

# Psychosemantic Peculiarities of Students' Perception of Everyday Informational Environment

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**Abstract**—The article presents the results of a pilot research exploring psychosemantic aspects of different informational environment (internet, book, television, radio, newspaper). The research offers data describing subjective significance of different informational environment, analyses quantitative and qualitative indicators of descriptors that used by respondents for different information environment assessment, identifies random associations and associative semantic universals for assessing different types of information environment. The study also defines spatial-temporal and object-subject indicators of different information environment and explores interrelations within the psychosemantic attributes systems of such informational environment as internet, book, television, radio and newspaper.

**Keywords**—*information environment; psychosemantic analysis; subjective significance; random associations; semantic universals; spatial and temporal characteristics; object (pragmatic) — subject (emotional) attributes of informational environment; normalized values estimation; measure of values semantic proximity*

## I. INTRODUCTION

The analysis of researches dedicated to the problem we consider shows the macro-level of its representation, as it's represented in the forms of separate fields of knowledge both in foreign (cyberpsychology, media psychology) and in Russian psychological science.

In foreign psychology, the analysis of the subject and the information environment interactions has well-established traditions. Without referring to the differential analysis of researches in this field, we'd like to note that there're a number of study reviews on the subject presented in the articles by S. Gosling, W. Mason [1], P. Valkenburg, J. Peter, J. Walther [2]. In Russian psychology, exploratory interest in these fields of study is focused on the analysis of psychological effects (cognitive, affective, behavioral) arising from a person's interaction with the information

environment, both of constructive and destructive nature [3], [4], [5], [6], [7], [8], [9], [10].

The researchers developed a paradigm of "informational socialization"; basic propositions of the concept were formulated in the papers of T.D. Martsinkovskaya [11], [12] and N. A. Golubeva [13]. Within the frameworks of this paradigm, the researchers study the problems of adolescents socialization in the information space [14]; correlation between adolescents information socialization and their psychological well-being [15]; coping with difficulties in the era of information technologies [16], endogenous factors of modern adolescents informational preferences [17]; relationship between students personal characteristics and their informational preferences [18] etc.

The researchers also formulated theoretical construct of "information personality" [19]; the subject of their researches is the development of information personality in the process of specially organized human activity in the Internet space considered as a person's spatial environment and as an informational educational environment.

It is obvious that most of the studies analyzing the influence of the information environment on a person are devoted to the Internet and the "content" it contains. In this study, we're especially interested in a comparative analysis of perception specifics of different information environments: Internet, book, television, radio, newspaper.

An independent methodological paradigm, where the relationship between the subject and the information environment is operationalized, is an ecopsychological approach aimed at studying the interaction between the subject and his environment [20]. In the frameworks of this approach, it is emphasized that the information environment does not exist independently, separately from a person (group); it is closely related to the individual's subjective needs. In this article we, following V.I. Panov, define information environment as "... the part of the information space that meets his (person's) perceptions and needs ...",

and is endowed with "... objective and / or subject qualities" [21]. We consider Internet, book, television, radio and newspaper as separate types of information environment.

It is experimental psychosemantic that provides the possibilities of a differentiated study of "object and / or subject qualities" the subject attributes to the information environment. We define psychosemantic characteristics as two groups of properties (values) representing different information environments in the subject's psyche. On the one part, we define the subjective significance of a certain information environment; on the other part, we analyze the signs that the subject attributes to a certain type of information environment. In general, the subjects of our analysis are "semantic spaces" defined by V.F. Petrenko as spaces of "... signs organized in a certain way, describing and differentiating objects (values) of a certain substantial area" [22]. In our study, "associative semantic universals" are considered as such "signs" [23]. The importance of studying images of objects of the digital cultural environment both for theoretical constructions and for empirical studies, is constantly emphasized by information technologies researches and digital cultural environment analytics [24].

We believe that different information environments (Internet, book, television, radio, newspaper) have different psycho-semantic attributes:

- Subjective significance of information environments will be different for different respondents;
- Associative semantic universals specifics of different information environments will be different for different respondents;
- There is a correlation between subjective significance indicators for different information environments and associative semantic universals specifics.

## II. RESEARCH METHODS

To determine the subjective significance of different information environments, we used "Infogram" method (originally "Sociogram", modified by G. V. Shukova into "Vitagram" to study the psychological space structure and content among students and practical psychologists). The

subjects were offered an instruction: "Here's a circle. You are in the center of this circle. Please, depict in this circle as smaller circles different information environments you encounter. The number of circles isn't limited". Then three indicators of this method were subjected to analysis: the order of depicting the circle, the distance from "Me" and the circle size. These indicators were considered as subjective significance "markers" of certain types of information environment for the subject.

To determine the associative semantic universals of different information environments, an associative experiment was used. The respondents were instructed: "Write down your associations to the word naming the type of information environment you specified." The data obtained was processed using the method of semantic universals — in accordance with it, a number of descriptors was determined, and every type of information environment was evaluated by a significant number of respondents with these descriptors. Conventionally, the technique includes analyzing nonrandom associations and calculating their normed valuation and the measure of values semantic proximity.

The pilot study involved 59 students from Russian State Agrarian University — Moscow Timiryazev Agricultural Academy and Bauman Moscow State Technical University (28 male, 31 female). Each subject provided information on seven indicators we denoted (circle priority, circle size, circle's distance from "Me", spatial, temporal, object (pragmatic) and subject (emotional) characteristics for five types of information environment — Internet, book, television, radio, newspaper), which amounted to 35 indicators for each respondent.

## III. RESULTS AND FURTHER DISCUSSION

First, in order to obtain data on the hierarchy of information environments within the subject's structure of information environment, we analyzed indicators of its different type's subjective importance ("Infogram" method). The results are shown in "Table I".

TABLE I. QUANTITATIVE VALUES OF SUBJECTIVE SIGNIFICANCE FOR DIFFERENT INFORMATION ENVIRONMENTS

Information environment	Priority	"Distance from Me"	Size
Internet	0,25	2,88	3,81
Book	0,37	2,50	2,73
TV	0,37	2,65	1,67
Radio	0,25	1,52	0,84
Newspaper	0,16	1,04	0,49

As "markers" indicating the "significance" of certain environment types for a subject, we considered such indicators of "Infogram" method as "priority", "distance"

and "size" of circles used by subjects to estimate the importance of different information environments for them.

The “priority” of marking a certain information environment type was considered as a “marker” of its subjective significance, and was counted by dividing the order of drawing a circle by the number of all drawn circles. The ranking order for certain types of information environment for the entire sample is as follows: the first rank — book (0.37) and television (0.37), the second rank — Internet (0.25), the third — radio (0.25), and the fourth is the newspaper (0.16).

“Distance from Me” was also considered as an indicator of subjective significance determined on a nominal scale and stated in the distance from ‘Me’ (the center of the bigger circle) to the center of the circle designating appropriate type of information environment. According to the “distance from Me” indicator, the closest position to “Me” belongs to newspaper (1.04), next goes radio on significant distance (1.52), then book (2.50), and Internet is the most distant (2.88).

The “size” of the circle was determined by standard formula:  $S = \pi r^2$ . According to the data obtained, the hierarchy of “significance” determined by a “circle size” indicator for different types of information environment is as follows: Internet (3.81) has the greatest significance for the whole group of respondents, next follows book (2.73), TV (1.67), radio (0.84) and newspaper (0.49) correspondingly.

From this part of research, we can conclude that Internet is the most subjectively significant type of information environment for the entire group; book is runner up as the

next most important type of information, and then follows television, radio and newspaper correspondingly.

Such a hierarchy of information environments according to the subjective significance criterion is generally determined by the objective Internet dominance in the modern information space structure, and particularly by comprehensive possibilities of Internet to satisfy the subject’s various needs. Despite the “total” position of Internet as the dominant segment in the modern information space as an objective reality, and, accordingly, the information environment as a subjective reality (according to V.I. Panov), “book” (in its paper version) also remains an important element of the subject’s information environment.

Then, to obtain information about the “fan” of needs, where different subjective significance of information environment types is determined by differences in possibilities of satisfaction these needs, we analyzed the semantic universals of the respondents group assessment of different information environment types using two indicators: the universal weightage and the measure of the universal’s semantic proximity (“Associative experiment” method). The methods selection for analyzing semantic universals was based upon classical psychosemantic procedures (V. F. Petrenko, V. P. Serkin, V. A. Skleyynis, et al).

First, we studied the quantitative indicators of the descriptors respondents used to assess different types of information environment. The data presented in “Table II”.

TABLE II. QUANTITATIVE ANALYSIS OF DESCRIPTORS USED FOR ESTIMATING ALL THE INFORMATION ENVIRONMENT TYPES

<b>Descriptor</b>	<b>Internet</b>	<b>Book</b>	<b>TV</b>	<b>Radio</b>	<b>Newspaper</b>
<i>Total number</i>	107	90	48	25	33
<i>Number of semantic universals</i>	5	5	3	2	2

To indicate significant Internet attributes, respondents used only 107 descriptors, and only 5 “non-random associations,” that is, semantic universals: “information,” “communication,” “network,” “entertainment,” “news.” The significant attributes of book as a type of information environment amounted to 90 descriptors, 5 of them are semantic universals: “interest”, “leisure”, “literature”, “paper”, “scientific”. For television as a type of information environment, the number of descriptors was 48, including 3 semantic universals: “news”, “lie”, and “entertainment”. Radio as a type of information environment was assessed by respondents with 25 descriptors including 2 semantic universals: “music” and “news”. While evaluating newspaper as a type of information environment respondents used 33 descriptors, 2 of them were semantic universals: “news” and “gossip”. Obviously, the greatest number of “meanings” for the whole group of respondents is associated with Internet, with book as a runner-up. However, the qualitative specifics of the meanings highlighted require additional comments.

Secondly, we analyzed the “weight” of meaning in assessment of a certain information environment type and

the degree of the meaning’s “proximity” with semantic charges peculiar to other types of information environment. As noted above, the qualitative indicators of “semantic charges” can be determined by specifying the descriptor’s “weight” or the association normalized assessment and indicating measure of semantic proximity of values for different information environment types. The data obtained can be seen in “Table III”.

TABLE III. ASSOCIATION NORMALIZED ESTIMATION AND MEASURE OF SEMANTIC PROXIMITY OF VALUES FOR DIFFERENT INFORMATION ENVIRONMENTS

Descriptors quality index	Internet	Book	TV	Radio	Newspaper
Normalized index for all the associations	1,81	1,52	0,81	0,42	0,55
Normalized index for nonrandom associations	0,08	0,08	0,05	0,03	0,03
Measure of semantic proximity of values	TV – 0,09; Radio – 0,08; Newspaper – 0,05		Internet – 0,09; Radio – 0,21; Newspaper – 0,15	Internet – 0,08; TV – 0,21 Newspaper – 0,14	Internet – 0,05; TV – 0,15 Radio – 0,14

Indicators of all the associations normalized assessment, obtained by dividing the number of all associations for a particular type of environment by a number of respondents, show that the greatest number of “characteristics” are attributed to Internet (1.81), next follows book (1.52), then television (0.81), newspaper (0.55) and radio (0.42) consequently. According to the indicators of normalized assessment of nonrandom, that is, given by not less than 3 respondents, associations, the same tendency remains. It’s interesting that Internet, television, radio, and newspapers are characterized, albeit to varying degrees, by semantic

proximity of values (by the “news” descriptor), and between the “book” and other types of information environment, no semantic proximity is found by all the descriptors. The data obtained may indicate that such types of information environment as Internet, television, radio and newspaper are focused on meeting a subject’s needs in the information relating to news, and the book has a different sense load.

In the third place, we analyzed the content of both all the associations and nonrandom semantic universals for each type of information environment. The data presented in “Table IV”.

TABLE IV. THE CONTENT OF DESCRIPTORS RESPONDENTS USED TO DESCRIBE ALL TYPES OF INFORMATION ENVIRONMENT

Information environment	Associations examples	Nonrandom associations
<i>Internet</i>	Benefit, advertising, movies, useless, network, communication, say ‘no’ to real life, encyclopedia, books, Facebook, VK, problems, interference, search engines, a lot of information, servers, addiction, entertainment, study, news, photos, 2 am, diversity, wrong, often, sites, interest, fun, extensive, informative, wide spreading, unlimited, YouTube, new knowledge, shows, series, Wikipedia, availability, doubtfulness, sport, health, humor, wide access to information, useful information, news, global search, phone, need, addiction, fast, convenient, comfortable, knowledge, politics, economy, photos, correspondence, online courses, work, self-knowledge, spam, movies, scientific articles, quickly, briefly, hobby, development, rest, search, guides, lies, analytical programs, constant development, information transfer, versatility, etc	Communication (11), information (10), network (9), entertainment (6), news (5)
<i>Book</i>	Study, recreation, literature, fantasy, history, words, philosophy, culture, dystopia, vivid impressions, memorization of words, spelling, new worlds, information, cognitive, broadening outlook, imagination, speech, library, textbooks, reading, writing, hard, white sheets, paper smell, calmness, serenity, rarity, history, tales, dragons, mysticism, comfort, artistry, reflections, feelings, hobby, silence, peace, favorite amusement, making sleepy, thoughts, depth, seriousness, intelligence, monographs, domestic classics, historical works, exciting, watery, thoughtful, fascinating, self-development, etc.	Rest (7), literature (6), literature (3), paper (3), scientific nature (3).
<i>TV</i>	Useless, a lot of, Malakhov, nonsense, news, politics, programs, films, dirt, negative _____, monitor, antenna, light, plasma, remote control, power supply, embellishment home, show, jokes, science, free time, boredom, information, TV shows, makes you anxious, gossip, leisure, lies, fools, entertaining programs, informative, a lot of noisy and unnecessary stuff, animation, watch, see, antiscientific programs, conspiracy theories, etc.	News (10), lies (3), entertainment (3)
<i>Radio</i>	Music, news, fun, car, musicality, entertainment, minimum of benefits, rest, useful information, good mood, new technologies, good for killing time in traffic, TV without a screen, sometimes makes you uncomfortable, fun facts, participation of listeners, sounds, etc.	Music (9), news (6)
<i>Newspaper</i>	Rumors, gossip, black and white, news, paper, useless information, subway, the elderly, silence, peace, tasty paper smell, health, sport, training, rarity, lost, horoscopes, Scandinavian crosswords, boredom, etc.	News (3), gossip (3)

To test the assumptions formulated in our study, we conducted a qualitative analysis of the descriptors obtained. First, among the descriptors, we analyzed the presence of “lexical units” associated with designation of spatial and temporal characteristics as having a universal, fundamental character in the subject's ideas about any “elements” of his environment. Secondly, the study of the “object” and “subject” characteristics of different information environment types, which appear to be significant in terms of ecopsychological approach, was defined as an independent

task. As “object” characteristics, we consider the lexical units capturing the meanings associated with pragmatics, convenience, and benefit the subject gets from this type of information environment – that is to say, meanings crucial for the subject — user. The “subject” characteristics included lexical units defining the meanings associated with the affective assessment of a certain information environment. We chose all descriptors — associations qualifying the considered “units of meaning”. The results are presented in “Tables V” and “Table VI”.

TABLE V. SPATIO-TEMPORAL AND OBJECT-SUBJECT CHARACTERISTICS FOR DIFFERENT TYPES OF INFORMATION ENVIRONMENT

Information environment	Spatial characteristics	Temporal characteristics	Object (pragmatic) characteristics	Subject (emotional) characteristics
Internet	Extensive, diversified, big, limitless, briefly, versatility	Often, 2 am, fast, permanent update	Availability, convenient, useful, useless, benefit, necessary	Doubtful, problems, noise, addiction, fun, fear, relaxing, lie
Book	Depth	Rarity, history, time, various time intervals	Convenient for eyes	Vivid impressions hard, calm, serenity, joy, interesting, exciting, comfort
TV	A lot	Free time	Useless a lot of excess and unnecessary stuff	Negative dirt, nonsense, boredom, makes you anxious
Radio	A lot	Good at killing time in traffic	Useless	Fun, good mood, sometimes makes you uncomfortable
Newspaper		Elderly people, rarity	Unnecessary information	Peace, quiet, delicious paper smell, lie

Descriptors analysis shows that the most subjectively significant information environment types (Internet, book) are attributed with all the “units of meaning” we have identified: spatial, temporal, object, and subject. It can be noted that the estimated description vector of internet as information environment type is associated with feelings of "tension" and "disequilibrium". On the contrary, a book as a type of information environment, in spite of presence of similar "semantic units", the emotional "tone" of assessment gravitates to "calm" and "comfort". In other words, Internet as the most subjectively significant information environment for the entire sample is spatially and temporally “total”, “convenient”, “useful”, but associated with “anxiety” and “addiction”. As for book, also being highly subjectively significant information environment, it has “depth”, “temporal multidimensionality” and is associated with experiencing “calm and pacification”.

For associative estimates normalizing, we conducted a corresponding procedure, dividing a number of associations by separate “units of meaning” by a total number of associations for a particular type of information environment. The results are presented in “Table VI”.

The analysis shows that the types of information environment vary based on different "contributions" of

"spatial", "temporal", "pragmatic" and "emotional" associations. Internet is characterized by equal representation of all the identified “units of meaning”. In book evaluation, emotional characteristics are prevalent. Evaluation results for television, radio and newspaper are also characterized by a large “contribution” of emotional characteristics to the “psycho-semantic portrait” of these information environments.

TABLE VI. NORMALIZED ESTIMATE OF SPATIO-TEMPORAL AND OBJECT-SUBJECT CHARACTERISTICS FOR DIFFERENT TYPES OF INFORMATION ENVIRONMENT

Informational environment	Spatial characteristics	Temporal characteristics	Object (pragmatic) characteristics	Subject (emotional) characteristics
Internet	0,05	0,04	0,05	0,07
Book	0,01	0,04	0,01	0,08
TV	0,02	0,02	0,06	0,1
Radio	0,04	0,04	0,04	0,12
Newspaper	0	0,06	0,03	0,12

Thirdly, in order to analyze the interconnection specifics for the identified psycho-semantic characteristics of different information environments, we made a correlation analysis

(Spearman's rank correlation coefficient) using SPSS 21 statistics software package. The data obtained are presented in "Table VII".

TABLE VII. THE RESULTS OF THE CORRELATION ANALYSIS OF NORMALIZED INDICATORS OF PSYCHOSEMANTIC CHARACTERISTICS OF DIFFERENT TYPES OF INFORMATION ENVIRONMENT

Psychosemantic characteristics	Normalized index for all associations	Normalized index for all semantic universals	Normalized index for subject (emotional) characteristics
Size of a circle depicting information environment type	0,900**	0,946**	-0,975**

<sup>a</sup>. \*\*Correlation is significant on the level 0,01

The results of correlation analysis of psycho-semantic characteristics for different information environments indicate that, first, the "circle size" indicator ("Infogram" method), qualifying the subjective significance of a certain information environment, is positively correlated with normalized indicators of all associations and all semantic universals; and, secondly, that the "circle size" indicator is negatively correlated with an indicator of subject (emotional) characteristics of a certain information environment type. Put it otherwise, the larger the circle representing a certain type of information environment, the greater the number of "lexical units" (non-random associations) a subject uses for describing this type of environment; at the same time, a number of "lexical units" denoting subjective, biased attitude to this type of environment, decreases.

#### IV. CONCLUSION

Different types of information environment have different subjective significance. The data obtained in the study indicate the following hierarchy: for our subjects, the most significant type of information environment is Internet, books run second in the hierarchy. TV, radio and newspapers have the smallest subjective significance for our sample (18–30 years old).

Different in terms of subjective significance information environment types are distinguished by quantitative indicators of all associations and semantic universals used by respondents to describe these types of information environment: the greatest number of all associations and semantic universals is used to describe Internet as the most subjectively significant information environment type; and the smallest number of "analysis units" accounts for descriptions of radio and newspaper as the least significant information environments.

Different in subjective significance types of information environment differ in the qualitative characteristics of

"semantic units" used by respondents to describe these types of information environment. Psychosemantic characteristics describing Internet are represented by all the "semantic units" and full differentiation of "analysis units" for each "semantic unit" highlighted in our study: spatial, temporal, objective (pragmatic) and subjective (emotional). Less subjectively significant information environments are distinguished by the absence of separate "semantic units" and a lower level of differentiation in "analysis units".

A connection was found between the level of subjective significance of the information environment type and the normalized indicator of "emotional" semantic universals number: Internet as the most significant type of information environment is characterized by the smallest amount of associations- descriptors attributed to the affective assessment of this environment type.

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