Integrative assessment of basic human values and motivations by means of handwriting psychology and PVQ-Test

Yury Chernov, Ivan Danyliuk,
Ludmila Romaniuk, Antonina Petrovic

INTODUCTION

The purpose of this study is to develop an integrated approach to the assessing of basic human motivations. It combines the handwriting analysis as a projective method with the questionnaire-based PVQ (Portrait Value Questionnaire of Schwartz).

The major advantage of the handwriting analysis is that it allows objective assessing of the personality without the influence of social desirability, which is the typical for questionnaires. In this study, we used the formalised model implemented in the computer program HSDetect (Chernov 2014; Чернов, 2011; Чернов 2012). The PVQ is a well-known and well validated instrument (Schwartz, 2012) that includes ten scales of human values. Therefore, the aim was to combine the advantages of both.

PSYCHOLOGY OF HUMAN VALUES AND MOTIVATIONS

Values is one of central concepts in social psychology, anthropology and related disciplines. They can be defined as internal cognitive structures that manage different choices of a person based on basic principles (right and wrong or good and bad etc.), priorities and meanings. Like other cognitive constructs values can be studied with the individual and the group (country, nation, age, profession etc.) level. In the current work, we are considering the first one.

Values are supposed to influence behaviour. However, these two aspects of personality are not the same. Behaviour can be observed and analysed directly, but values together with other related concepts (motivations, beliefs, goals, and attitudes) can be studied only indirectly. Modern theories of values are founded on the works of Melvin Kohn, Milton Rokeach, Robert Merton and Clyde Kluckhohn (Kohn, 1969; Rokeach, 1969; Merton, 1973; Kluckhohn, 1951). The main features of values can be summarised as followers (Schwartz, 2012):

- Values are concepts or beliefs linked to affect.
- Values refer to desirable goals, end states or behaviours that motivate action.
- Values transcend specific actions and situations.
- Values serve as standards or criteria.
- Values are ordered by importance.
- The relative importance of multiple values guide action.

These features are valid for all values. One value distinguishes from another through the type of goal or motivation that it expresses. People must communicate about these goals and motivations in order to coordinate their behaviour. That is, as mentioned above, values are not visible explicitly and can be evaluated only indirectly through the analysis of behaviour or through communication. Other similar constructs like norms and attitudes refer to specific actions, objects, or situations; values is a more abstract construct. Everyone holds numerous values, and people differ through degree of importance.

The Schwartz theory of values and the Portrait Values Questionnaire (PVQ)

The value theory of Schwartz integrates the conception of several previously developed theories (e.g. Allport, 1961; Feather, 1995; Kluckhohn, 1951; Morris, 1956; Rokeach 1973).

Different values express different goals or motivations. The theory of Schwartz defines ten values (Schwartz, 2012) presented in Table 1.

Table 1. PVQ Values

PVQ Scale (Value)	**Characteristics**
Self-Direction	Choosing and creating independent thought and action
Stimulation	Excitement, novelty, and changes in life
Hedonism	Pleasure or sensuous gratification for oneself
Achievement	Personal success through demonstrating competence according to social standards
Power	Social status and prestige, control or dominance over people and resources
Security	Safety, harmony, and stability of society, of relationships and of self
Conformity	Restrain of actions, inclinations, and impulses likely to upset and harm others and violate social expectations or norms
Tradition	Respect, commitment and acceptance of the customs and ideas that one's culture or religion provides
Benevolence	Preserving and enhancing the welfare of those with whom one is in frequent personal contact
Universalism	Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature

The PVQ test was developed to measure the value orientations described above. The test consists of forty items, each of which includes a "short verbal portrait" and the answering person should say how much she or he is like the portrait. The answer should be given on a six-point scale: very much like me, like me, somewhat like me, a little like me, not like me, not like me at all. Below are some examples:

He thinks it is important to do lots of different things in life. He always looks for new things to try.

Getting ahead in life is important to him. He strives to do better than others.

He always wants to be the one who makes the decisions. He likes to be the leader.

According to the idea of Schwartz, respondents are asked to compare the portrait to themselves rather than themselves to the portrait, which should set more focus on the other (the portrait) and thus reveal more value-relevant aspects.

The PVQ test was compiled in many languages and was adopted to different ages. It was systematically validated and applied in different countries. In our study, besides the original version, we included language adaptations for Ukrainian (Romanyuk, 2009) and Russian (Карандашев, 2004).

THE HANDWRITING ANALYSIS AS A PSYCOMETRIC INSTRUMENT

The handwriting analysis is a traditional instrument that has been intensively used for personal assessment. It belongs to projective tests and like all projective tests, it is to a certain extent controversial. The major advantage of the handwriting analysis is that it allows an objective assessing of the personality without the influence of social desirability, which is typical for questionnaires. However, the traditional manual procedure is often subjective, since it strongly depends on the qualification and experience of the particular handwriting expert. That could be acceptable if the expert is a psychologist that uses the handwriting analysis as an additional instrument in individual cases and is actually responsible for his report. In the research or industrial assessment, subjectivity is not acceptable. That is why the proper implementation of the handwriting analysis as an assessment instrument can be achieved only when we maximally exclude the subjectivity of the procedure in order to support the objectivity of the method. That is achieved by using the corresponding software and by thorough very strict definition of the involved handwriting signs.

Modelling of personal values with computer-aided handwriting analysis

The computer-aided handwriting analysis allows overcoming of many problems of this projective technique. In the current study we used the HSDetect program. The program supports the hybrid approach, with which the handwriting signs are evaluated by experts manually and psychological traits are calculated with a special algorithm. The validity of the model and the program was demonstrated in previous experiments and publications (Chernov, 2017; Nauer & Chernov, 2015).

The advantages of the computer-aided procedure of the handwriting analysis can be summarized as followers:

- the full coverage of possibilities of the method, since with a manual procedure they always take substantial reductions
- higher objectivity of the evaluation (when using a formalised definition of the handwriting signs)
- higher reliability
- assured storage of the evaluated data in a database
- enabling of profound statistical evaluations
- the usage of the same data for different purposes and in different experiments

HSDetect models about 400 psychological traits. It is an integrative system, which is based on many different sources of basic graphological information. The aim of the program is to include the approaches of different handwriting schools and directions, and to formally integrate them into one model. Of course, the quality of modelling of every individual trait is different. In HSDetect a special parameter is introduced, which represents the trait quality. It is algorithmically calculated and it is taken into consideration by the further modelling of more complicated psychological constructs, for instance, test dimensions or scales. In PVQ such test scales are the values, which were described above.

The major step in an experiment with a psychometric test in general and PVQ in particular, is to properly model every test scale (in case of PVQ – value) through the HSDetect variables and functions. The variables reflect three major objects – the handwriting signs, the psychological traits, and the connections between signs and traits. One connection has a sign on one side and a trait on the second side. Based on these connections, we can build so-called graphometric functions. Every graphonomic function has one trait as dependent variable and several signs as independent ones. Besides, every component of a graphometric function is weighted.

The relation between traits and signs is rather complicated and is of type many-to-many. That is every handwriting sign is generally related to several traits and every trait is represented by several handwriting signs.

Every individual test scale is modelled through the psychological traits. That is done based on the detailed description of values and their attributes provided by Schwarz (Schwartz, 2012). The mapping is presented in Table 2. It should be understood that every trait is actually not a very distinct psychological feature, but a sort of a cluster of similar features. They are unified under one variable because simply the handwriting analysis has a certain limited distinguishability. In order to verify the quality of the modelling the Cronbach Alpha was calculated for every scale. This calculation was based not only on the experiments data, but rather on the several hundred handwriting evaluations in the norm-referenced database.

Table 2. Mapping of PVQ Scales on HSDetect Traits

PVQ Scale	**HSDetect Traits**	**Cronbach Alpha**
Self-Direction	Self-dependence, Interest to things, Creativity, Self-esteem, Independence, Intelligence	0.87

Stimulation	Courage, Motivation, Willing to take risks, Activity	0.75
Hedonism	Wastefulness, Sensuousness, Drive-derived behaviour	0.72
Achievement	Ambition, Aggrandizement, Vanity, Self-esteem, Intelligence	0.80
Power	Dominance, Vanity	0.84
Security	Carefulness, Good judgement, Clearness, Self-esteem, Conservatism, Reasoning, Moderation, Desire to be under protection, Moral consistency, Foresight	0.85
Conformity	Responsibility, Discipline, Politeness, Will-power, Resignation, Loyalty, Respectfulness	0.79
Tradition	Spirituality, Religiousness, Sense of family, Conservatism, Moderation, Tactfulness	0.85
Benevolence	Tendency to forgive, Spirituality, Honesty, Interpersonal skills, Friendliness, Responsiveness, Loyalty	0.75
Universalism	Integrity, Receptiveness, Objectivity, Spirituality, Friendliness	0.69

As we can see, some traits are included in more than one scale. However that is logical, since the scales themselves correlate with each other. After the traits are defined, every scale can be represented directly by a set of handwriting signs (Table 3).

Table 3. Modelling of PVQ Scales through Handwriting Signs

PVQ Scale	**Handwriting signs**
Self-Direction	Vertical slant, Disconnected handwriting, Large size, large upper zone, Original letter form, Thin and sharp strokes, Rapid speed

Stimulation	Heavy pressure, Normal right slant, Rapid speed, Large size, Angular connections, Rising lines, Wide letters, Garland connections, Narrow right margin, Irregularity
Hedonism	Pasty strokes, Full and inflated lower zone, Rising lines, Large lower zone, Heavy pressure, Normal right slant, Wide letters
Achievement	Large size, Small middle zone and large upper zone, Capital letter large and emphasized, Rising lines, Scrolled letter from, Arcade connection, Quick writing
Power	Large size, Emphasized first letters, Enriched letter form, Arcade and angular connections, Form dominates over dynamics, Heavy pressure, Left slant
Security	Small size, Slow speed, Vertical slant, Arcade connections, Narrow letters, Simplified form, Connected handwriting, Large middle zone, Narrow left margin, Thin and sharp strokes, Narrow left margin
Conformity	Regularity of handwriting, Straight lines, Angular and garland connections, Small size, Vertical slant, Big upper margin, Slow speed, Heavy pressure (stronger on horizontal formations)
Tradition	Small size, Narrow letters, Arcade connections, Light pressure, Closed ovals, slow speed, Left slant
Benevolence	Garland connections, Normal right slant, Light pressure, Pasty strokes, Large middle zone, Ovals open at top, Connected handwriting
Universalism	Garland connections, Large middle zone, Light pressure, Small size, Wide letters, Simple letter form, Thin writing, Narrow margins

The handwriting signs are listed according to the decreasing of their weights, when we model a scale. This information is interesting for the future validation research and the adaptation of HSDetect, but, in the below described experiment the first model was used. That is necessary because not only the positive pole of a trait but as well a negative pole (opposite characteristic) should be calculated. Only their comparison gives the correct result of the trait evaluation through the

handwriting analysis. Most of the traits do have the counter-pole, but not all of them do.

PILOT STUDY. EXPERIMENT

The aim of the pilot study was to develop the method of combined evaluation of the PVQ-values – (scales) with the handwriting analysis, to check the method and to be ready for a bigger experiment with a large amount of data (Chernov et al., 2017). The part of the pilot study, evaluated so far, includes 22 subjects. Most of the tests and handwriting samples are in Russian (13) and Ukrainian (7), and 2 in German. For every subject the test evaluation included the calculation of the absolute scores of the test scales, ranks of every scale among other scales of the subject, and the scale zone. We have introduced three zones: low (L), middle (M) and high (H). The results relate to the zone based on the test score (or rank). The basic procedure is as follows: for every subject, three scales with the lowest rank belong to the low zone, three values with the highest rank to the high zone and the remaining four belong to the middle zone. The same procedure was executed for the evaluations based on the handwriting analysis. The results for the first two subjects (as example) are shown in Table 4.

Table 4. Results for Subjects

Subject	Scale	PVQ Test			Handwriting Analysis		
		Score	Rank	Zone	Score	Rank	Zone
PVQ-001	AC	0.6	5	M	0.79	5	M
	BN	0.55	6	M	0.68	7	M
	CF	0.15	9	L	0.54	10	L
	HD	0.93	1	H	0.84	2	H
	PW	0.67	3	H	0.8	4	M
	SC	0.64	4	M	0.6	8	L

	SD	0.85	2	H	0.85	1	H
	ST	0.53	8	L	0.81	3	H
	TR	0.1	10	L	0.58	9	L
	UN	0.53	7	M	0.78	6	M
PVQ-002	AC	0.75	4	M	0.81	3	H
	BN	0.4	9	L	0.61	8	L
	CF	0.8	3	H	0.66	7	M
	HD	0.27	10	L	0.68	6	M
	PW	0.73	5	M	0.88	1	H
	SC	0.84	2	H	0.68	5	M
	SD	1	1	H	0.75	4	M
	ST	0.67	7	M	0.82	2	H
	TR	0.4	8	L	0.56	9	L
	UN	0.67	6	M	0.55	10	L

The average ranks, obtained with the PVQ test with their variations and the check on the normal distribution are presented in Table 5.

Table 5. PVQ Ranks

PVQ Scale	**Mean**	**STD**	**Median**	**Variation (%)**	**Shapiro-Wilk**	**Shapiro-Wilk p (normal)**
Self-Direction	1.86	1.67	1.0	89.63	0.60	0.00
Stimulation	5.77	2.71	6.5	46.89	0.89	0.02
Hedonism	4.95	2.77	4.5	55.88	0.93	0.11
Achievement	4.27	2.12	4.0	49.61	0.92	0.08
Power	6.86	2.21	7.0	32.20	0.94	0.23
Security	4.68	2.46	5.0	52.48	0.94	0.20

Conformity	6.95	2.15	7.0	30.90	0.92	0.09
Tradition	9.09	1.11	10	12.20	0.75	0.00
Benevolence	5.77	2.83	6.5	48.98	0.86	0.00
Universalism	4.77	2.14	5.0	44.77	0.97	0.60

The value of Shapiro-Wilk p (normal) should be less than 0.05 in order to definitely reject the normal distribution of ranks. We can see that six scales are distributed normally and four (Self-Direction, Stimulation, Tradition and Benevolence) are not.

The same data for the HSD evaluations is given in Table 6. Here the normality of the distribution should be rejected for six scales. That does not allow building reliable correlations. And indeed, when we try to do that, we receive rather chaotic values.

Table 6. HSD Ranks

PVQ Scale	Mean Rank	STD	Variation Coeff (%)	Shapiro-Wilk	Shapiro-Wilk p (normal)
Self-Direction	5.86	3.03	51.65	0.92	0.09
Stimulation	4.09	2.83	69.10	0.86	0.01
Hedonism	6.82	2.57	37.77	0.92	0.06
Achievement	6.22	2.00	32.09	0.93	0.15
Power	6.14	3.14	51.11	0.89	0.02
Security	3.59	2.36	65.82	0.89	0.02
Conformity	3.73	3.38	90.77	0.77	0.00
Tradition	7.32	2.48	33.84	0.83	0.00
Benevolence	5.45	1.82	33.34	0.90	0.03
Universalism	5.77	2.58	44.71	0.95	0.26

That is why a more reasonable way to compare the results would be the described above approach based on the assignment of individual results to one of three zones. The results of this transformation are shown in Table 7.

Table 7. Zones

PVQ Scale	Zone Agreements	Zone Disagreements	Zone Undefined
Self-Direction	7	10	5
Stimulation	8	8	6
Hedonism	7	8	7
Achievement	11	7	4
Power	11	5	6
Security	10	4	8
Conformity	3	10	9
Tradition	13	5	4
Benevolence	12	3	7
Universalism	13	4	5

If we take binomial distribution for three possible outcomes (three zones), the critical value for p=0.05 is 11. The results for scales that have the number of agreements (or disagreements) equal or greater than 11 could be considered statistically significant. We see five such scales by agreement and none disagreement: Achievement, Power, Tradition, Benevolence and Universalism. Five rest scales that do not provide statistically significant results (Self-Direction, Stimulation, Hedonism, Security and Conformity). When we look attentively at the statistics of the scales we can see that these scales have the highest average between the test and HSD variations. That means that either by PVQ or by HSD the variance is especially high or that it leads to less agreement.

CONCLUSION

The pilot study demonstrated that the evaluation of human values according to the PVQ by Schwartz could be well supported by the handwriting analysis, which looks at the concept from a different point of view. Five scales, namely, Achievement, Power, Tradition, Benevolence and Universalism ensure good agreement and can be evaluated by both methods with high reliability. Five remaining scales could be investigated further in order to detect the potential of the modelling improvement. For that, test material with additional (up to 75) subjects has already been obtained, the data should be processed and evaluated.

REFERENCES

Allport, G.W. (1961). *Pattern and growth in personality.* New York, Holt, Renehart & Winson.

Chernov, Y. (2017, July). Formal Modeling of Projective Techniques and Their Validation. Presented at IMPS 2017, Annual Meeting of American Psychometric Society, Zurich.

Chernov, Y. (2014). Der Einsatz des Computers in der Graphologie. *Angewandte Graphologie und Persönlichkeitsdiagnostik*. 62 (2), 18-37.

Chernov, Y., Danyliuk, I., Romanyuk, L., Rudska, A. (2017, July). Integration of Projective Instruments (Handwriting Analysis) with the PVQ-Test for the Assessment of Basic Human Values and Motivations. Presented at ECPA14, 14th European Conference on Psychological Assessment, Lissabon.

Feather, N.T (1995). Values, valences, and choice: The influence of values on the perceived attractiveness and choice of alternatives. *Journal of Personality and Social Psychology, 68*, 1135-1151.

Kluckhohn, C. (1951). Values and value-orientations in the theory of action: An exploration in definition and classification. In Parsons, T. & Shils, E. (Eds.) Towards a general theory of action, 388-433, Cambrifge, MA, Harvard University Press.

Kohn, M.L. (1969). *Class and conformity: a study in values*. Homewood, IL. Dorsey Press.

Lilienfeld, S.O., Wood, J.M., Garb H.N. (2000). The scientific status of projective techniques. Psychological Science in the Public Interest, Vol.1, No 2, pp. 27-66.

Merton, R. (1973). *The Sociology of Science: Theoretical and Empirical Investigations*. Chicago, University of Chicago Press.

Morris, C.W. (1956). Varities of human value. Chicago, IL. University of Chicago Press.

Nauer, M.A., Chernov, Y. (2015, July). Psychodynamic diagnostics – validation research based on computer modelling of handwriting psychology. Presented at ECPA14, 13th European Conference on Psychological Assessment, Zurich.

Rokeach, M. (1973). *The nature of human values.* New York. Free Press.

Romanyuk, L. (2009). A problem of method in research of values: instruments, technologies, perspectives. In: *The Collection of scientific works psychology*, Taras Shevchenko National University of Kyiv. Problems of empirical researches in Psychology, 3, p. 69–75.

Schwartz, S. H. (2012). An Overview of the Schwartz Theory of Basic Values. Online Readings in Psychology and Culture, 2(1).

Карандашев, В. Н. (2004). *Методика Шварца для изучения ценностей личности*. Санкт-Петербург, Речь.

Чернов, Ю. (2011). *Психологический анализ почерка: системный подход и компьютерная реализация в психологии, криминологии и судебной экспертизе.* Москва, Генезис.

Чернов, Ю. (2012). *Анализ почерка в работе с кадрами*. Санкт-Петербург, БХВ-Петербург.