Compute" button to compute all dummy variables which are added to the data grid:

![Data Grid with Dummy Variables](image1)

**Fig. 7.** Incorporation of all dummy variables in data grid

### 2. How to Perform SSA with EV in HUDAP

From the "Analysis" menu, choose "Wssa1-Weighted Smallest Space Analysis". Note the frame "Kind of Similarities". This frame appears when the data contained in the grid are raw data. In this case the system "understands" that it has first to compute a matrix of similarities. In the "Source Variables" list box, select the content variables:

![SSA Analysis Window](image2)

**Fig. 8.** Content variables to be processed by SSA Analysis

To specify external variables click on "Advanced" button and select variables from "Source Variables".
Click "Ok" to return to the previous window, and then click "Perform" to process SSA.

The upper window is the output where the complete process is given as a text file. You can maximize it and scroll it to see the results. But let us focus on the graphic features of WSSA1: Click on Graphics menu and choose 1. WSSA 1 submenu. A small window, WSSA1 Graphics Plots, appears at the upper right corner of the screen. Through this window you can choose the dimensionality, the plot type (2D or 3D) and the specific projection. Keep the defaults and click OK. A window containing the plot appears at the lower left corner of the screen.
Maximize the plot window to allow more convenient operations. The following window contains several menus helping the researcher to explore more efficiently the results. External variables are represented by an X. Click on the *Labels* menu and choose the *Variable Labels* submenu to display labels instead of the serial numbers of the variables.
3. Dummy Variables as New Original Variables

Next we would like to address the issue of using the dummy variables created by the procedure explained above into an SSA as original variables. In the framework of a study on Jewish identity in US, several dummy variables were constructed in order to better understand the complex dynamics of the relationship to Jewish life. The 20 dummy variables were located in a way which we could quite easily comprehend. This first result, and the fact there were so many dummy variables, gave us the idea to consider these dummy variables as original variables. It is well understood that the dummy variables extracted from an original variable (we will call them linked dummy variables or LDV) are by definition dependent and opposed. So, four LDV will be placed in such a way that they constitute a circle. But, as we will consider many other groups of LDV, and the SSA takes into account all the correlations between all of the variables, this simple circularity in principle is changed. We would like to stress that the essence of the information we are seeking lays in this change in the exact circularity. Let consider an empirical example.

In the SSA shown in Figure 13, the following items are considered: denominational self-definition (Orthodox, Conservative, Reform and Just Jewish); extent of participation in the life of the local Jewish community (in four categories from Very frequently to Never), level of Kashrut observance (in four categories from Always to Never), level of religiosity (in four categories from Very high to very low); and attitudes regarding exogamy (in four categories from "vehemently opposed" to "No problem at all"). All 20 categories were transformed into dummy variables.

![Fig. 13. SSA with dummy variables placed as original variables](image)

As expected, the dummy variables here considered as original variables in the SSA, are located in a logical way. The levels of attitudes and behavior are...
relevant in each area. As we could assume, there is a polar structure of the data. Nevertheless, we would like to emphasize two results of this kind of procedure. First of all, the polarization is twofold: the Orthodox world is opposed to the Reform one, and the Conservative world is opposed to the Just Jewish one. Moreover, we can discern quite clearly that although each area is quite compact, the Conservative area is the largest: the various items belonging to this are quite distant from each other. Can we assume, on the basis of this result, that the Conservative world is the most diffuse? Such an assumption would be (socio)logical, as the Conservative movement includes a wide spectrum of people from those who are in many respects Orthodox through those who are Reform in many respects. Thus we can see that this new technique allows sufficient evidence to display and emphasize non trivial results.

4. Coefficient of Alienation of the EV

Each EV is characterized by a coefficient of alienation. This coefficient measures the extent of monotonicity between the input row correlations (of the EV with the content variables) and the corresponding computed row distances (of the EV from the content variables). A similar definition holds for the general coefficient of alienation (concerning content variables): the extent of monotonicity between the input symmetric matrix correlations (between content variables) and the corresponding computed symmetric matrix distances (between content variables). Zero value means perfect fit.

We would like now to consider the signification of this coefficient. When the coefficient of alienation is low or quite low, the location of the EV is very reliable. When it is high, we suggest doing the two following operations: first to analyze the SSA in a higher dimension and verify if the coefficient of alienation of the EV has lessened; and verify if the location of the EV in the SSA is fundamentally changed or not. If it is the case, thus the first result has to be considered as not reliable.

Sometimes the EV is located in the very middle of the SSA. This result may have two different and sometimes opposite meanings. As we have already mentioned, if the coefficient of alienation is low, the central location is reliable. But if this coefficient is high or especially high, it is plausible to think that the central location is due to the amount of difficulty the computer has found in locating this variable. In such a case, the "least worst" solution is the middle of the map: i.e. close to all the original variables. In this case, we suggest some additional steps. First, consider an SSA with more dimensions. This may make the coefficient lower, as indicated before. Here, we have discovered empirically, new traits. If the location of the EV has a lower coefficient in the higher dimension and is located in another region than the middle of the SSA, it confirms that the first location was not the accurate one. But, if the coefficient of alienation is lower and the location is still in the middle, this result assesses the
first location in the middle. In other words, despite the high coefficient of alienation in the first SSA, the location in the middle was not only the "least worst" solution but was in fact a good solution. This point is significant, as it enlightens the necessity of verifying the various aspects of the solution, and encourages us not to accept the results automatically.

5. A New Technique of Positive / Negative EV

Let us consider an item such as level of satisfaction. In this case, the categories are in principle ranged: for instance, 1 designates those who are very satisfied, and 4 designates those who are not satisfied at all. We can introduce the whole item into the SSA so that the more the respondents are satisfied, the closer the EV representing them will be to a certain region of the SSA. But sometimes, beyond this general statement, which is in itself not trivial, we want more detail, specifically designated the least satisfied respondents into the map as a separate EV. In order to get this information, we can compute a "negative" satisfaction item by multiplying it by -1, and introducing this new item in the SSA. So now, we have two satisfactions items in the SSA: a positive one and a negative one. By tracing a line between these two items, we can establish the 'direction' of satisfaction: from 'Not satisfied at all' to 'Very satisfied'. We suggest generalizing this technique as enlightening the SSA and the sub-populations.

References


Chapter 8.

Values
Value Structure at an Early Age: Cross-Cultural Replications

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Abstract. Schwartz’ (1992) theory on the structure of values has been validated in a large number of studies. However, most of these studies were based on data from adult samples. Bubeck and Bilsky (2004) studied a German sample of 10-12 year old children. They found a clear separation of the value types. However, instead of finding a wedgelike partitioning of values, Similarity Structure Analyses revealed a more complex structure. To investigate the stability of these deviations, three additional studies were run, analyzing samples of 10-12 year old children from Germany, Chile, and Portugal.

1. Introduction

Schwartz (1992); Schwartz & Bilsky, (1987, 1990) presented a comprehensive theory of the structure of values. In this theory, values are conceived as trans situational concepts or beliefs concerning desirable goals. They vary in importance and serve as guiding principles in people's lives. According to Schwartz, values can be subsumed under ten distinct categories, i.e., value types, which differ with respect to the motivational goals they express. The dynamic relation between these value types results from the mutual compatibilities and incompatibilities of their behavioural implications, yielding an overall pattern as shown in Figure 1.

This value theory has been validated in a large number of studies, using different instruments and analyzing data from different cultures around the world (Schwartz & Sagiv, 1995; Schwartz et al., 2001). However, most of these studies were based on data from adult samples. Information about children's value preferences and value structure is scarce. Bubeck and Bilsky (2004) applied Schwartz' Portrait Values Questionnaire (PVQ-29) to a German sample of children and juveniles aged 12 to 17 (N=1,555). Data were analyzed by means of Similarity Structure Analysis. They found a clear separation of the value types hypothesized by the Schwartz model, even in the sub-sample of 10-12 year old children (N=601). Furthermore, the basic value dimensions "openness to change vs. conservation" and "self-transcendence vs. self-enhancement" could be clearly identified as predicted. The structural pattern of value types, however, deviated from the theoretical model. Instead of finding a wedgelike partitioning of values (Schwartz, 1992), two-dimensional Similarity Structure Analyses revealed a more complex structure: In adult samples,
tradition and conformity have been the only value types arranged one behind the other. In several sub-samples of younger people, however, similar arrangements were found for other value types too. Stimulation, for instance, was repeatedly located behind self-direction, and power behind achievement (Bubeck & Bilsky, 2004).

Fig. 1. Theoretical model of relations among motivational value types and two basic bipolar value dimensions

2. Cross-Cultural Replications

To investigate the stability of these deviations, three additional studies were run with subjects aged 10 to 12 years. The instrument used was a revised version of the Portrait Values Questionnaire, comprising 21 items. Findings from these studies are outlined below.

2.1. Study 1 - German Students

Sample. The first study was conducted in two federal states of Germany, North Rhine-Westphalia and Baden-Wuerttemberg. Participants were students from four different types of school (Hauptschule, Realschule, Gesamtschule, Gymnasium), covering a wide though not strictly representative range of intelligence and social background. Data were collected in class sessions, resulting in a total of 1,100 complete records. The sample was almost evenly split into male (N=563) and female (N=537) participants.
**Data Analysis and Results.** In accordance with former studies on value structure (e.g., Schwartz et al. 2001; Bubeck & Bilsky, 2004), Smallest Space Analysis (SSA) was applied to item inter-correlations, using Guttman's coefficient of alienation as a loss function. Analyses were conducted using SYSTAT 10.

A two-dimensional SSA of value items, based on the complete sample of 1,100 students, resulted in a coefficient of alienation $k = .13$. This coefficient indicates a satisfactory solution with respect to conventional criteria (cf. Borg & Groenen, 1997, for a detailed discussion). More importantly, however, the resulting SSA-plot reflects several features of Schwartz' value theory (Fig. 2). Thus, the basic value dimensions "openness to change vs. conservation" and "self-transcendence vs. self-enhancement" can be identified without any problem. Furthermore, nine value types form distinct partitions. The fact that hedonism does not appear as a separate region is of minor importance, because the Schwartz model does not definitely assign this value type to either the "self-enhancement" or the "openness" pole of the two basic value dimensions (see Fig. 1).

![Two dimensional SSA of the German sample (N=1,100). PO=power, AC=achievement, HE=hedonism, ST=stimulation, SD=self-direction, UN=universalism, BE=benevolence, TR=tradition, CO=conformity, SE=security](image.png)

**Fig. 2.** Two dimensional SSA of the German sample ($N=1,100$). PO=power, AC=achievement, HE=hedonism, ST=stimulation, SD=self-direction, UN=universalism, BE=benevolence, TR=tradition, CO=conformity, SE=security
Finally, findings from our former study on value structure of children and juveniles (Bubeck & Bilsky, 2004) received considerable support: In addition to the usual location of tradition and conformity, power showed up behind achievement, stimulation behind self-direction, and universalism behind benevolence.

2.2. Study 2 - Chilean Students

Sample. All in all, \(N=659\) students, 314 male and 345 female, participated in our second study. Data were collected in two Chilean cities: Los Angeles (\(N=232\)) with about 100,000 and Puerto Montt (\(N=427\)) with about 150,000 inhabitants. About one half of the participants attended public (\(N=341\)), the other half private (\(N=318\)) schools.

Data Analysis and Results. Data were analysed in the same way as in the first study. The two-dimensional SSA of the Chilean sample resulted in a coefficient of alienation \(k = .18\). Figure 3 shows the respective split of the 21 PVQ-items.

![Two-dimensional SSA of the Chilean sample (N=659). PO=power, AC=achievement, HE=hedonism, ST=stimulation, SD=self-direction, UN=universalism, BE=benevolence, TR=tradition, CO=conformity, SE=security](image.png)
Partitioning of items resulted in nine distinct regions. Again, the four poles of the two basic value dimensions could clearly be verified. Contrary to the former analysis, however, hedonism formed a region of its own. At the same time, conformity and tradition values could not be separated as expected; this is due to the fact that one of the tradition items was misplaced. As in the German sample, achievement, self-direction, and benevolence are close to the centre of the plot. These value types can be separated from power, stimulation, and universalism, respectively, by an (interrupted) circular line.

2.3. Study 3 - Portuguese Students

**Sample.** Participants of our final study were \( N = 464 \) Portuguese students from four different schools; 248 of them were male, and 216 female. One school was located in Lisbon, two in Lisbon's immediate surroundings, and the fourth in Lamego, a city about 300 kilometres to the north of Lisbon. One of the schools in the vicinity of Lisbon was private all the others were public schools. The majority of our sample attended the private school (\( N = 287 \)). Thus, this sample cannot be considered representative of Portuguese students aged 10-12.

**Data Analysis and Results.** Again, data were analysed in the same way as in the other studies. The two-dimensional SSA of the Portuguese sample resulted in a coefficient of alienation \( k = .19 \). Figure 4 shows the partitioning of the 21 PVQ-items.

As expected, the two basic value dimensions could be identified without any problem. It should be noted, however, that the hedonism-items do not separate "self-enhancement" from "openness to change" as predicted by the Schwartz model; rather, they are imbedded in the openness-sector. Furthermore, partitioning of items can be accomplished in two different but equivalent ways. First, all value types can be split into wedgelike regions, except for benevolence and universalism which are mixed. Second, partitioning can be accomplished in the same way as in studies 1 and 2, i.e., by combining wedgelike partitions with a (broken) circular band. This latter partitioning resembles an imperfect radex structure.

3. Discussion

As expected, our cross-cultural data from 10 to 12 year old students are in line with Schwartz’ (Schwartz et al., 2001) claim that his theory is not restricted to adults. In fact, data collected with a short version of the Portrait Values Questionnaire (PVQ-21) reveal the same basic and higher-order value types as reported in studies conducted with the Schwartz Value Survey (Schwartz & Sagiv, 1995) or with an older version of the PVQ (Schwartz et al., 2001; Bubeck & Bilsky, 2004).
Until recently, we directed our attention primarily to the two basic value dimensions and to the number of value types when studying developmental changes in value structure (Bubeck & Bilsky, 2004). Deviations from the wedgelike configuration of value types assumed by the Schwartz model were attributed to chance, at least in the beginning. However, in accordance with our former study, the present data show some reoccurring structural peculiarities: In adult samples, tradition and conformity were the only value types arranged one behind the other (Schwartz, 1992; Schwartz & Sagiv, 1995). Our samples of 10-12 year olds, in contrast, show similar arrangements for other value types, too. Thus, stimulation appeared behind self-direction, power behind achievement (Fig. 2-4), and universalism behind benevolence (Fig. 2 and 3). Figure 5 summarizes these findings in a modified model of value structure.

From literature on Facet Theory we know, that content and structure are closely interwoven. Borg and Shye (1995) point to the fact that variables towards the center of an SSA plot are likely to show higher mean intercorrelations with the other variables than towards the periphery. Stated more content oriented, “variables represented by points in the innermost circle are more general in content than items represented by points in outer regions. Put another way,
variables occupying positions in outer circles entail all that variables in inner circles entail, plus an additional level of complexity” (Dancer, 1990, p. 372)

With this in mind, it seems promising to consider the model presented in Figure 5 as an alternative, when looking for developmental changes in value structure. It may not be the number of value types but the type of configuration which is indicative of developmental changes. If the (incomplete) radex found in our studies should occur reliably, two further steps seem appropriate: to investigate whether and to what extent value types in the inner and the outer circle differ with respect to generality of content, and how generality and specificity of value types change over time in the course of value acquisition and internalization.

To sum up, our studies have shown that both, basic value dimensions and value types could be identified in samples of German, Chilean and Portuguese students aged 10 to 12, as postulated by Schwartz’ theory (1992; Schwartz & Sagiv, 1995). As regards developmental changes in value structure, the mere number of value types does not seem to be a useful indicator. Rather, our findings point to the fact that changes in the configuration of value types deserve more attention in this context. This interpretation is in line with findings from a former study on developmental changes in value structure (Bubeck & Bilsky, 2004).
References


Civic Values in Learning Environments in 24 Countries
A Theory Based Analysis with Methodological Applications

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Abstract. This study applies a general theory about the content and structure of values on characteristics of learning environments, reported by 14-years old students. The IEA-civic education study collected data from 70 thousand students in 24 countries. The items in the IEA Civic Education Study concerning characteristics of learning environment, attitudes and behaviour have been analysed on the basis of the theoretical model. The 37 items were reduced to eight factors (political self-efficacy, self-efficacy at school, participation, stimulation of engagement, stimulation of traditional citizenship, stimulation of communication, freedom and diversity, curriculum reproduction). The factors have been tested with CFA. A WSSA of these factors gives a picture of the relationship between these factors, of the correspondence with the hypothesis made, and of the stability of the model across countries.

1. Introduction

The educational system is supposed to transmit social values to the students so that they become citizen, sharing the values that are accepted and important in that society. This has been called the socialization function of the educational system. The transmission of values is performed not only through the contents of several disciplines, but also through the values inspiring the curriculum, the educational organisation and the classroom climate. The teachers' behaviour in the classroom serves as a model in the classroom and in society. The relations shaped within the students' group are also powerful in bringing in life the values that count in a certain context (Westling Allodi, 2002).

The theory on the content and structure of values, which was developed by Schwartz and tested in several empirical studies (Schwartz, 1992; 1994), has been applied to the study of goals, values and attitudes in educational settings and reported by Westling Allodi (2003; 2005). This model proved to be stable and useful in studying the values perceived by students in learning settings in a Swedish context.

We want to apply this model in learning settings in other national contexts, with the hypothesis that the cultural and historical differences between
countries and between their educational systems are not influencing in a decisive way the essential content and structure of values in learning environments.

The purpose of this paper is therefore to investigate whether this theory-based bipolar model on values would apply to civic values and attitudes as reported by students at age fourteen in twenty-four countries, in a large international study of Civic Education (Torney-Purta et al., 2001).

One additional objective is to combine a Confirmatory Factor Analysis (CFA) and a Weighted Smallest Space Analysis (WSSA) in order to get a broader view of the structure of these values.

2. The Model on Contents and Structure of Values in Learning Settings

The model on the content and structure of values suggested by Schwartz has been proved to describe universal values, which are considered depending on basic human needs, needs of group interaction, and social needs of coordination. Cross-cultural comparisons have shown that there can be cultural differences across countries and across populations, but also that the essential structure of the values, and the internal relations among the values are quite stable. According to this model there are two bipolar value dimensions: *Openness to Change* is opposed to *Conservation* and *Self-Enhancement* is opposed to *Self-Transcendence*. The combination of these dimensions is used to identify universal value types (tab. 1). These universal values types can be used to understand and categorise the values that are present in different settings.

**Table 1. Universal value types defined by motivational concern (adapted after Schwartz, 1994)**

<table>
<thead>
<tr>
<th>Self-direction: Independent thought and action – choosing, creating, exploring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stimulation: Excitement, novelty challenge and change</td>
</tr>
<tr>
<td>Hedonism: Pleasure or sensual gratification</td>
</tr>
<tr>
<td>Achievement: Personal success through demonstrated competence according to social standards</td>
</tr>
<tr>
<td>Power: Social status and prestige, control or dominance over people and resources</td>
</tr>
<tr>
<td>Security: Safety, harmony, stability of society or relationship and of self</td>
</tr>
<tr>
<td>Conformity: Restraint of actions, impulses and inclinations likely to harm others and violate social expectations and norms.</td>
</tr>
<tr>
<td>Tradition: Respect, commitment and acceptance of customs and ideas that traditional culture provide</td>
</tr>
<tr>
<td>Benevolence: Preservation and enhancement of the welfare of other people</td>
</tr>
<tr>
<td>Universalism: Tolerance, understanding, appreciation of all people, the surrounding world</td>
</tr>
</tbody>
</table>
The model has recently been applied to students in different learning environments. A questionnaire based on this theoretical model was developed and tested among several populations in Swedish schools (Westling Allodi, 2003; 2005). The identified values in these specific settings were: Creativity, Stimulation, Achievement, Efficacy, Control, Helpfulness, Participation, Responsibility and Influence.

3. Method

3.1. Subjects

The samples of the present study consist of representative selections of students (about 70 thousand) participating in the IEA Civic Education Study at age fourteen in 24 countries, (23 European countries and USA are included). The data collection took place in 1999/2000. (Read more on the IEA-Civic Education Study at the following address: http://www.iea.nl/iea/hq/).

3.2. Instrument

From the Student Questionnaire in the IEA Civic Education Instrument we selected 37 items using a four grade scale concerning aspects of classroom and school climate, which were relevant in the mapping of the attitudes and values transmitted at school.

[The Questionnaire is available at the following web address http://www.wam.umd.edu/~iea/studentQ.htm]

3.3. Data Analysis

The items are analysed and related to eight latent variables (factors). The factors were tested with One-factor models (Confirmatory Factor Analysis) initially in a country sample with AMOS and STREAMS (Gustafsson & Stahl, 2003, http://www.mwstreams.com). The sum scores for each scale and country were then calculated with SPSS. The mean scores, achieved by dividing by the number of items for each scale, are standardized to z-scores (mean=0, and sd=1). Both these scores are comparable across countries. Weighted Smallest Space Analysis was performed using z-scores on a randomly selected sample for each country (between 400 to 750) and for the whole dataset of 24 countries (13987 of 70 thousand) with HUDAP.
4. Results

4.1. Confirmatory Factor Analysis

The 37 items were related to eight latent factors with a structural model. The factors were called

   Example I5: *When political issues or problems are being discussed, I usually have something to say.*

2. Self-efficacy at school (sceff). Three items: J4, J6, J7.
   Example J4 *If members of my class felt they were unfairly treated, I would be willing to go with them to speak to the teacher.*

   Example J5: *Students acting together can have more influence on what happens in this school than students acting alone.*

   Example K6: *In school I have learned to be concerned about what happens in other countries.*

   Example K4: *In school I have learned to be a patriotic and loyal citizen of my country.*

   Example N6: *Teachers require students to memorise dates or definitions.*

7. Freedom, respect for diversity and pluralism (free). Three items: N1, N3, N5. Example N5: *Students feel free to express opinions in class even when their opinions are different from most of the other students.*


These latent variables were tested by means of Confirmatory Factor Analysis (one-factor models) on the Swedish sample of the IEA database. The measures of goodness of fit were satisfying in this sample for the eight factors hypothesised. We then calculated the reliability for the scales for each country with SPSS. The means, standard deviation and Alpha reliability for the 24 countries are showed in table 2.

See fig. 1 to see how the factors are related to the theoretical model. Seff and Sceff are representing personal initiative and efficacy in influencing aspects of the learning environment and are expected to relate to Openness to Change. They represent aspects of personal efficacy, the willingness to express oneself and act to influence, but also the possibilities that are offered in the learning environment to the students to express themselves and make a difference with
Civic Values in Learning Environments in 24 Countries …

253

Table 2. Mean sum scores, Standard deviations, Coefficient α reliability for the
factors Seff, Sceff, Part, Steng, Trad, Curr, Free, Comm in 24 countries (country
number, country code)

56
BFR
100
BGR
196
CYP
200
CZE
201
SVK
208
DNK
233
EST
246
FIN
280
DEU
300
GRC
348
HUN
380
ITA
428
LVA
440
LTU
578
NOR
616
POL
620
PRT
642
ROM
643
RUS
752
SWE
756
CHE
826
ENG
840
USA
890
SVN

Seff
Sceff
Part
Steng
Trad
Curr
Free
3 items
3 items
4 items
4 items
3 items
5 items
3 items
M Sd α M Sd α M Sd α M Sd α M Sd α M Sd α M Sd α
6.8 1.8 .46 9.1 1.8 .48 12.1 2.4 .66 11.82.4 .70 7.8 2.0 .56 14.42.9 .57 8.3 2.2 .64

Comm
6 items
M Sd α
14.13.5 .70

7.2 1.8 .51 8.6 1.9 .56 12.4 2.5 .78 11.42.3 .68 7.9 1.9 .57 15.73.0 .66 8.1 2.2 .64 14.33.5 .68
7.7 1.7 .61 9.5 1.6 .60 13.8 1.9 .67 12.72.1 .68 9.6 1.7 .55 16.02.5 .55 9.5 1.8 .51 16.73.3 .66
6.5 2.7 .62 8.5 1.6 .60 12.2 1.8 .57 11.21.8 .64 7.8 1.7 .56 14.92.7 .53 8.4 2.2 .65 14.63.7 .76
7.3 1.7 .67 8.8 1.6 .62 12.8 1.8 .60 12.21.8 .68 8.9 1.6 .58 15.42.5 .48 9.3 1.9 .56 15.63.4 .72
6.3 2.1 .71 8.7 2.0 .70 12.9 2.1 .72 11.52.0 .63 7.5 1.7 .49 13.12.7 .56 9.1 2.2 .75 15.33.5 .75
6.7 1.7 .68 8.2 1.8 .64 12.7 1.8 .69 11.41.8 .63 7.6 1.8 .61 16.12.5 .56 8.9 2.0 .58 14.13.4 .73
6.3 1.9 .73 8.1 1.9 .67 12.4 1.9 .71 11.01.9 .65 7.4 1.8 .65 13.52.5 .60 9.2 1.9 .66 14.23.2 .75
6.8 1.8 .59 8.1 2.0 .67 11.7 2.0 .68 11.52.0 .65 7.4 1.8 .51 15.02.7 .58 9.3 2.0 .65 15.93.4 .71
7.7 1.7 .59 9.7 1.6 .62 13.5 2.0 .68 12.51.9 .60 9.1 1.8 .60 15.32.5 .51 9.7 1.9 .60 16.73.2 .64
6.7 1.6 .65 8.3 1.3 .59 11.9 1.8 .64 10.81.8 .64 8.3 1.6 .59 17.12.4 .55 8.4 2.0 .49 14.33.7 .76
6.7 1.8 .61 9.2 1.6 .55 12.3 1.9 .60 12.11.8 .63 7.9 1.8 .59 14.92.4 .43 9.3 2.0 .66 16.83.4 .73
6.9 1.6 .58 8.4 1.6 .53 12.1 1.9 .64 11.41.8 .58 7.8 1.6 .54 15.62.6 .55 8.7 2.0 .53 14.53.4 .67
6.7 1.6 .63 8.3 1.7 .62 12.8 1.9 .73 11.52.0 .67 8.0 1.8 .60 16.42.4 .57 8.9 1.9 .51 14.73.5 .71
6.5 2.0 .68 8.6 2.1 .71 12.9 2.1 .74 11.72.1 .71 7.7 1.8 .58 15.52.5 .60 9.8 2.0 .70 15.93.3 .70
7.1 1.8 .62 9.1 1.9 .65 13.1 2.2 .75 12.22.4 .73 9.0 2.0 .68 16.02.6 .63 9.2 2.1 .70 16.13.8 .77
6.8 1.6 .57 9.3 1.6 .59 13.5 1.7 .67 12.51.8 .68 8.8 1.5 .53 14.52.1 .49 8.9 1.7 .61 13.82.9 .70
7.6 1.8 .45 9.1 1.7 .51 13.0 2.0 .62 12.62.1 .66 9.9 1.7 .59 17.02.4 .52 8.5 2.0 .48 15.23.6 .68
7.2 1.5 .57 8.4 1.6 .55 12.3 1.6 .56 11.51.8 .61 8.4 1.6 .56 16.82.3 .54 9.1 1.9 .57 16.23.8 .76
6.4 2.0 .69 8.3 2.0 .66 12.9 2.1 .74 11.72.1 .71 7.7 1.7 .49 14.82.4 .55 9.4 1.9 .64 15.23.3 .75
6.4 1.9 .62 8.6 1.9 .64 12.0 2.0 .67 12.02.0 .66 7.4 1.9 .60 13.32.8 .59 9.4 2.0 .67 16.03.3 .71
6.4 2.0 .71 8.5 1.9 .65 12.5 2.2 .75 12.12.0 .70 7.7 1.8 .58 14.62.6 .60 8.9 2.1 .67 14.63.4 .73
7.4 2.0 .69 8.9 1.9 .72 12.7 2.2 .79 12.12.1 .75 8.5 1.8 .69 15.82.6 .64 9.2 2.0 .69 17.13.5 .75
6.7 2.0 .69 8.6 1.7 .58 12.1 2.0 .65 11.61.8 .61 7.8 1.7 .55 14.52.7 .56 8.4 1.9 .58 13.93.1 .68


their ideas and initiatives. Part and Steng are related to Self-Transcendence because they are concerned with what is collective and communitarian, the well being of others and the environment. Steng has also a content of Conservation since this concern means also a willingness to protect and preserve. Trad and Curr are supposed also to relate to the polarity of Conservation: Trad is about the transmission of traditional civic values in the educational setting and Curr is about the transmission of contents with a rather fixed curriculum. Free and Comm are related to Self-Enhancement since they are about pluralism, respect of diversity and respect of the individual freedom to have own opinions. Comm is in that sense also related to Openness to Change, since it is about stimulation of communication and discussion of actual events and matters.

4.2. Facet Analysis and WSSA

The following mapping sentence is based on the theory-based model on values

Student (x) assesses his or her learning environment with respect to

<table>
<thead>
<tr>
<th>FACET A</th>
<th>FACET B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Value contents</strong></td>
<td><strong>Reference</strong></td>
</tr>
<tr>
<td>Political self-efficacy</td>
<td>self</td>
</tr>
<tr>
<td>Self-efficacy at school</td>
<td></td>
</tr>
<tr>
<td>Collective participation at school</td>
<td>referring to</td>
</tr>
<tr>
<td>Stimulation of engagement</td>
<td>group</td>
</tr>
<tr>
<td>Stimulation of traditional citizenship</td>
<td></td>
</tr>
<tr>
<td>Stimulation of communication</td>
<td>community</td>
</tr>
<tr>
<td>Freedom and respect for diversity</td>
<td></td>
</tr>
<tr>
<td>Curriculum reproduction</td>
<td></td>
</tr>
</tbody>
</table>

Range

in a very high to very low

We hypothesise that the structure of the Facet A (value contents) would show an axial structure with the bipolar dimensions Openness to change contra Conservation and Self-Enhancement contra Self-transcendence. The facet B is supposed to show a modular structure that could vary to a larger extent across countries, depending on the dominant focus in that culture.

The factors seff and sceff are expected to be conceptually oriented toward Openness to change, while curr and trad would be oriented toward Conservation. The factors part and steng would be oriented toward Self-Transcendence, while comm and free are expected near Self-Enhancement.

We performed MONCO and WSSA with the program HUDAP with randomly selected sample for each country and all countries together.

We retained for further analysis only the countries showing not more than one variable having a coefficient of distribution uniformity lower than .20. (See table 2). These 15 countries were: Bulgaria, Cyprus, Czech Republic, Slovakia, Denmark, Hungary, Italy, Norway, Poland, Romania, Sweden, Switzerland,
England, USA and Slovenia. The following countries were thus excluded from further analysis as having more than one variable with too low coefficient of distribution uniformity: Belgium, Estonia, Latvia, Lithuania, Germany, Greece, Portugal and Russia.

![Diagram of Civic Values in Learning Environments in 24 Countries](image)

**Fig. 1.** Hypothesised structure of the relations between the eight factors 1. seff, 2. sceff, 3. part, 4. steng, 5. trad, 6. curr, 7. free, 8. comm and the bipolar model

We analysed the WSSA diagram for each of the remaining 15 countries with 2 or 3 dimensionalities, depending on the respective coefficient of alienation.

The bipolar structure *Openness to Change ↔ Conservation* was found in the diagrams from all the countries and proved to be a very stable structure across the countries. The variables *seff* and *sceff* are often on the same side of the diagram and they are often opposite to *curr* and *trad*.

The bipolar structure *Self-Enhancement ↔ Self-Transcendence* is also identifiable in the diagrams from many countries. The variables *free* and *comm* end up near each other, and they are often opposed to *part* and *steng*.

In five countries however the structure was not clearly interpretable and the variables appeared rather mixed to some extent, and not completely related to each other as expected.

In some countries the dominant structure assumes a modular shape, instead of axial, Poland. The WSSA for Poland contains both the bipolar dimensionality and the modular structure (individual, group, community).

In certain countries some factors appear closer related to each other and build a cluster. The placement of this cluster on the bipolar structure varies among countries. In the diagram of Sweden the closer factors are found in the space between *Self-Enhancement* and *Conservation*. In the diagram of Italy they are close to the middle of the diagram space. In the case of Poland they are clustering in the space between *Self-Enhancement* and *Change*. 
Table 3. Case Summaries of MONCO and WSSA for each Country and Analysis of the Bipolar Structure in 15 countries. Country code, number of randomly selected cases, variables having coefficient of distribution uniformity lower than .20, coefficient of alienation with 2 dimensionality, coefficient of alienation with 3 dimensionality, Bipolar Structure Self-Enhancement ↔ Self Transcendence, Bipolar Structure Openness to Change ↔ Conservation, and type of deviation from the model. (n.a. = not analysed)

<table>
<thead>
<tr>
<th>COUNTRY code</th>
<th>N</th>
<th>coefficient of distribution uniformity &lt; .20</th>
<th>coefficient alienation 2 dimensions</th>
<th>coefficient alienation 3 dimensions</th>
<th>Bipolar Structure Self-En.</th>
<th>Bipolar Structure Self Trans</th>
<th>Bipolar Structure Change-Conserv</th>
<th>Deviations from model</th>
</tr>
</thead>
<tbody>
<tr>
<td>56</td>
<td>399</td>
<td>part trad curr</td>
<td>.15</td>
<td>.05</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>100</td>
<td>480</td>
<td>-</td>
<td>.16</td>
<td>.04</td>
<td>yes</td>
<td>yes</td>
<td>2-3 ↔ 4-5</td>
<td></td>
</tr>
<tr>
<td>196</td>
<td>550</td>
<td>steng</td>
<td>.06</td>
<td>.005</td>
<td>yes</td>
<td>yes</td>
<td>6 ↔ 5</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td>733</td>
<td>steng</td>
<td>.13</td>
<td>.08</td>
<td>yes</td>
<td>yes</td>
<td>4 ↔ 5</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>708</td>
<td>seff</td>
<td>.12</td>
<td>.01</td>
<td>yes</td>
<td>yes</td>
<td>3 ↔ 4</td>
<td></td>
</tr>
<tr>
<td>208</td>
<td>575</td>
<td>steng</td>
<td>.16</td>
<td>.05</td>
<td>yes</td>
<td>yes</td>
<td>5 ↔ 6 + 7</td>
<td></td>
</tr>
<tr>
<td>233</td>
<td>632</td>
<td>part steng</td>
<td>.16</td>
<td>.03</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>246</td>
<td>505</td>
<td>part trad</td>
<td>.15</td>
<td>.07</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>280</td>
<td>761</td>
<td>seff part steng trad</td>
<td>.18</td>
<td>.08</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>638</td>
<td>seff steng</td>
<td>.16</td>
<td>.02</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>348</td>
<td>617</td>
<td>trad</td>
<td>.16</td>
<td>.07</td>
<td>no</td>
<td>yes</td>
<td>modular</td>
<td></td>
</tr>
<tr>
<td>380</td>
<td>635</td>
<td>steng</td>
<td>.07</td>
<td>.04</td>
<td>yes</td>
<td>yes</td>
<td>irregular</td>
<td></td>
</tr>
<tr>
<td>428</td>
<td>462</td>
<td>seff steng</td>
<td>.16</td>
<td>.11</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>440</td>
<td>685</td>
<td>part sceff</td>
<td>.16</td>
<td>.07</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>578</td>
<td>597</td>
<td>-</td>
<td>.12</td>
<td>.02</td>
<td>yes</td>
<td>yes</td>
<td>irregular</td>
<td></td>
</tr>
<tr>
<td>616</td>
<td>645</td>
<td>-</td>
<td>.04</td>
<td>.007</td>
<td>no</td>
<td>yes</td>
<td>modular</td>
<td></td>
</tr>
<tr>
<td>620</td>
<td>568</td>
<td>steng trad</td>
<td>.19</td>
<td>.08</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>642</td>
<td>571</td>
<td>-</td>
<td>.10</td>
<td>.01</td>
<td>yes</td>
<td>yes</td>
<td>1 ↔ 2</td>
<td></td>
</tr>
<tr>
<td>643</td>
<td>401</td>
<td>seff part trad</td>
<td>.17</td>
<td>.02</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>752</td>
<td>563</td>
<td>-</td>
<td>.14</td>
<td>.03</td>
<td>yes</td>
<td>yes</td>
<td>Irregular 6</td>
<td></td>
</tr>
<tr>
<td>756</td>
<td>532</td>
<td>-</td>
<td>.17</td>
<td>.07</td>
<td>yes</td>
<td>yes</td>
<td>Irregular 6</td>
<td></td>
</tr>
<tr>
<td>826</td>
<td>566</td>
<td>part</td>
<td>.12</td>
<td>.06</td>
<td>partially</td>
<td>yes</td>
<td>6-7-8</td>
<td></td>
</tr>
<tr>
<td>840</td>
<td>546</td>
<td>-</td>
<td>.06</td>
<td>.02</td>
<td>partially</td>
<td>yes</td>
<td>6-7-8</td>
<td></td>
</tr>
<tr>
<td>890</td>
<td>618</td>
<td>part</td>
<td>.13</td>
<td>.01</td>
<td>partially</td>
<td>yes</td>
<td>6-7-8</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>13987</td>
<td>part steng trad comm curr</td>
<td>.07</td>
<td>.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The diagram of Czech Rep. show a rather good correspondence with the hypotesised model.

In table 3 we present the coefficients from MONCO and WSSA for each country, the analysis of the bipolarity structure, and the type of deviation from the model identified with the analysis of the the WSSA diagram.

The diagrams from the WSSA analysis described here are available at the following web address: [URL: http://www.lhs.se/~marallod/hem/fig05.html]

5. Country Profiles

The underlying theoretical model has been confirmed with the WSSA analysis in several of the countries considered in this study. If the bipolar structure is emerging from the data analysed, then it would be possible to identify this structure also when comparing country means. We hypothesised that countries having relatively lower means on Openness to change would have relatively higher means on Conservation, and vice versa. We suppose also that those having relatively lower results on Self-Transcendence would consequently have relatively higher results on Self-Enhancement.

To make the data comparable we divided each country mean of sum of scores (tab. 1) with the number of items in the scale. The range is from the lowest mean scale value 1.8 to the highest mean value 3.4. This interval is divided into 10 classes, minus 5 to plus 5, labelled ‘rank’. The results are showed in table 4.

The analysis of the patterns in the students' answers confirms the existence of a correlational structure in several countries. Some countries tend to have relatively high results on nearly all the variables (e.g. Poland). We can call this an Engagement profile with an emphasis on the aspects of Conservation, Self-transcendence and Self-enhancement values represented in this instrument (profile 1), fig. 2.

The countries having relatively higher results on Self-Transcendence and Conservation can be defined as having a Traditional profile (profile 2), fig. 3. In this profile the emphasis is on curr. Trad is not as low as in the profile 3 and 4. The difference between profile 1 and 2 is that profile 1 has high results also on free.

The countries having lower results on Conservation (trad) and higher on Self-Enhancement and Openness to Change (free, respect for diversity are higher than curr) can be considered having a Transformational profile (profile 3), fig. 3.

The countries with no clear emphasis could be defined as having an Indefinite profile type (profile 4), where curr and part are the variables with higher results, as for the Traditional profile, but where trad is low, as in the Transformational profile, fig. 4. This could be interpreted in the sense that Civic
Table 4. Country profiles for 24 Countries, mean scores, and rank for the eight variables (1=Engagement, 2=Traditional, 3=Transformational, 4=Indefinite, n.a.= not analysed)

<table>
<thead>
<tr>
<th>COU</th>
<th>profile</th>
<th>Seff s</th>
<th>Seff r</th>
<th>Sceff s</th>
<th>Sceff r</th>
<th>Part s</th>
<th>Part r</th>
<th>Steng s</th>
<th>Steng r</th>
<th>Trad s</th>
<th>Trad r</th>
<th>Curr s</th>
<th>Curr r</th>
<th>Free s</th>
<th>Free r</th>
<th>Comm s</th>
<th>Comm r</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFR</td>
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Education in these countries are shifting emphasis from a model of transmission of values to another.

6. Discussion

The aim of this paper was to apply a theory-based model on civic values to different countries by using a combination of data analytical approaches. We found that the hypothesised bipolar dimensions with the expected relations between variables could be found in most countries. Some East European countries showed a tendency toward Conservation in civic values, while other (many West European countries) show the tendency toward less Conservation and more Openness to Change. Self Enhancement and Self-Transcendence were also identifiable, but here the bipolar pattern was less evident.
Country profiles: Engagement

![Graph showing Country profiles: Engagement](image)

**Fig. 2.** Profile Engagement: Cyprus, Poland, Slovak Republic., USA

Country profiles: Traditional

![Graph showing Country profiles: Traditional](image)

**Fig. 3.** Profile Traditional: Romania and Hungary
Fig. 4. Profile Transformational: Italy, Norway, England, Switzerland, Sweden, Denmark

Fig. 5. Profile Indefinite: Czech Republic, Bulgaria, Slovenia
The analysis of the answers of pupils permit us to interpret four profiles. Some countries could be characterised by an overall engagement (e.g. Cyprus), others by traditional values (Romania), others by weaker traditional values and an emphasis on change and diversity. The fourth profile seems avoiding traditional values without to show an emphasis on change and diversity either. It is possible that these countries are in a transition phase, possibly with conflicts between different views on the role of civic education in the educational system.

These results also confirm that a combination of data analysis approaches (CFA and WSSA) could enhance the possibilities of interpreting these results and further develop the original model and the instrument used.

References


[URL: http://www.lhs.se/~marallod/hem/data05.html]


Towards a Typology of Values: Application of Facet Theory to the Study of French Jews

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Bar-Ilan University, School of Education, Ramat Gan, 52900, Israel

Abstract. Facet Theory is used to develop a typology of values based on an empirical study of values among French Jews. Each of the analytic tools used revealed a unique facet of the data, which together gave a rich picture of both the study population and the concept of values. SSA revealed a polar structure of six categories of values arranged around a central value. Two axes are identified, one political, one social. POSAC identified four basic profile types of French Jews which are then re-introduced into the SSA map. The resulting typology may be verified among other populations.

1. Introduction

1.1. Previous Typologies: French Jews

In this study, we develop an axiological typology of French Jews. We chose a branch of study based on value judgments for several reasons. In the first place, the questions about values presented to Jews of France have been used for many years among other populations. This enables the construction of a universal typology for it is based on variables that are not specifically related to Judaism, although specifically Jewish values can still be expressed. Furthermore, the axiological typology avoids the debate on the nature of Judaism (a body of practices or a feeling of belonging, religion or culture, etc.) In this sense, it is scientifically more objective and more neutral, since it does not presuppose an “ideal” Jewish model. We shall also see that the axiological typology is also the most discriminating, in the sense that it enables the construction of non-hierarchical categories.

Several previous typological studies of the Jews of France are worth noting, as they provide contextual background for interpreting the results of the current analysis. Schnapper (1980) distinguished between observers, who continue or return to religious tradition, militants, who pass tradition on through political means and Israelites who primarily associate with non-Jews of their same social status. More recently, Hubert Hannoun (2000) distinguished between militant Jews, spectator Jews and indifferent Jews, based on level of attendance at community institutions. Using a more systematic approach, Regine Azria (2003) graphs a typology of traditional practices along two axes: Jewish law (halakha) versus custom (minhag), and individual versus collective
practices with five categories of French Jews: 1) professionals: those working in Jewish institutions or businesses 2) faithful: those concerned with Jewish continuity, 3) militants or volunteers: those who dedicate service to Jewish causes, 4) consumers: those who purchase goods and services related to Judaism and 5) seekers: disenchanted soul-searchers (p. 67). These typologies, however, do not specifically address the issue of values. They differentiate between types based on behavior. They are specific to the Jewish population and therefore the typologies are less widely applicable.

A typology based on values rather than on behavior entails a reversal of theoretical approaches. While centrifugal and centripetal movements can be perceived among the Jewish population, they are not sufficiently strong to interpret and explain reality. We hope, through this axiological study, to address questions such as: In what way do the Jews of France constitute an integrated collective? How does each member find his place in this collective?

In sociological studies of values, the notion of context is of utmost importance, as, “Values are nothing more than collective preferences, which emerge in an institutional context and which, because of the way they develop, contribute to the regulation of this context,” (Boudon and Bourricaud 1982, 601-608). The context in which the study population, the French Jewish community today, lives consists of multiple layers: the Jewish religion and culture, French culture and the culture of North African Jews who comprise 70% of the current French Jewish community. Traditional Jewish values, French Republican values and values of the Maghreb (Algeria, Morocco, and Tunisia) interact to create the value structure of the study population. Nevertheless, universal typologies of value types have been developed and verified in many different cultural contexts. These typologies present a structure of value types which allows for variation in emphasis within different social contexts.

1.2. Previous Typologies: Universal Structures of Values

Guttman and Levy (1976) were the first to depict various axiological tendencies on a geometric graph as polarities revolving around a center. The main polarities on this graph are authority versus autonomy and altruism versus egoism. These two basic structures have been used and verified many times all over the world and it would seem that the universe of values is fundamentally structured in the same way in all human societies.

Today, the most widely recognized and repeatedly verified structure of values is that developed by Schwartz and colleagues over the course of over a decade. Schwartz refined Rokeach's (1973; 1976) typology of 36 values which were divided into two categories: personal or social end values and moral or beneficial instrumental values. Schwartz and colleagues (Schwartz 1999; Schwartz and Bilsky 1987; Schwartz and Sagiv 1995) expanded the list of values to 56 and proposed a universal typology of ten value-types: self-direction,
universalism, benevolence, conformity, tradition, security, power, achievement, hedonism and stimulation. Schwartz's theory utilizes the Facet Theory approach and the typology recognizes the importance of the relationship between the categories of values. His typology is graphically represented as a two-dimensional model showing categories of compatible and incompatible value-types. Schwartz notes two sets of general moral positions: self-transcendence versus self-enhancement and conservation versus openness to change. The applicability of the Schwartz model has also been tested in studies based on other measurement tools (i.e. not the "Schwartz Value Survey") (Bilsky and Koch 2000).

These two theoretical approaches provide theoretical guidance for the development of an axiological typology using the case study of French Jews.

2. Methodology

2.1. The Survey

During the month of January 2002, a large socio-demographic and attitudinal survey was conducted among a representative sample of French Jewry. Potential interviewees were selected based on family name. 1132 phone interviews were conducted with the head of household in 30 geographical French departments. The survey included 300 questions on issues such as Jewish identity, Jewish life, Jewish education and relationship to Israel. Several of the questions related to values.

In one question, which forms the basis of the current analysis, respondents were given 14 value items (shown in Table 1) and asked to rate the importance of each on a scale of 1-3 (one representing 'not important', two 'somewhat important', three 'very important').

2.2. Development of a Typology

The process by which we established a typology of the Jews of France involved nine stages, which we shall describe in brief.

Stage 1: Using the Smallest Space Analysis, we created a structural order of the values of the Jews of France (see Figure 1).

Stage 2: The semantically linked variables in each region in the SSA were transformed into indices. The central value in the structure was not retained in the following stages.

Stage 3: Once the six indexes were constructed, we verified their different frequencies.

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I would like to thank Shlomit Levy for her help in selecting these 14 items from a larger list of items she used with Louis Guttman.
Stage 4: We then calculated the average for each index.

Stage 5: Each index was transformed into two categories: one category representing answers below the average and one category representing answers above the average.

Stage 6: Using the POSAC (Partial Order Scalogram Analysis with Base Coordinates), from the HUDAP statistical package, we were able to establish a partial order for the 64 profiles on the basis of the six indexes assigned to each interviewee. A partial order of the 64 profiles identified by the statistical package was represented in a scalogram. The axes by which the scalogram may be divided were identified by the statistical program.

Stage 7: On the basis of this result, we created a new variable, consisting of 4 categories. Each of these categories refers respectively to one of the four areas of the scalogram.

Stage 8: Additionally, based on the last scalogram, four binary variables were created, each representing one of the four areas.

Stage 9: These four binary variables were introduced onto the graph of values as external variables. An external variable, by definition, plays no part in the order of the graph (Cohen and Amar 2002). Only the original variables can do so. Once the graph is defined and fixed, an external variable is identified based on the correlations between this variable and the original variables. The external variables are introduced one by one (see figure 1).

3. Results

3.1. Axiology (Moral Choices)

Table 1 shows the averages of the responses to each of the 14 values included in the survey question. The two values, with the most importance for the Jews of France are related to the family nucleus: *honor your parents* and *founding a family*. These are fundamentally traditional values and principle pillars of social organization related to respect and authority. Next come two values related to the individual: *Studying* and *Being oneself*. These are followed by two variables relating to relationships with others and social law: *Helping others* and *Being useful to society*. Lastly one finds values that could be described as individualistic and egoistic: *Caring for one’s appearance*, *Going away on holiday* and *Earning a lot of money*.

Analysis of the results of the survey enables us to draw an axiological graph of the value system of the Jews of France. The monotonous correlation matrix of the responses to the list of 14 values was calculated then plotted on an SSA map. Of the total correlations between the 14 variables, we find only three relatively negative correlations confirming that we are dealing with a unified system. Figure 1 shows the graphic representation of the values. The distribution
Table 1. Average of responses to the item, "Assess each variable by level of importance in your life: 1 = not important, 2 = important, 3 = very important"

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<td>Helping others</td>
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<td>Earning a lot of money</td>
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Fig. 1. Axiological graph and typology. Geometric representation (SSA) of the values of the Jews of France in 2002 with typological profiles as external variables of the variables over the whole of the graph shows that the semantic terrain was well covered by the questionnaire.

Six axiological regions emerge, each representing a way of living and expressing life’s multi-faceted character: 1) tradition (belief in God, honoring parents, founding a family), 2) altruism (helping others, being useful to society), 3) authenticity (being oneself, studying), 4) social life (having a good time with
friends, doing what I like), 5) leisure (going on holiday, engaging in sport), and 6) materialism (caring for one’s appearance, earning a lot of money). In the center of the structure is a sixth region with one value "making the most of life". The same graph enables us to see, within the system, the polarities and oppositions that organize the values among themselves.

3.2. Axes of Values

The graph of the values of the Jews of France can also be read according to two diagonals that represent choice of values: a political diagonal, which deals with collective life in an organized group and a social diagonal, which deals with relationships with others. We can thus define four poles that organize the graph of values.

The two poles of the political diagonal are:
*Autonomy:* an individual (or a collective) defines his own principles of behavior and obeys only the rules chosen after examination. (*Having a good time with friends, Doing what I like, Studying, Being oneself*);
*Authority* (Heteronomy): an individual (or a collective) looks to the outside for principles and rules. This is the pole of values that are imparted; it is thus the pole of tradition and authority. In other words, duty, discipline, and respect for values based on imitation and continuation (*Founding a family, Honor your parents, Belief in God*).

The two poles of the social diagonal are:
*Altruism:* an individual (or a collective) places the most emphasis on the wellbeing of others (*Being useful to society and Helping others*).
*Egoism:* an individual (or a collective) makes the interest of the individual the main guiding force of his behavior (*Going away on holiday and engaging in sport, Caring for one’s appearance and Earning a lot of money*).

The center of the structure is a largely consensual value, Making the most of life. It is at the center because of its multifaceted character since everyone can impart to it the meaning they want. For some, it can mean total dedication to enjoyment and, for others it can mean enrichment, taking advantage of every moment to enrich oneself through study or work.

Given the importance of autonomy, subjectivity and self-fulfillment in modern society, one could have expected to find the value Being oneself at the center of the graph of values. But, we see that self-fulfillment is linked to study and training, through which an individual forges his future. In the same way, the value that is directly linked to individual liberty, Doing what I like, is correlated with social conviviality, Having a good time with friends. One assumes then that Doing what I like does not mean exercising one’s freedom, or having total power over one’s destiny. It relates more to a value that represents relaxation,
pleasure, a state in which an individual frees himself from social constraints and moves towards autonomy.

From the results of the SSA, indices were created for each of the semantic regions by adding together the variables. For example, an index for the Tradition region, designated index 1, adds together the variables Belief in God, Founding a family, and Honoring one's parents. The frequencies of the indices were then verified. Since each of the three questions, which are the basis of this index, consist of three categories (very important, important, not important), the minimum of their total equals three and the maximum equals nine. The same process was followed for each of the regions, creating six indices. We then calculated the average for each index. For index one, we found an average of 7.6. Next, each index was transformed into two binary categories representing below and above average responses. For index one, answers of three through seven were transformed into 1, answers of eight and nine were transformed into 2.

3.3. Profiles of Value Types

Using these six binary indices, we found 64 possible profiles for the interviewees. The partial order scalogram of the 64 profiles is shown in Figure 2. Profile 1 appears on the top right-hand side of the scalogram. Profile 64 appears diagonally facing it. Between these two extreme profiles, the statistical package identified the remaining 62 profiles, according to their partial order. The statistical package enables one to locate the axes of the scalogram. It emerges that the axes are perfectly correlated with indices 1 and 2. The first designates the index of variables, Belief in God, Founding a Family, and Honor one's parents, which forms the Tradition region in the SSA. The second designates Doing what I like, and Having a good time with friends, which forms the Social life region.

As a result, the statistical package divides the scalogram according to these two indices, as seen in the scalogram below. Nearly all the profiles below the horizontal line fall into category 1, index 1. Similarly, nearly all the profiles to the left of the vertical line fall into category 1, index 2. On the basis of this result, we created a new variable (TYPO), consisting of four categories. Each of these categories refers respectively to one of the four areas of the scalogram. Thus all the profiles in the lower-left quadrant (26, 30, 45, 50, 51, 52, 54, 57, 58, 60, 62, 63 and 64) are included in category 1 of the new variable.

Next, four binary variables were created, each representing one of the four areas of the scalogram. These were introduced as external variables into the SSA of values, as shown in Figure 1.
Fig. 2. Partial order scalogram of 64 profiles of French Jews

This analysis, using several complementary multi-dimensional tools, enables us to distinguish four basic value profile-types among the Jewish population of France. Two are based on values of autonomy (profile 1 and profile 2) and two are based on values of authority (profile 3 and profile 4). As seen in Table 2, these four profiles are demographically balanced.

Table 2. Frequency of occurrence of the four profiles

<table>
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<tr>
<th>Profile</th>
<th>Percentage</th>
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<tr>
<td>Profile 1: Individualists</td>
<td>22%</td>
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<td>Profile 2: Universalists</td>
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<td>Profile 3: Traditionalists</td>
<td>31%</td>
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<td>Profile 4: Revivalists</td>
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<td>Total</td>
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Profile 1, called Individualists, places the emphasis on values based on egoism. Profile 2, named Universalists, places the emphasis on autonomy and favors sociability. Traditionalists (Profile 3) derive the principles that govern their lives from external sources and stress values that are linked to authority. Finally, profile 4 is made up of people who combine values of autonomy with values of authority. We call this group Revivalists.

The order of the profiles on the graph does not indicate the character of the members of the group. This geographic organization simply highlights tendencies, propensities, which we call the dominant traits. For example, we find Traditionalists and Universalists along the political diagonal, reflecting the process of individualization characteristic of French society, with each
Towards a Typology of Values: Application of Facet Theory to the Study of French Jews

individual personalizing his own identity. We find Traditionalists next to the authority pole and Universalists next to the autonomy pole. This does not mean that the members of these profiles are authoritarian or autonomous. It means that these profiles have a greater tendency to conform to principles of authority or autonomy.

We find Revivalists at the juncture of the two diagonals, practically at the center of the graph, indicating that this profile is correlated with all the values. Revivalists belong as much to the Altruist/Egoist poles as to the Authority/Autonomy poles, but with an emphasis on values of authority (God, family, parents). Revivalists are thus trying to create a synthesis between the political and social diagonals. It is because of this synthesis that one can speak of an integrative identity approach in respect of Revivalists. We use the term in the sense of an internal integration within a specific collective, in this case, the Jews of France. In contrast, we could say Traditionalists and Universalists have an opposing identity approach.

As for Individualists, we find them on the social diagonal, very close to the Egoism pole. In their case, none of the political concepts apply. In relation to the Jewish identity pole, they constitute a marginal, almost disconnected, population. Furthermore, Individualists have a negative correlation with the group of values. Hence the negative attitude regarding the Authority/Autonomy poles and the passivity regarding the Altruism/Egoism poles. But Individualists express the least opposition towards holidays, appearances and money. It is thus the Egoism pole, which characterizes them most. Their social choices are thus directed towards individualism. This profile has a somewhat passive identity approach.

It should be noted that no profile is positioned close to the altruism pole. This does not mean that the expression of Jewish identity does not take into account the welfare of others. It simply means that it is the pole that is least correlated with the profiles. It may be linked to a decline of voluntarism in favor of the growing professionalism of community institutions and the disengagement of youth movements from the community landscape.

4. Conclusion

A wide variety of Facet Theory techniques applied to data from an empirical survey enabled the development of an axiological typology of French Jews which may be verified among other populations. Each of the various analytic tools revealed a unique facet of the data, which when taken together gave a rich picture of both the study population and the concept of values.

The SSA revealed a polar structure with five value types arranged around the central value "Making the most of one's life." Two axes may be recognized in the SSA, one political (autonomy versus authority) and one social (altruism versus egoism). These two axes are similar to the two basic dichotomies in the
Schwartz typology. They confirm also several other studies by Levy and Guttman (1985), Levy (1990), Elizur and Sagie (1996) and Cohen and Cohen (2002), just to name a few.

The altruism versus egoism axis may be said to represent the same concepts expressed in Schwartz's self-transcendence/self-enhancement dichotomy. The autonomy versus authority axis, similarly, may be said to represent the same concepts expressed in Schwartz's openness to change/conservation dichotomy. This further finding further strengthens the universality of these basic types of values.

The POSAC identified four basic profiles of French Jews: Individualists, Universalists, Traditionalists and Revivalists. Since these profiles are based on universal value types, rather than specific behaviors, the typology may be applied to other populations. It has been noted that French Jews are similar to the general French population in their general value orientation. Since the same question regarding values was included in the European Values Survey, these categories could be tested among the general French population and other sub-populations such as Muslims in France. Are the same profile types recognizable, and are they found in the same distribution as among the French Jews? Similarly, the typology could serve as the basis for a comparison between French Jews and Jews in other countries. Given the 'identity crisis' being experienced in contemporary Europe and the role of values in this crisis, a widely applicable tool for understanding and comparing values held by various sub-groups is critical.

Acknowledgements

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References


Abstract. In the first part of this paper we give a short insight into our studies of values with regard to occupational work since 1986 in Switzerland. Stability and changes of work involvement, work values, and of the perception of work reality are presented as well as a debit and credit outcome. In the second part we suggest an enlargement of the facets analyzed till now and their representation in a four-dimensional space.

1. Introduction

In this paper we want to give you first an insight into our data base on occupational topics in Switzerland, showing you some results of stability and change over a period of 15 years. After that we suggest to you a structural analysis of occupational work values in a more-dimensional space.

2. Research on Occupational Topics in Switzerland: The UNIVOX Study

Since 1986 we have an instrument in Switzerland, called UNIVOX, for regularly collecting and analysing data from a representative sample of the German and the French part of the country in a broad range of life areas. From the beginning I am responsible for research on the life area of occupational work. Following international and national research we mainly examine therefore

- occupational work involvement in general
- occupational work values
- perception of one’s own work situation

The definitions of involvement, values, and perception correspond to the well-known definitional system proposed by Shlomit Levy and Louis Guttman (s. a. o. Guttman, 1981(1977), 51.)
2.1. Some Results

To begin with the results of work involvement in general: The interviewees – only people doing occupational work – had to choose here one of four possibilities for answering, in a range going from a centralistic occupational work involvement up to a pluralistic one and up to exclusively instrumental ones.

We hypothesized among others, an exclusively instrumental work orientation to be found only with minorities in Switzerland. As you can see, this holds true over the whole period of time. However people with a low educational level, the main losers in the recent modernization process, show such distant orientations to occupational work significantly more frequent than better educated do. Further we supposed, that a pluralistic orientation with regard to occupational work should be pushed more and more to the fore corresponding to the recent modernization and differentiation process. The results of some surveys confirm this hypothesis – so 1986-1988, 1990-1993, 1995/1996 and 1999/2001. But in the remaining years the data show a statistical balance between the centralistic orientation and the pluralistic one – certainly with big demographic differences: part-time working people, women and the younger interviewees prefer a pluralistic orientation with regard to occupational work. Maybe, the hypothesized change will need a longer time to be realized.

As we all know, values with regard to occupational work are playing a major role in the respective research since the fifties of the last century (see Borg, 1992, 118ss.). For examining such values we confronted the whole sample with a catalogue of 17 variables. In the reason for the election of specific variables we followed the criteria of the definition (cognitive, affective, instru-
Table 1. Hierarchy of occupational work values 1987 – 2003. (Percentage of the category “very important; hierarchy in according to 2003; 1990 and 1995 not questioned, since 1999 biennial)

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ment: very important to not at all important that it should) and to the special content of interest.

Looking at the results over the whole period we notice a remarkable stability as well as some interesting variations. To be short: on the top we find regularly the affective value “good colleagues”, mostly followed by the cognitive value “an interesting job” and the instrumental value “a certain workplace”. In 2003 the three have statistically the same position, and the affective value “good superiors” is also advanced into the same group. That means that a really demanding and self-oriented work orientation characterizes the people in Switzerland. Completely illusory seems to be the high valuation of “a certain workplace”. But in 2003 also the reason took place that it is indispensable in a modern economy to permanently develop the own capacities. Till 1999 the instrumental value “good earnings” ranged ever in the middle of the hierarchy. Since then this criterion takes a higher place, may be caused by vivid discussions in the media. Significantly traditional values as for example a “strong leadership” range ever on the bottom. The same holds true for “teamwork”, which is explicitly (and irrationally) understood as an estrangement in Switzerland.

The socio-demographic differences are ever big, but with a tendency to diminish. The biggest differences are also here shown between the highly educated and the lowly educated, parts of the population. The latter range instrumental values much higher, the first the cognitive ones. The differences between women and men with as regard to affective values are diminishing.
Table 2. Experiences in occupational work 1987 – 2003. (Percentage of the category “fully agree”; hierarchy according to 2003; 1988, 1992 and 1995 not questioned, since 1999 biennial)

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Values and the daily real experiences in a life area should be in a complicated interrelation, from which we still know not too much. But this question has to be let open in this paper. Anyway we gave the interviewees with a workplace the same list of variables with the range “fully agree to not agree at all” for judging their own work situation.

In general the results show again a relatively high stability over the time period in question. On the top we find since the early nineties the good colleagues, whereas only minorities can agree, that the other affective criteria, “appreciation” and “good superiors” are highly fulfilled. The assessment of the own work as very interesting fluctuates, but mostly beyond the fifty percent mark. The same holds true with “independence”, but with a tendency of diminishment. Only a minority sees for himself really good chances for developing the own capacities. The results for the security of workplaces show the realistic perception of the replying people. Finally, only one third express the conviction that their earnings are really adequate.

A short look on the socio-demographic differences shows again a big gap between the highly and the low educated interviewees, mainly with regard to the cognitive and the affective criteria. In both cases low educated people show a loser’s perspective.

After the short look over the values and the perception with regard to occupational work the hypothesis imposes us that a remarkably big gap must exist between the two. To proof this we calculated it for each interviewee. So, we receive some sort of a balance sheet:
The subdivision into fulltime and part-time workers is owed to the insight into the big differences between the two in the earlier surveys. These differences are diminishing in 2003. By the way the gap between debit and credit remain.

3. A Structural Analysis of Occupational Work Values

After giving you the necessarily short impression of some basic results we turn now towards the structural analysis of values with regard to occupational work. The following mapping sentence was created in a long-term interactive process of going deeper into the literature, of thinking and rethinking about possible additional structural elements in the variables and trying to analyze a higher dimensional space of the correlations. In the beginning we worked explicitly only with the above mentioned facet (cognitive, affective, instrumental). Meanwhile the structural analysis of our data is based on this mapping sentence:

---

2 I have to thank Stefan Auer for his challenging earlier analyses.
3 See the correlation matrix in the appendix. The first law does hold with one exception, namely teamwork.
The extent to which respondent (x) agrees with regard to his occupational work to the importance of

A (cognitive) and B (specific)
(affective) (general)

and

instrumental)

to

C (personal) and D (company-)
(interpersonal) (self-)

and

instrumental)

related orientation in a
to

E (cooperative) and F (heternomous)
(authoritarian) (autonomous)

way of G (frame of work)
acting in the (work itself)

fully agree)

(fully agree)

that it should be in his work situation.

(not agree at all)

The first space-representation of the correlation matrix of the year 2003 shows us especially the A Facet; second the D Facet; third the C Facet; fourth the F Facet, fifth the G Facet, and sixth the B and E Facets.
Values of Occupational Work in Switzerland: The Double-Pyramid

Diagram showing the relationships between various aspects such as company-related, self-related, personal, and interpersonal facets, with dimensions like strong leadership, independence, interesting duties, promotion, wages, certain workplace, developing capacities, superiors, appreciation, and colleagues.
Fig. 3. Four dimensional representation of the correlation coefficient (in 6 steps; stress 0.0045; proportion of variance 0.98599; 35 iterations)

Till now we could not find any plausible modular order.

If we try to compose the findings, a double pyramid⁴ results from them:

---

⁴ Great thanks to Maria von Tavel for helping me in finding a correct geometrical representation of the data in the space.
4. Final Remarks

On the basis of first respective analyses with the matrices from other years we are confident that the proposed solution is replicable. No doubt, more analyses are needed for that reason. It would be of special interest if we could make comparisons in an international context.

References


### Appendix

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**Fig. A.** Correlation matrix of work values (weak monotonocity correlation coefficients; 571 observations).
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Integrating Theory Construction with Data Analysis
July 10 – 13, 2005
Rome, Italy