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Publication Culture of Russian Science: International Perspectives

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Abstract: The article deals with the culture of scientific publications in Russia on the example of psychology. The bibliometric base of the Russian Science Citation Index is considered from the point of view of compliance with the publication culture. It is shown that the currently existing three-level hierarchical structure of the RSCI provides a quantitative analysis of publications by a large number of metrics, some of which have no analogues in Web of Science and Scopus. Publications with the term "psychology" in their titles are analyzed. It is noted that not all psychological publications are labeled as areas of psychology. However, there is an opportunity to specify directions in the subjects and objects of research. It is noted that the features of the Russian publishing culture include a small number of co-authors of publications and a pronounced interest in socially significant objects of research, as well as in the history and methodology of psychology

Keywords: Russian Culture Publication Culture, Russian Science Citation Index, Bibliometric Analysis, Keywords, Psychology, Areas of Psychology.

1. Introduction

The start of a special military operation in Ukraine has intensified the discussion about the national features of Russian science. Two years ago, the editors conceived the interdisciplinary international journal Natural Systems of Mind, aimed at publishing both classic and debatable articles without regard to the status and other social merits of the authors. Our attitudes expressed in the first editorial remain in full force. We firmly believe that scientific thought knows no boundaries and should be spread as widely as possible. The duty of a scientist is to convey his/her scientific results to the widest possible audience. At this stage of science development, its international language is English. Our journal is published and will be published in English. The second invariable setting is free publication and open access. All this cannot be destroyed by any sanctions, which are absurd when it comes to scientific communication. However, it would be wrong to pretend that nothing has changed in the current historical conditions. Over the past ten years (since 2013), the effectiveness of Russian science within the country has been assessed by publications indexed in international scientific databases. This sometimes led to amusing paradoxes (see Zuev, 2021). These requirements have now been cancelled. Russian science is on the verge of isolation. In this regard, the mission of

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disseminating advanced scientific knowledge obtained in Russia for the English-speaking reader is added to the existing missions of the journal.

This does not mean that non-Russian authors will not be able to publish their manuscripts in the journal. On the contrary, we look forward more than ever to a scientific dialogue. Our urgent task is to bring Russian science as close as possible to the interested reader. For this purpose, it would be appropriate to briefly outline the publishing landscape of Russian science. Since the early 2000s, Russia has had its own bibliometric database hosted on elibrary.ru. Unfortunately, neither the base itself nor its capabilities are known to the foreign reader. Therefore, in this article, we will briefly inform about the Russian bibliometric database and compare the publication landscape in the Russian database and in Web of Science, which was presented in the first editorial of the journal (Volkova, Zuev, Rusalov, 2021).

2. Russian Science Citation Index: History and Modernity

It is known that the first scientific citation indexes were developed by J. Garfield in the 1960s and the modern Web of Science apparatus functions on their basis. In the USSR, the issue of systematizing scientific information was rather acute. The Institute of Scientific Information of the Academy of Sciences of the USSR was established in 1952, later it was renamed the All-Union Institute of Scientific and Technical Information (VNIITI). Despite the widespread opinion Soviet science has never been isolated from world science. VNIITI subscribed to thousands of scientific journals, which were translated on time by order of Soviet scientists.

Over time, library institutes were created in the system of the USSR Academy of Sciences, which also performed review functions: the Institute of Information on Social Sciences, the Library of Natural Sciences, etc. These institutions widely used automatic information accounting systems in their activities. Nevertheless, the Soviet system for the dissemination of scientific information

was far from perfect. Books of the central publishing house of the USSR Academy of Sciences "Nauka" and journals were sent to specialized libraries, but a lot of scientific information (collections of articles, conference materials, etc.) remained "invisible". This led to the normalization of multiple publications (autoplagiarism). In the modern scientific world, this is absolutely unacceptable, but in the late Soviet period it was widespread and justified. After a turbulent and uncertain time for Russian science and the country as a whole (the 1990s), a new publishing culture began to form, which required both a revision of the ethical standards of publications and the significance of their individual types.

At this stage in the development of science, the standard type of publication is a scientific article in a journal. Scientists compete to get into the journals with the highest impact factor (or similar), and so on.

As mentioned above, the Russian bibliometric database was created in 2005. From her predecessors, she inherited the SRNTI classifier, which is still used today. For a fairly long period (until 2016), the base was homogeneous. Publications were not divided in it by status and source of origin. Until 2013, the base was used by a small number of specialists, despite the significant opportunities that it already had at that time. Quantitative indicators for evaluating the effectiveness of Russian scientists, including the RSCI indices, were administratively introduced in 2013. The Russian science was not unique in this regard. Quantitative indicators have come to be used as criteria for assessing the effectiveness of science in Hispanic countries, China, and other regions. This state of affairs led to the publication of the Leiden Manifesto for Scientometrics in 2015 (Hicks et al., 2015). By that time, many scammers appeared in Russia who

offered to publish anything for money in the RSCI. The author could "wind up" the number of publications, citation and derived indicators (due to self-citation). An attempt to "calculate" Russian science led to chaos. Certainly, this did not apply to all Russian scientists. More and more researchers began to advocate the need to introduce clear ethical standards for publications and reform the RSCI. In Russia, a free online community "Dissernet" was launched, through the efforts of which hundreds of people were deprived of their academic degrees. Over time, they also presented a list of unreliable magazines. The Council on Ethics of Scientific Publications started its activity. Thanks to the activities of the Russian Council on Ethics, a procedure has been established for retracting articles from scientific journals. Thousands of papers were retracted for violating scientific ethics. The changes also affected the main bibliometric base of the country. Thanks to the Russian Council on Ethics, the procedure for retraction of articles from scientific journals has been established. Thousands of papers were retracted for violations of scientific ethics. The changes also affected the main bibliometric base of the country. The database became hierarchical in 2016. As before, any publication can be indexed on the portal. At the bottom of the database hierarchy are poor quality publications that are not counted by either employers or grant makers. The middle level of the database hierarchy is peer-reviewed publications. The editors of journals and books provide reviews confirming the required level of publication quality. And, finally, the highest level is the "core" of the RSCI, in which a strict selection of journals is carried out, taking into account scientometric indicators and peer review. Until this year, the RSCI core was part of Web of Science as a regional database. Now it exists as an independent project within the Russian Science Citation Index.

The first editorial discussed the main features of Russian publishing culture (Volkova, Zuev, Rusalov, 2021). Let's turn again to the topic of scientific journals. There are practically no general journals in the Western tradition. The well-known journals "Science" and "Nature" are rather an exception. Psychology, which according to Western classifiers includes both cognitive science and social science, is mainly represented by journals created according to the industry principle, for example, "Family Psychology" published by APA. It should be noted that the more advanced the area, the more differentiated journals are published in it. The highest impact factor in the core Web of science collections is currently held by medical research journals in the field of cancer treatment. In Russia, the situation is the opposite, namely, almost all journals, even within a specific subject area, claim to be universal. It should be noted that there were practically no highly specialized journals in the Soviet Union. Today the situation is somewhat different. Some journals included in the core of the RSCI have an industry focus. For example, "Social Psychology and Society", "Psychological Science and Education", etc. A similar trend is also present among journals striving to get into the core of the RSCI. For example, the Institute of Psychology of the Russian Academy of Sciences. Socio-economic psychology".

At the same time, scientific results in Russia are traditionally published not only in scientific journals. An integral and very important part of the Soviet and then Russian publishing landscape are collections of scientific articles, author's and collective monographs. Let us briefly describe their meaning using the example of the Institute of Psychology of the Russian Academy of Sciences (AS USSR). Publishing activity started from the first days of the existence of the Institute of Psychology AS USSR. At the very first meeting of the Academic Council of the newly formed scientific institution, which took place on June 29, 1972, the plans for books that were to be published under the heading of the Institute of Psychology at

the Nauka publishing house were discussed.

The real flowering of collections of articles as a special type of publication falls on the 1970s and is associated with the founding of the Institute of Psychology of the USSR Academy of Sciences. As mentioned above, initially close attention was paid to publishing issues, but the mass appearance of books under the heading of the Institute of Psychology AS USSR dates back to 1974. And, certainly, there were collections of articles. Both collections of articles published in 1974 are of an industry nature: the first book is devoted to psychophysics ("Problems of Psychophysics"), the second discusses issues of personality psychology ("Theoretical Problems of Personality Psychology"). They in some way set the standard and the specifics of the collections of articles of the 1970s. Books summarize a certain stage of theoretical development in a certain area. The very fact that the collections were published underscores the importance of these branches of psychology and the need for their further development. In a way, they set the standard and the specifics of collections of articles of the 1970s. The books summarize a certain stage in the development of an area. The very fact of publication of the collections emphasizes the importance of these areas of psychology and determines the prospects for their future development. This feature is characteristic of the vast majority of collections published at the Institute of Psychology (AS USSR). It is impossible to ignore the fact that the books are very high quality published by the Nauka publishing house. Evidently, it can be stated that the formation of a collection of articles (and, accordingly, an article in a collection of articles) as a special type of scientific publication, which occupy an intermediate position between an article in a journal and a monograph, belongs to this period. A journal article implies a rigid structure depending on the type (empirical, review, etc.) with a clearly defined volume. The article in the collection does not restrict the authors so severely and provides them more opportunities. This feature became most pronounced in the second half of the 1980s, when the Institute of Psychology received the right to independently conduct publishing activities. Thus, the collections published by the Nauka publishing house are joined by a considerable stream of books published directly at the Institute of Psychology (AS USSR).

The 1990s were a difficult time in many respects, including a significant reduction in science funding. Nevertheless, books as well as collections of articles were regularly published at the Institute of Psychology. The volume of work of the Nauka publishing house was greatly reduced, and for the researches the publishing house of the Institute of Psychology became the main publishing house. Publications cover a wide range of issues which include, first of all, the reaction to the ongoing social upheavals in a variety of aspects: personal, socio-psychological, etc. The penetration of various Western theories and methods into Russia led to the publication of diagnostic methods. Nevertheless “Classic” academic publications also continued to be published, such as a 1993 collection of articles on the psychology of color. In general, it can be summarized that both publishing in general and collections of articles, as a special type of publications, have survived and have not lost their specificity, despite difficult external circumstances.

In the 2000s, the range of books expanded notably, and publishing series were formed. However, the subject matter of books in some cases is somewhat "blurred". There is a departure from integrity, from a specific direction or area of research.

The role of collections of articles is changing due to the change in formal evaluation in the 2010s. It is necessary to mention a number of fundamental publications relating to this period,

namely, "The Principle of Development in Modern Psychology", which echoes the book of 1978 "The Principle of Development in Psychology". It should be notes the collection “Human Resilience: Individual, Professional and Social Aspects”, in which both leading domestic and foreign scientists were involved.

Currently, articles from collections and monographs are not included in the core of the RSCI, but it can be assumed that this situation will change over time. In our analysis, which will be presented below, we did not ignore these publications.

The objectives of the article are (1) to demonstrate the capabilities of the Russian bibliometric base and (2) to show how psychology is represented in Russia.

3. Method

The standard search for RSCI for the key word “psychology” (headlines, keywords, abstract) was effected without the using of altered grammatical forms. Of course, this search technology has clear restrictions and raises the question of the relevance of the request. In this article, we will not enter into a discussion on this matter. Definitely, this search technology has clear restrictions and raises the question of the relevance of the request. In this article we will not discuss this issue. We have identified those works whose authors are unambiguously associated themselves with psychology. Another reason was the desire to limit the number of studies that will fall into the sample, it should not be excessive.

4. Results

The total number of publications corresponding to the criteria of the request is 4570. Moreover, the articles in the journal are only 1676 among them. This ratio (approximately 1/3) illustrates those features of the Russian publication culture that were described above: the journal article is not the only means of scientific communication between scientists. However, it should be noted that psychology occupies an intermediate position between natural-scientific and humanitarian disciplines. The interdisciplinary status of psychology also affects its expression on the publication landscape. Only 244 articles are indexed in WoS and Scopus databases. This is about half a percent of all publications, which indicates a low level of representation of Russian psychology in the world public stream.

However, if you look at the relative number of all published articles, it turns out that more than 14% of the publications of Russian psychologists meet international standards, and Russian psychology partly corresponds to world trends. Here a meaningful analysis is needed, to which separate works will be devoted. In total, 5986 authors were the authors of the articles. This figure gives only a rough idea of the number of researchers involved in scientific research in the field of psychology. At the same time, we note that the total number is quite impressive. For comparison, the total number of researchers at the Faculty of Psychology of Moscow State University, the Psychological Institute of the Russian Academy of Education and the Institute of Psychology of the Russian Academy of Sciences is less than 500. Thus, the spread is quite high. Below is an analysis of the leaders of organizations by the number of articles.

The published materials are quite in demand both among psychologists and scientists of other disciplines. In total, published works are cited in the RSCI 11197 times. At the same time, there are 1167 self-citations, that is, approximately 10%, which can be considered a very good indicator. The Hirsch index of the sample is 39 units.

4.1. Thematic headings

According to the thematic headings, most of the articles (3026) are, as expected, related to psychology. These articles cover 36 scientific topics, which testifies to the interdisciplinary status of psychological research (see Table 1). The absence of physiology among these areas is surprising, since psychologists and

physiologists traditionally conduct joint research. It is likely that such studies are labeled in the title and keywords as physiology or psychophysiology, but not as psychology.

Collaboration with pedagogy is traditional for Russian psychology. As is known, the only research institute engaged in psychological research was for a long period part of the Academy of Pedagogical Sciences. Philosophers and sociologists are also often co-authors of psychological research. A significant number of works on legal psychology are of interest. The presence of psycholinguistic studies in the Russian sample fits into the global trend. It should be mentioned that psycholinguistics is a separate section in our journal.

Table 1. Thematic headings of publications

Thematic headings	Number of publication
Psychology	3026
Public education. Pedagogy	715
Economy. Economic Sciences	143
Philosophy	124
State and law. Legal Sciences	95
Sociology	88
Medicine and healthcare	72
Physical culture and sport	58
Linguistics	37
Social sciences	22

4.2. Keywords

Let us turn to the analysis of the most frequent keywords of the publications presented in Table 2. In total, the authors used more than 1000 keywords.

The most frequent keywords refer to areas of psychology. The exceptions are the keywords "personality" and "family psychology". Apparently, this is another facet of the national publishing culture. However, the first of them can be recognized as marking the direction. Family psychology in Russian psychology is most often not considered as a separate direction. The study of the family is usually carried out within the framework of developmental psychology, social psychology, and other areas. In any case, family psychology is not institutionally fixed in Russian psychology.

The leading position is occupied by studies of a social orientation (pedagogy, social psychology, social work, family psychology). Considerable attention in Russian science is paid to the methodology and history of psychology, which is undoubtedly a feature of Russian psychology. Western methodological studies and discussions follow different rules. The same applies to the history of psychology.

4.3. Russian journals in which the articles of the sample were published

Publications were distributed among 627 journals. Let's focus on the top five (see Table 3). It should be noted that our request implied the presence of the word "psychology" in the title. This explains why not all journal articles with clearly defined psychological themes were included in the sample.

The results obtained confirm the specifics of the Russian publishing culture described above, namely, three out of five journals publish articles on the broadest topics. The journal “Institute of Psychology Russian Academy of Sciences.

Table 2. Selected publication keywords

Keywords	Number of keywords
Psychology	1460
Pedagogy	616
Social work	558
Personality	349
History of Psychology	318
Social Psychology	151
Developmental psychology	115
Psychology of the family	115
General Psychology	102
Methodology	84

Social and economic Psychology" is an industry-specific one. The Journal «Cultural-Historical Psychology» is a cross-disciplinary journal but it accepts papers made within the framework of a particular paradigm of psychology.

It should also be noted that two of the five journals are published by the Institute of Psychology of the Russian Academy of Sciences, the leading Russian psychological center, which is the publisher of our journal as well. The Institute of Psychology of the Russian Academy of Sciences is also the leader in terms of the number of publications among organizations (see Table 4).

The data obtained testify to the predominant localization of psychological research in the Russian capital, Moscow (7 out of 10 organizations); St. Petersburg is in second place (2 organizations); Yaroslavl is in third place (1 organization). It should be emphasized that both St. Petersburg and Yaroslavl have long established their own psychological schools, and it is not surprising that organizations from these regions become leaders.

It should be emphasized that regional psychology in Russia is much more widespread and includes many scientific centers: in total, articles were submitted from 662 organizations.

4.4. Number of co-authors of articles

In contrast to the global trend of doing research in large collaborations, about half of the articles in Russia are written by one author (2291 out of 4570); about a quarter of all articles (1135 out of 4570) are by two authors; 526 by three authors, 213 by four authors. Less than a hundred articles were written by a large number of co-authors. The largest number of authors is 75. It must be emphasized that this is a collective monograph, and not an article.

4.5. Number of citations

The last metric offered by the standard RSCI sample analysis tool is the distribution of publications by citation count. This analysis tool is useful for understanding the relevance of research. Most of the articles (2684 out of 4570) are not cited, which reflects the global trends. 595 works are cited once, that is, about 30%. Two citations have 311 publications, three citations - 215 publications, four citations - 147 publications, five citations - 119 publications. More than five citations in each group have less than a hundred publications. The maximum number of citations is 237 (Monograph by V.A. Mazilov "Methodology of psychological science: history and modernity").

Table 3. Distribution of articles by journals (top 5)

Journals	Number of publications
Psikhologicheskii Zhurnal	68
Institute of psychology Russian Academy of Sciences. Social and economic psychology	56
Yaroslavl Pedagogical Bulletin	33
Cultural-historical psychology	31
Voprosy Psychologii	26

Table 4. Distribution of publications in the sample by organization (top 10)

Organization	Number of publications
Institute of Psychology of the Russian Academy of Sciences	200
Moscow State University of Psychology and Pedagogy	172
Lomonosov Moscow State University	168
Yaroslavl State Pedagogical University named after K.D. Ushinsky	160
St. Petersburg State University	149
Moscow State Pedagogical University	137
Russian State Pedagogical University named after A. I. Herzen	104
National Research University Higher School of Economics	96
Moscow City Pedagogical University	91
Psychological Institute ofthe Russian Academy of Education	66

The article by Zhuravlev A.L., Yurevich A.V., Mironenko I.A. "Psychological Science in the Global World: Challenges and Prospects" (Psychological Journal, 2018, vol. 39, No. 2, pp. 58-71) is the most cited among articles. The standard RSCI tools also allow you to consider citing publications from different angles. There are 12 metrics in total: distribution of citing publications by subject, keywords, journals, organizations, authors, and years. The distribution of citations is similar. These metrics are useful for analyzing the relevance and scope of the research subject area. For this purpose, let us consider the distribution of citing publications by subject (Table 5).

The data presented in Table 5 largely duplicates Table 2. However, there are some differences that should be considered. There is a clear trend in the specification of research objects: students, teenagers, family. The subjects of research are also formulated more specifically: motivation, development. The history and methodology of psychology are still strong. The data presented in table 5, largely duplicate table. 2. However, there are some differences that should be considered. There is a clear trend in the choice of research objects: students, adolescents, and families. The subjects of research are more specifically formulated: motivation and development. The history and methodology of psychology are still relevant.

5. Conclusion

The Russian publishing culture has a number of features that partly overlap with the world culture (the importance of high-ranking publications in journals, the aspiration of Russian journals to international bibliometric databases, etc.). At the same time, specificity is retained, associated primarily with the

Table 5. Distribution of publications that cited articles in the sample by keywords (top 10)

Keywords	Number of publications
Psychology	768
Personality	688
Education	338
Students	334
History of Psychology	315
Motivation	182
Development	177
Adolescents	124
Family	114
Methodology	111

high significance of collective and individual monographs.

The Russian hierarchical bibliometric database (Russian Science Citation Index) has significant tools for analyzing both individual publications and their selections. Many of the presented RSCI metrics have no analogues in international bibliometric databases.

An analysis of publications in psychology indexed in the RSCI for the period 2017-2021 made it possible to identify the main areas of psychological publications, keywords, leaders among organizations and journals. In terms of content, publications are most often marked by areas of psychology. However, citing publications make it possible to specify directions in the subjects and objects of research.

The peculiarities of the Russian publishing culture include a small number of co-authors of publications and a pronounced interest in socially significant objects of research, as well as in the history and methodology of psychology.

CRediT author statement:

Zuev K.B.: Data Collection, Writing-Original Draft Preparation.

Volkova E.V.: Conceptualization, Writing-Review & Editing.

Highlights:

- Scientific publications in Russia comply with advanced international standards.
- The Russian bibliometric database has a hierarchical structure. The RSCI core is included in Web of Science.
- Russian psychologists have published more than 4,500 articles over the past five years.

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REVIEW

Actual Trends in the Psychology of Abilities: Bibliometric Analysis

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Abstract: Around 24 000 WoS records in the field of psychology containing the search word abilities and dated from 1975 onwards were analysed to reveal actual trends by the means of formal analysis based on citation count: citation index, co-citation, bibliographic coupling; and analysis of content based on words co-occurrences count: thematic mapping and topic modeling. The main increased trendlines found are developmental deficits in executive functions related to individual differences; personality traits models in relation to professional success and satisfaction; knowledge acquisition, especially math learning and language, in the childhood; methodological issues: meta-analysis, data processing and modeling methods. Topics revealed as downward trends are general intelligence, achievement goals, psychometric tools of personnel selection, spacial abilities in relation to sexual differences, cognitive ageing. Individual differences and performance remain the two stable characteristics determining the domain of abilities while the third characteristic coined by B.M. Teplov seems more elusive: abilities foster knowledge and skills acquisition while irreducible to them.

Keywords: Psychology, Abilities, Bibliometric Analysis, Actual Trends, Performance, Individual Differences, Knowledge, Skills.

1. Introduction

One of the most traditional psychological notions, that of abilities, is currently facing a growing number of other concepts, such as competencies or resources, that deal with the same empirical area of individual performance-related differences. Is the idea of ability still relevant, productive, or should we abandon it in favor of more modern ones?

Aim of the study was to reveal actual and emerging perspectives of the psychology of abilities on the literature review basis. Since the topic publications volume measures by thousands, bibliometric approach was applied, using bibliometrix (Aria & Cuccurullo, 2017), tm (Feinerer et al., 2008), topicmodels (Grün & Hornik, 2011) and ldatuning (Murzintcev & Chaney, 2020) packages of R statistical software (R Core Team, 2022).

2. Data

Database used was the Clarivate's Web of Science Core Collection, from which I extracted approximately 24 thousand records of articles and proceedings published since 1975 in the field of psychology and containing the term "abilities" in Title, Abstract, Author Keywords and Keywords Plus (keywords automatically generated from reference list by an WoS algorithm).

3. Results

3.1. Citation Analysis

Annual number of publications displayed on Figure 1 varies between 92 and 135 till 1990, then demonstrates

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virtually linear rise to 1264 in 2019 and afterwards level off again (apparently because of not all of the recent publications being yet recorded in the database). Figure 1 also reveals some causes of that takeoff by demonstrating how different search fields contributes to the number of records found when added sequentially to the query, starting from the Title. The number of titles mentioning abilities levels up quite moderately from around 200 in 2004-2007 and attaining the 500 milestone only in 2021. Author Keywords and Keywords Plus, when included in the query, both result in adding equally huge amounts of records starting from 1991 while the Abstract's contribution is insignificant. The secret of the pivotal 1991 is that it was the moment all 3 fields were included in the database.

The top-20 most cited texts date from 1984–2011 with citation index 1123-3759, in the large part focusing on such topics as implicit theories of abilities, self-effectiveness, executive functions, achievement motivation, data analysis methods. Similar publication list 2016–2019 happens to contain texts with citation index of 139–339 on general and emotional intelligence, mathematical abilities, gender bias in STEM education, professional adaptation, interrelationship of cognitive development's genetic and environmental factors. The top cited 2020-2022 texts touch on the psychological issues of the COVID-19 pandemic, irrational beliefs and conspiracy theories, cognitive ageing, cognitive abilities in autism and ADHD, interrelationship of cognitive abilities with personality and academic performance (see Table 1).

Being simple, clear and easy understandable, citation index, proposed in the pioneering work of E. Garfield (Garfield, 1955), is popular as biblio- and scientometric measure but has few known drawbacks: it suffers from some temporal lag due to (uneven) time a record takes to appear in the database and, more importantly, citation index on its own doesn't catch publications relationship thus being unsuitable for citation network modeling. To surpass these limitations of the citation index a series of more elaborated analyses were carried out.

3.2. Co-citation analysis and bibliographic coupling

Co-citation analysis is built upon numerical indices reflecting co-occurrence of two source texts in the same reference list thus allowing to model a network of simultaneously cited publications (Small, 1973). Comparison of those networks of publications from different decades on Figures 2-5 revealed a stand-alone cluster of Clinical diagnostic methods, with which the Executive functions cluster merge in 2022-2022. Those in turn appear in the last decade on the basis of Working memory cluster; in the same time disappears the stand-alone Reading skills development, and in the Spatial ability cluster vanishes the sexual differences agenda. Meanwhile Personal traits and performance separates from Intelligence models, and Methodology individualize in 2020-2022, whose agenda were until then allocated to other clusters.

In bibliographic coupling the strength of the two sources' (texts, authors etc) relationship is calculated as the number of other sources they both reference to (Kessler, 1963). According to some authors it appears to be more accurate (Boyack & Klavans, 2010), and to capture more unique information than either direct or co-citation analyses (Kleminski et al., 2022). In our study bibliographic coupling revealed rather social aspect of knowledge structure in the field: for example in the 2020-2022 network some clusters consist mainly of authors originating from the same culture, judging by their names (see Figure 6).

3.3. Thematic mapping and evolution

Along with citation analysis, methods based on formal analysis of publication content data are also useful to reveal the actual trends. Thus, the keywords co-occurrences were analysed by the means of thematic mapping on two dimensions: Centrality (relevance degree, integration in the research field) on the horizontal

Table 1. Top 20 most cited articles published in 2020-2022

#	Article	Cited
1	MacCann, C., Jiang, Y., Brown, L. E. R., Double, K. S., Bucich, M., & Minbashian, A. (2020). Emotional intelligence predicts academic performance: A meta-analysis. *Psychological bulletin*, *146*(2), 150–186. https://doi.org/10.1037/bul0000219	103
2	Lövdén, M., Fratiglioni, L., Glymour, M. M., Lindenberger, U., & Tucker-Drob, E. M. (2020). Education and cognitive functioning across the life span. *Psychological science in the public interest : a journal of the American Psychological Society*, *21*(1), 6–41. https://doi.org/10.1177/1529100620920576	65
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axis, and Density (development degree, internal coherence) on the vertical one (Cobo et al., 2011). Clusters in the upper-right quadrant of the map (the values on both dimensions are high) are interpreted as motor, or mainstream themes; those in the upper-left (low relevance, high development degree) as niche; those in the lower-left (values on both dimensions are low) as emerging or declining, and those in the lower-right (high relevance, low development degree) as basic, transversal, or bandwagon themes.

Keywords Plus were selected for the analysis: they apparently are at least as effective as Author Keywords in exploring the knowledge structure of scientific domains thus commonly employed in bibliometric studies to grasp research trends (Zhang et al., 2016). After the removal of the search words “abilities” and “psychology” three clusters of terms were identified in 2011-2019 publications (Figure 7): two of them tend to motor: the first one, interpreted as Learning and language is highly interconnected with other themes and medium developed, i.e. semi-basic; the second, Intelligence, personality and performance is semi-niche (well developed and medium relevant), while the third, Executive functions, is clearly “emerging or declining”.

Four clusters of terms were identified similarly in 2020-2022 (Figure 8): Executive functions cluster remains in place while Learning and language moved to pure motor while Intelligence and performance lost personality and became rather “emerging or declining”. Personality enters the new motor thematic cluster, Cognitive ability and personality models.

The changes in the clusters’ content over larger time-span are additionally visualized on the interactive map of thematic evolution (Figure 9). Keywords individual differences and performance although intertwined keep forming stand-alone clusters all the time, while intelligence blended into others in 2011-2019, in the same time knowledge emerged, and meta-analysis did so only recently.

3.4. Topic modelling

To provide more flexible analysis units instead of clusters, the latent topic grouping keywords, topic modelling was applied using the Dirichlet latent allocation (LDA) technique (Blei et al., 2003). LDA is a generative three-level hierarchical statistical model where the latent level, topic determines the both observable levels: [key]words and containing them documents. Topics are identified upon co-occurrence of words inside and between documents. In contrast to clustering, the method allows a keyword to belong to more than one topic at the same time, thus making the resulting model more realistic. To determine the number of topics to model, four different fit metrics was calculated (Arun et al., 2010; Cao et al., 2009; Deveaud et al., 2014; Griffiths & Steyvers, 2004). According to their scree plots (Figure 10) 38 topics were identified as a result of Keywords Plus analysis, five of which demonstrated visible rise during the last two decades:

Topic 1. Developmental disability and math learning;

Topic 2. Emotional health problems and self-regulation;

Topic 7. Personality traits models, efficacy and job satisfaction;

Topic 8. Autism and ADHD in adolescents;

Table 2. The first 15 most likely terms for the hot topics

Topic 7	**Topic 1**	**Topic 2**	**Topic 8**	**Topic 19**
personality	skill	behavior	disorder	performance
self	child	control	function	motor
trait	disability	anxiety	deficit	movement
scale	representation	stress	executive	physical
behavior	mathematics	self	attention	reliability
validation	achievement	depression	syndrome	imagery
job	learn	regulation	autism	questionnaire
satisfaction	developmental	health	child	sport
efficacy	numb	emotion	adolescent	activity
psychometric	knowledge	symptom	high	eye
success	system	risk	spectrum	strength
model	predictor	use	Asperger	body
predictor	difficulty	report	communication	risk
property	cognition	problem	impairment	exercise
role	sense	rate	profile	visual

Table 3. The first 15 most likely terms for the cold topics

Topic 9	**Topic 12**	**Topic 21**	**Topic 3**	**Topic 18**
mental	validity	adult	brain	knowledge
spatial	performance	age	cortex	belief
sex	test	life	human	judgment
strategy	selection	old	activation	accuracy
difference	personality	impairment	injury	children
rotation	job	disease	prefrontal	information
gender	meta-analysis	state	mechanism	perspective
orientation	impact	dementia	relate	mind
experience	cognitive	health	event	bias
woman	construct	mental	functional	preschooler
environment	criterion	Alzheimer	neural	false
preference	personnel	decline	lobe	inference
navigation	predictor	risk	network	deception
object	dimension	quality	frontal	attribution
man	employment	population	matter	confidence

Topic 19. Body performance and imagery (see Figure 11 and Table 2 for more detailed lists of terms forming each topic).

In contrast, the following six topics have declined in popularity:

Topic 3. Neuropsychology and brain;

Topic 5. General intelligence, progressive matrices and cognitive speed;

Topic 9. Spatial ability and gender

differences;

Topic 12. Personnel selection, test validity and job performance;

Topic 18. Information accuracy, beliefs and deception in children;

Topic 21. Mental impairment and quality of life in old age (see Figure 12 and Table 3 for details).

4. Conclusion

As we can see, actual trends in the domain of psychology of abilities are manifested in growing amount of mentioning and interlinked individual differences and developmental deficits in executive functions; personality traits models in relation to professional success and satisfaction; knowledge acquisition in the childhood, especially math learning and language; marked distinct interest in methodological issues such as meta-analysis and other data processing and modeling methods.

The opposite tendency of being lessen mentioned revealed in the field of general intelligence and cognitive speed testing, achievement goals, psychometric tools of personnel selection, spacial abilities in relation to sexual differences. The decline of cognitive ageing agenda as shown by topic modeling is apparently inconsistent with the initial citation index findings, but it may be explained by its partial absorption by neuroscience.

The decline of neuropsychological topic seems in turn surprising and contrasting the flourishing neuroscientific studies, but it may be due to the fact of flourishing: neuroscience have appropriated the agenda while its methodology focuses primarily on general cues rather than on differential psychological features.

At the same time the two of main pillars in the domain of psychology of abilities — individual differences and performance — remain in place. It is worth mentioning the third one by simply remaindering the classical definition of abilities by B.M. Teplov: they are individual-psychological features conditioning performance and not to be reduced to present skills or knowledge but fostering their acquisition (Teplov, 1941). The results obtained via different analytic methods appear to be quite consistent, making the key findings more valid and comprehensive.

Highlights:

- Main uptrends found are developmental deficits in executive functions; personality traits models in relation to professional success and satisfaction; knowledge acquisition, especially math learning and language, in the childhood; methodological issues.
- Downward trends are general intelligence, achievement goals, psychometric tools of personnel selection, spacial abilities in relation to sexual differences, cognitive ageing.
- Individual differences and performance remain the two stable characteristics determining the domain of abilities.

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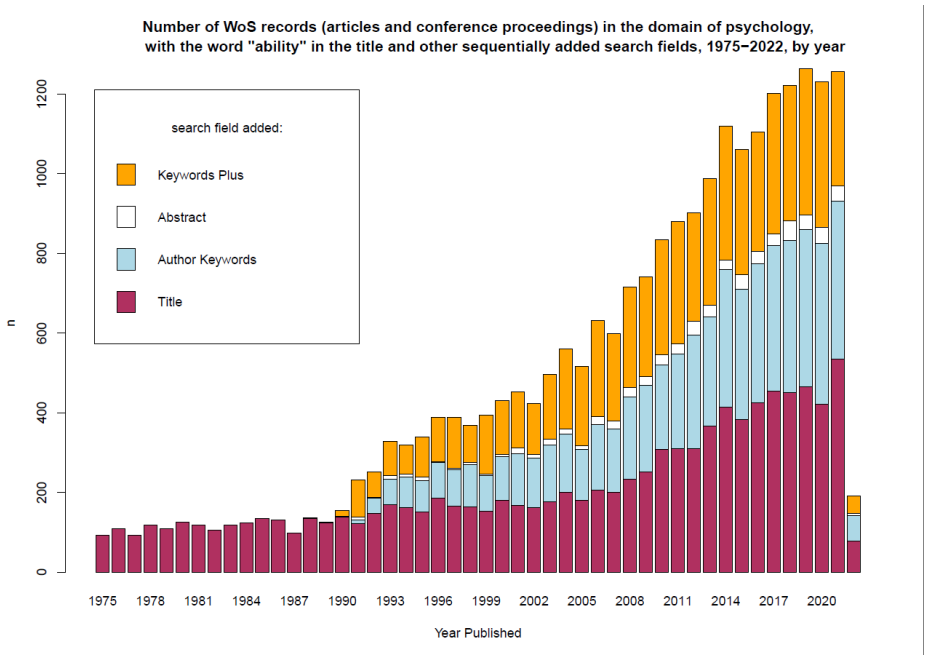

Figure 1. Number of WoS records (articles and conference proceedings) in the domain of psychology with the word "ability" in the title and other sequentially added search fields, 1975-2022, by year.

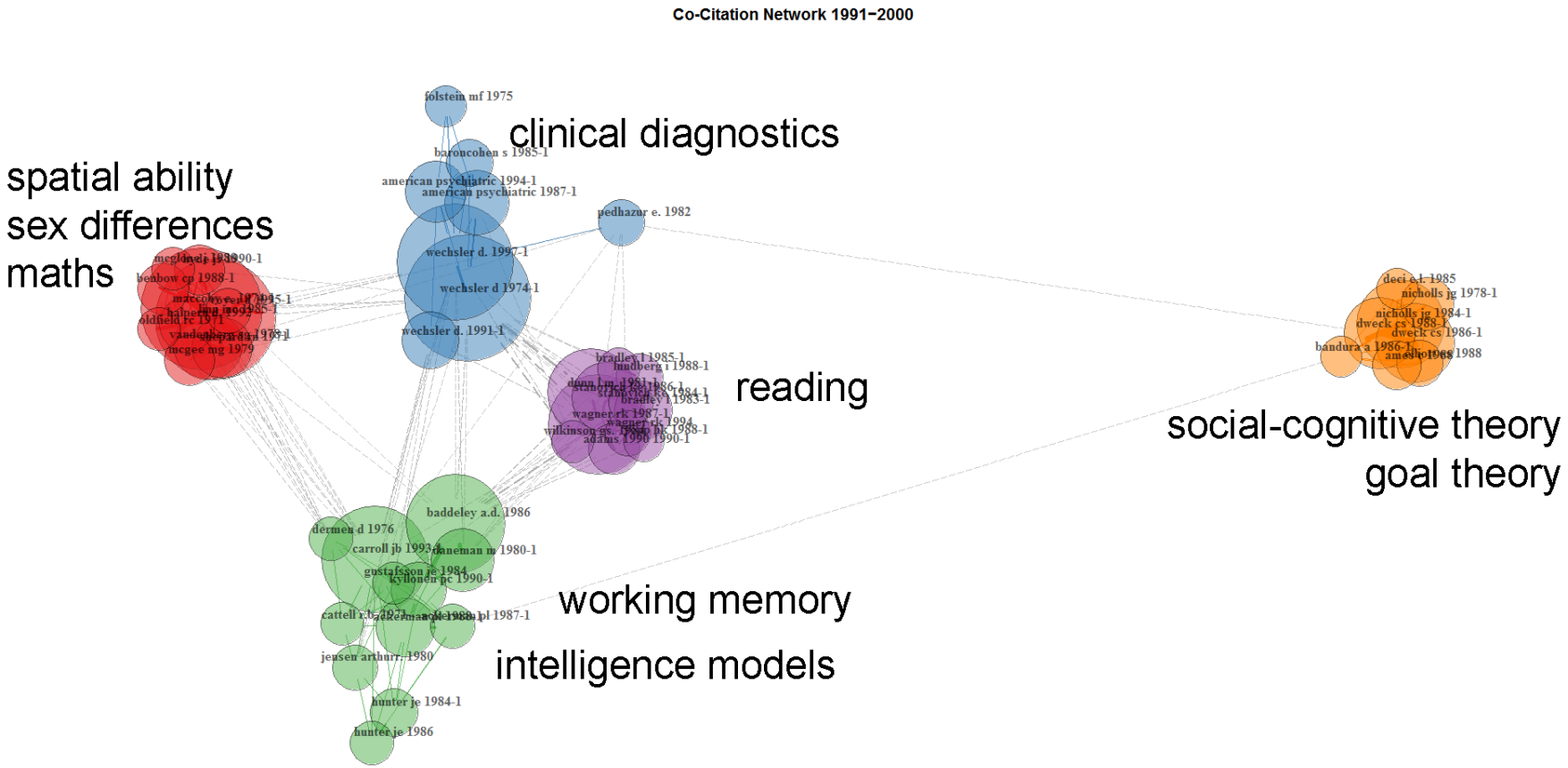

Figure 2. Co-citation network 1991-2000

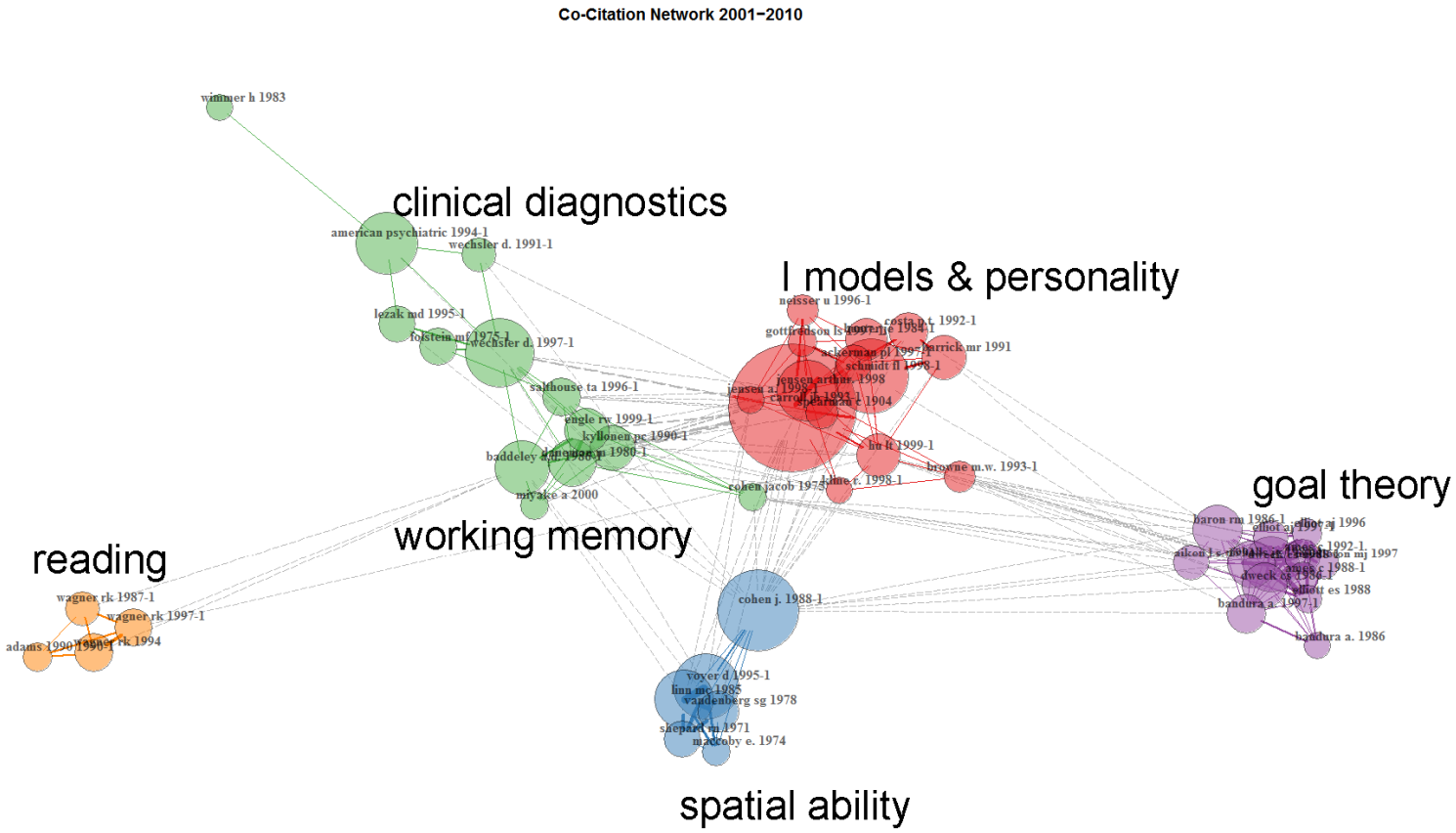

Figure 3. Co-citation network 2001-2010

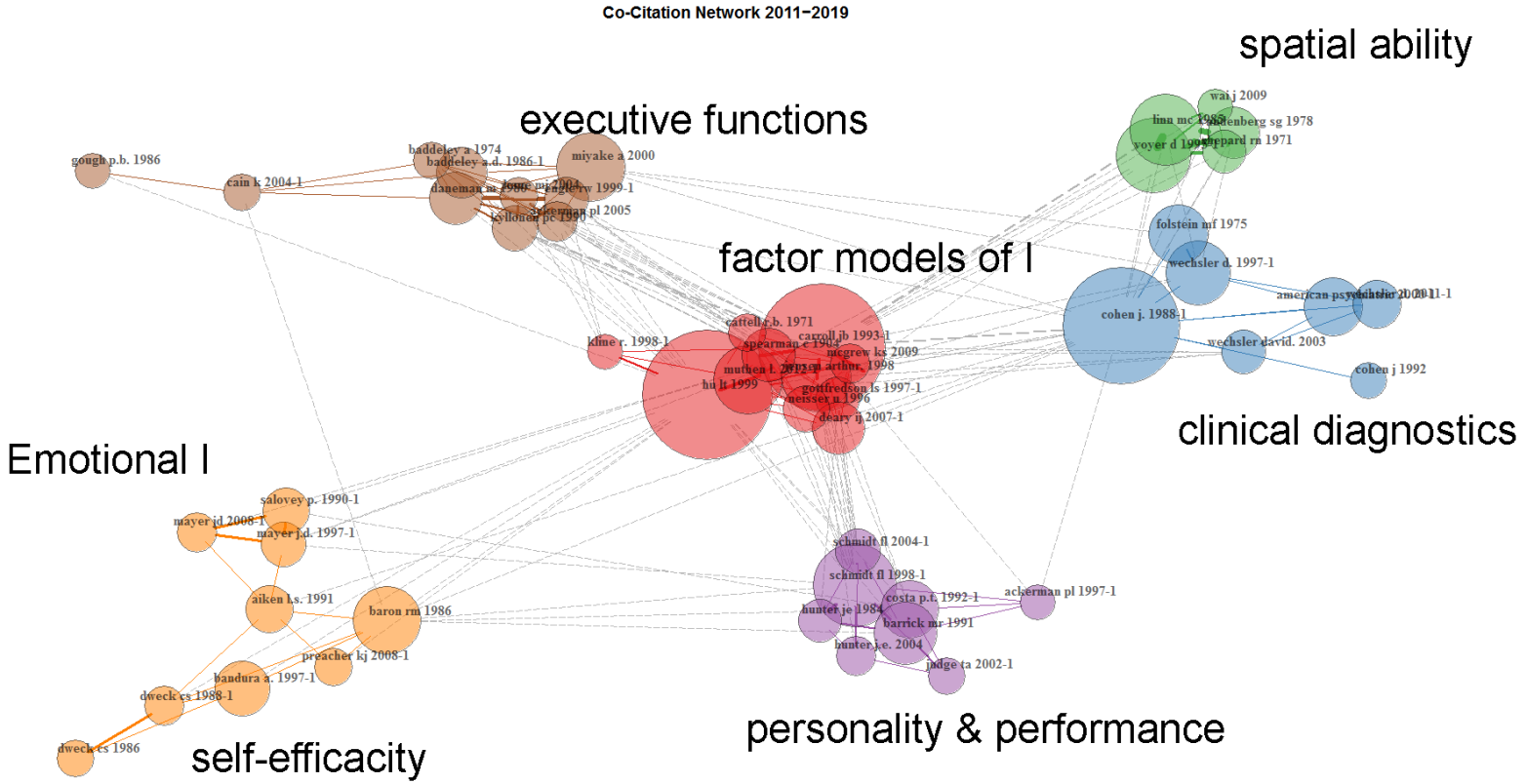

Figure 4. Co-citation network 2011-2019

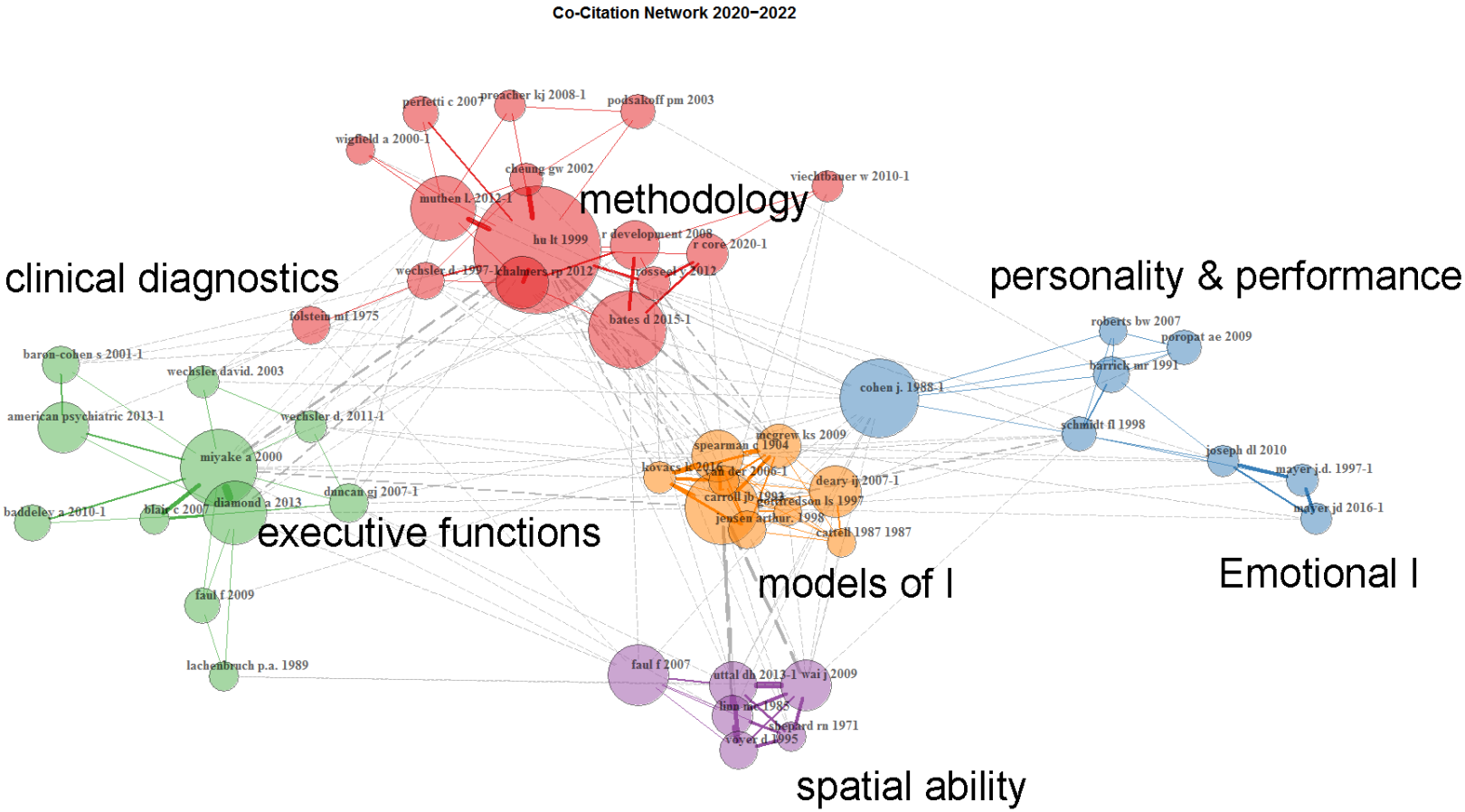

Figure 5. Co-citation network 2020-2022

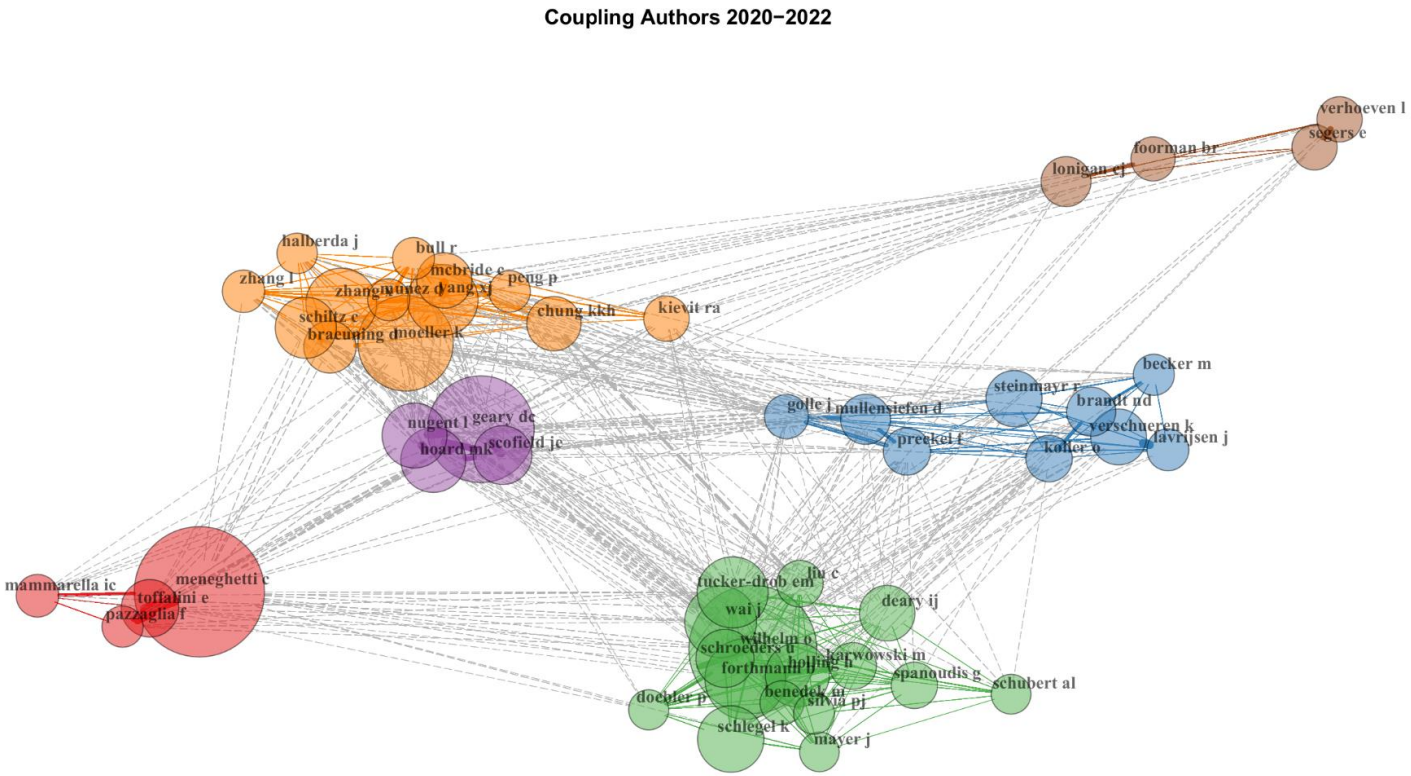

Figure 6. Coupling authors 2020-2022

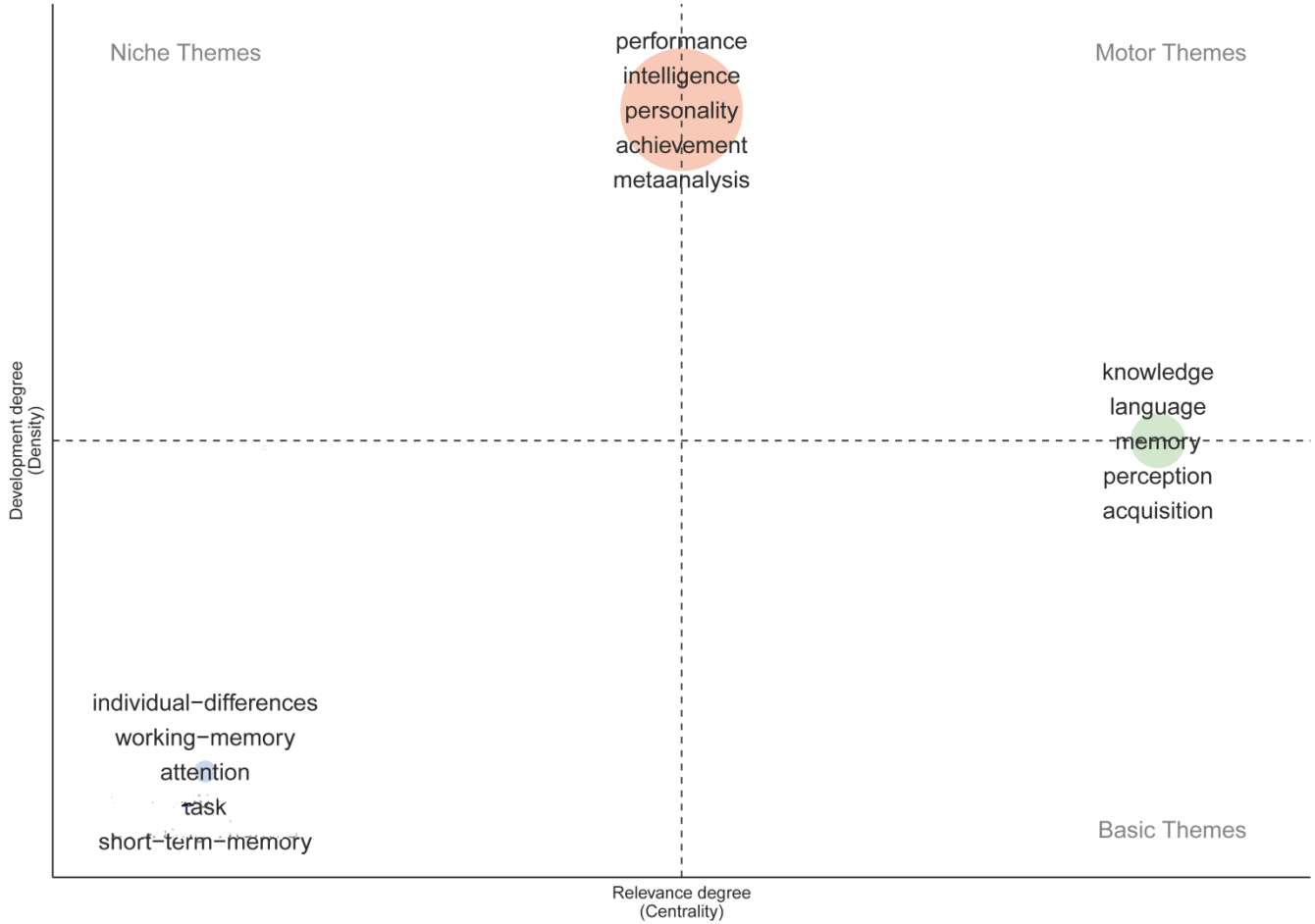

Figure 7. Thematic map 2011-2019

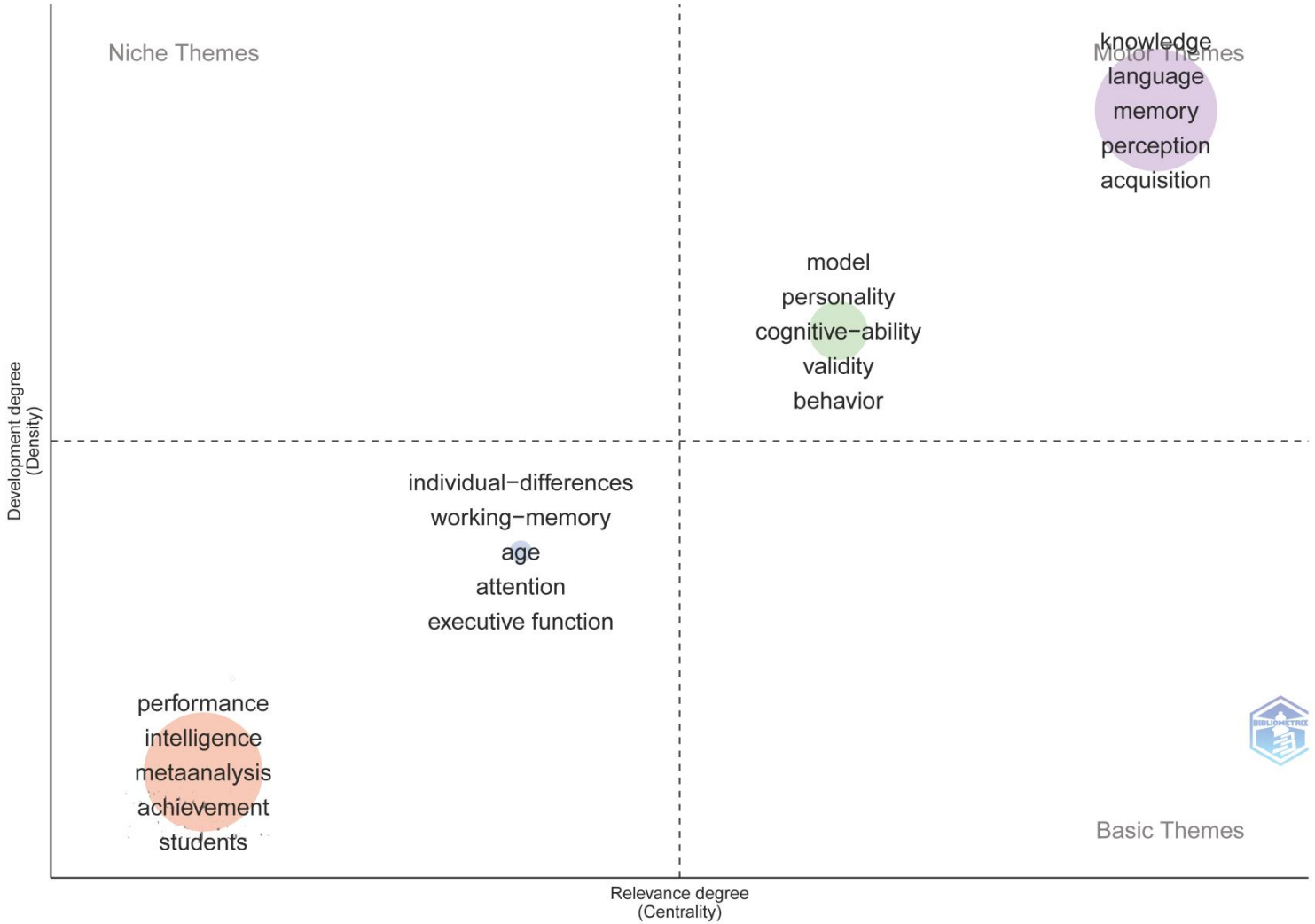

Figure 8. Thematic map 2020-2022

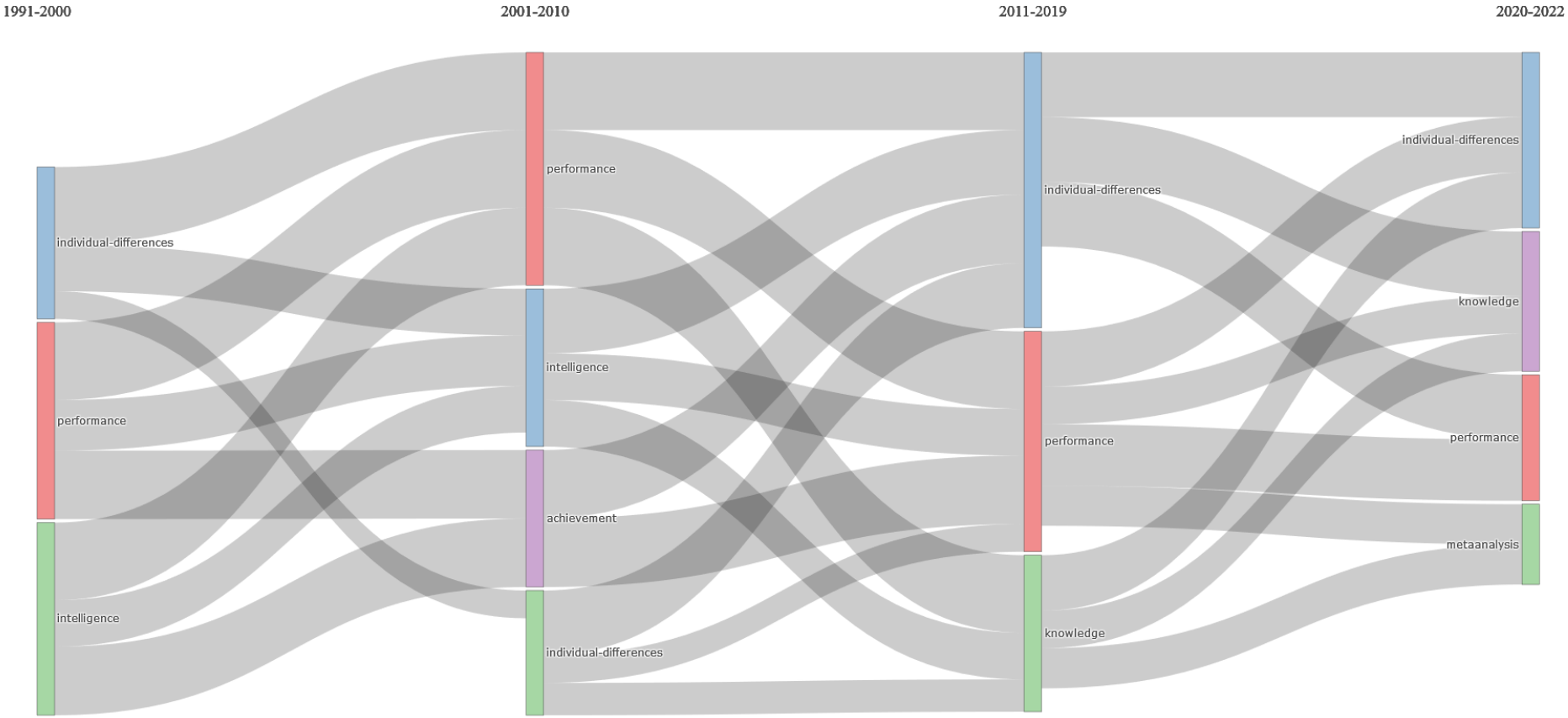

Figure 9. Thematic evolution map 1991-2022 (mouse over to see details)

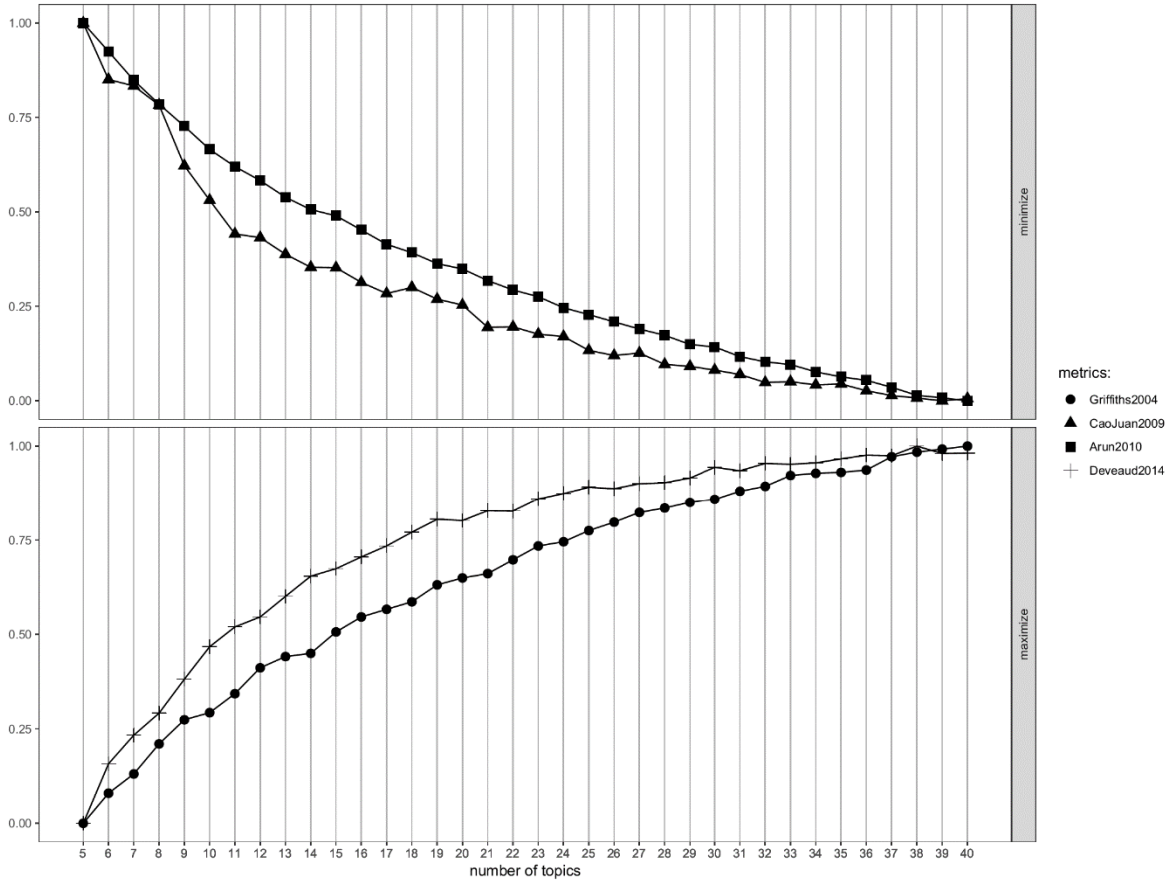

Figure 10. Scree plots of four different fit metrics determining the optimal number of topics to model

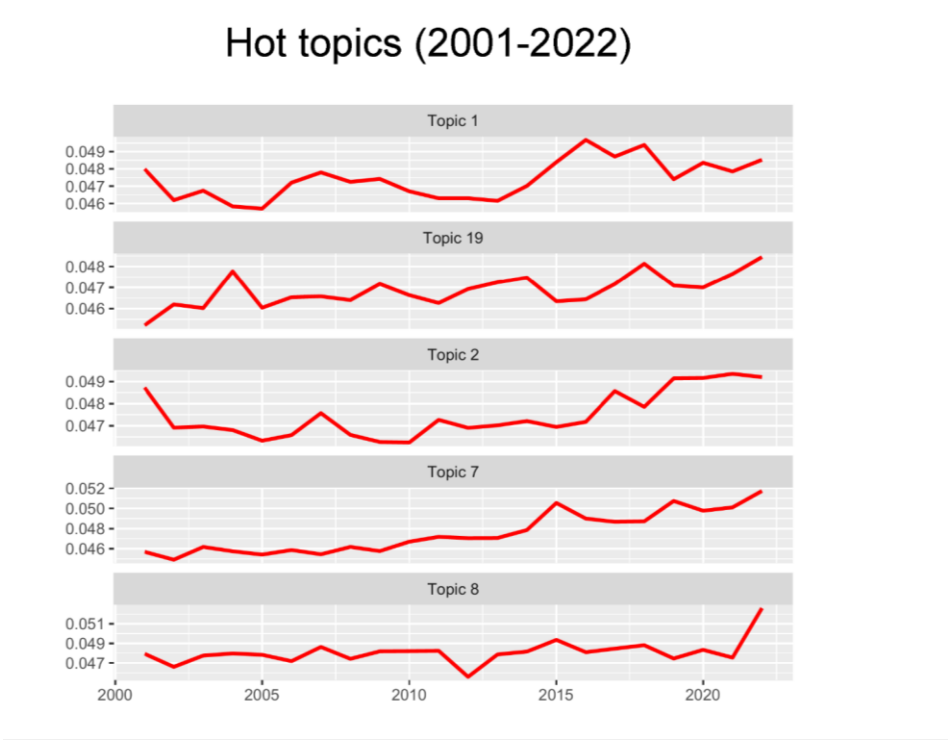

Figure 11. Hot topics demonstrating rise during 2001-2022

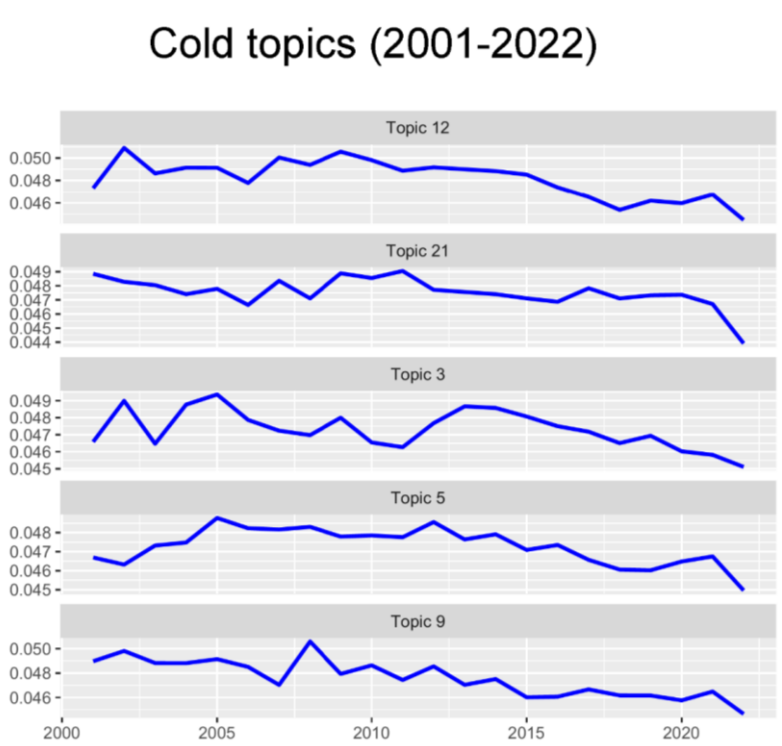

Figure 12. Cold topics demonstrating decline during 2001-2022

EMPIRICAL ARTICLE

Personality Traits, Attitudes to Life and Patterns of Behavior

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Abstract: The present paper is devoted to the study of structure and type of the relationships of personality traits, attitudes towards life and human behavior patterns. To identify these relationships, the study involved 2583 volunteers aged 18 to 40 years. The diagnostic complex included 81 scales. In the first part of the study Principal Component Analysis was used to reveal three generalized personality traits, which we called Wisdom, Emotionality, and Activity. Based on these generalized features, three clusters of respondents with similar psychological profiles were identified in the second part of the study. Psychological profiles of the clusters were significantly different (MANOVA). The first cluster included people with pronounced psychotic traits (N=985), low indexes of value-meaning attitude towards life, the subjects of this cluster preferred to ignore to face the problem or turned to social actions in a difficult life situation. The second cluster (N=707), united respondents with high indicators of activity and extraversion, higher indexes of value-meaning attitude to life. They were readily able to implement a wide range of copings and productive cognitive styles. The third cluster (N=987) included persons with pronounced emotional and neurotic traits. They were characterized by lower activity, hardiness and preferred to blame themselves in difficult life situations. The identified generalized personality features, as was established, make the greatest contribution to the differentiation of clusters. The data obtained are useful for understanding the holistic nature and the sources of human individual differences.

Keywords: Personality Traits, Attitudes to Life, Human Behavior Patterns.

1. Introduction

Challenges of our time (pandemics, digitalization, globalization, migration of peoples, etc.) make us look more deeply into the problem of personality and individual differences. This problem is widely discussed in various investigations. There are many studies devoted to the relationships between personality and cognitive styles (Glicksohn, Naftuliev, & Golan-Smooha, 2007; Rawlings, 1984; Sternberg, 1990, 1994; Volkova & Rusalov, 2016, and others), personality and coping (Connor-Smith & Flachsbart, 2007; Greene, Cowan, & McAdams, 2020; Magnano, Paolillo, Platania, & Santisi,

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2017), personality and value orientations (Anglim, Knowles, Dunlop, & Marty, 2017; Fetvadjiev & He, 2019; Parks-Leduc, Feldman, & Bardi, 2014), etc. However, all these studies are concentrated on separated aspects of personality, forming a faceted view of human behavior. The split approach does not allow us to catch the holistic nature of man. We believe that the solution to this problem is only possible by searching for basic generalized personality traits, the combinations of which would underlie a wide range of individual differences.

Some scientists consider personality as a manifestation of biological properties in a person (Clarke, 2010; Eysenck, 1990; Pavlov, 1941). According to Pavlov's theory of conditioned reflex, the strength or weakness of nervous activity, the ratio of an excitatory and inhibitory processes can determine individual differences in behavior patterns (Pavlov, 1941). H. Eysenck (1944), comparing the results of a factor study of 39 character traits in 700 neurotic soldiers with the experimental and animal studies, with the theoretical analysis of the temperamental traits given by Jung, Pavlov, and others, came to the conclusion about the two prevailing forms of personality traits generalization. The first principle or generalized trait H. Eysenck called integration as opposed to disintegration or neuroticism. H. Eysenck emphasized that the principle of "integration" appears to be similar to Pavlov's concept of "strength of nervous functioning". The second principle or generalized trait H. Eysenck named dysthymia: affective disorder, desurgency, introversion, repression. This principle seems to be identical to Pavlov's concept of "inhibition". H. Eysenck suggested that these generalized traits are associated with heredity or the working capabilities of the endocrine systems. At the present time, there is enough evidence that that Psychoticism, Extraversion, and Neuroticism are genetically determined (Eaves, Eysenck, & Martin, 1989; Eysenck, 1990). As H. Eysenck noticed, these personality traits are universal and inherent in all the representatives of Homo sapiens.

Other researchers consider personality as a set of biological and social qualities of a person (McAdams, 2006; McCrae & Costa, 2008; Merlin, 1986; Rusalov, 2012,). In this case, the highest social manifestations of a person are referred to personality. V.M. Rusalov maintains that the complex multi-level structure of personality is a manifestation of the interactions of genetic and environmental factors mediated by social activities of man. Neurophysiological foundation of human mind and behavior are the temperament. Every personality trait is formed under the influence of society as an amplification (continuation) of temperament properties or as their compensation. Temperament has a biological determination and describes human behavior in terms of Activity (Ergonicity, Tempo, Plasticity) and Emotionality. This scholar considers Activity broadly as an externally observable manifestation of brain activation, underlying dynamic features of human behavior. Plasticity characterizes the ease of the process of switching from one behavior program to another. Emotionality reflects the threshold of sensitivity to the discrepancy between the real result of an action and the "acceptor of the result of an action". As shown in numerous studies by V.M. Rusalov, these properties of temperament can manifest themselves in different ways in the psychomotor, intellectual or communicative spheres of activities (Rusalov, 2012). V.M. Rusalov and E.V. Volkova revealed that these formal-dynamic properties of individuality are associated with the manifestation of certain personality traits and cognitive styles (Rusalov & Volkova, 2015).

Despite the difference in the approaches of H. Eysenck and V.M. Rusalov to the understanding of temperament, the similarity is obvious if we based ourself on the ideas of I.P. Pavlov on the strength of the nervous system and the processes of inhibition.

Then theoretical analysis indicates that the two core personality characteristics can underlie the manifestation of a variety of individual differences. These properties of the nervous system are inherent in both humans and animals. However, it should be emphasized that the fundamental uniqueness of human mental processes consists in the verbal-meaningful control of behavior and activity. As N.I. Chuprikova showed in a series of experimental studies that an excitatory and inhibitory processes change under the influence of verbal instructions. For example, the activity of the nervous system to strong stimuli can decrease, while to weak stimuli can increase. Thanks to the word (concept), the outer world with a certain approximation is built into a person's inner world, connecting the past, the present and the future. The people continuously exchange the results of their mental activity with each other, accumulating the results of the reflective activity of the brain of other individuals. Therefore, human consciousness, without losing its individual form, also becomes a cultural-group phenomenon, objectifying itself in the language, objects of material and spiritual culture. Thus, perception, evaluation, understanding of life situations and the choice of behavior strategies are determined not only by the peculiarity of the human nervous system, but also by individual and social experience. Obviously, in addition to such generalized traits as integration (activity, in Rusalov's terms; strength of nervous system, in Pavlov's terms) and dysthymia (emotionality, in Rusalov's terms; the ratio of an excitatory and inhibitory processes, in Pavlov's terms), inherent in both humans and animals, there should also be specifically human generalized personality features, verbalized in value-meaningful attitudes to life.

From the evolutionary point of view, personality is as a microcosm which possesses the properties of all stages of the development of matter, from chemical to socio-historical ones. Each of these properties have both something typical for groups of people and something unique for each individual. Each level (biochemical, somatic, neurodynamic, psychodynamic, personal, socio-psychological, and socio-historical) is formed and functions according to its own laws. Flexible and changeable relationships between levels ensure adequate adaptation. We believe, that generalized personality features would determine the stability and relative constancy of behavioral manifestations. The objective of the present research is twofold: 1) to reveal the structure and types of generalized personality features, 2) to establish psychological profiles of types of individuals and their connections with life attitudes and behavior patterns.

2. Materials and Methods

2.1. Procedure and Participants

The focus was to cover the widest possible population of modern Russia. The study involved 2583 respondents (46% male and 54% female), aged 18 to 40 (M = 22.2, SD = 4.5) from different cities of Russia and of various specialties. As is known, the majority personality traits in this age range are relatively stable (Cobb-Clark & Schurer, 2012; Rantanen, Metsäpelto, Feldt, Pulkkinen, & Kokko, 2007; et al.).

The gathering of empirical data was organized in accordance with generally accepted ethical standards. Testing was anonymous. Volunteers filled out test books in a comfortable environment. The average test time was about 120 minutes. Researchers helped participants if the questions arose.

2.2. Measures

R. B. Cattell noted we should identify the human personality through multiple dimensions (Cattell, 1978). The diagnostic complex included internationally acknowledged and adapted on the Russian sample tools for assessing (a) personality traits, (b) attitudes to life, and (c) patterns of behavior and cognition. Most of the tools have a common theoretical basis (Rusalov special theory

of individuality), while the other tools have demonstrated their good agreement with this theory.

The diagnostic complex covered 81 Scales. Cronbach's Alpha varied from 0.58 to 0.92 for most of them. The Scales with lower Cronbach Alpha values were not used in data interpretation. The used shortened version Scales had significant correlations with their full-version Scales (Volkova, Rusalov, & Nilopets, 2017). Detailed descriptions of these Scales and ways of their measurement were presented in Data in Brief paper with the title "Dataset on the relationship among Personality Traits, Attitudes to Life and Behavior Patterns: Russian Sample" (Volkova, Kalugin, & Rusalov, 2022). Bellow, we give a short description of these Scales and examples of items.

(a) Personality traits:

Temperament Properties were measured with the shortened version of the Structure Temperament Questionnaire (STQ-Short) (Rusalov & Trofimova, 2007). STQ-S contains 26 items with maximum values (2 items in each scale):

(1) **Motor Ergonicity** – physical strength, muscle performance, the need for movement, the desire for physical labor.

- *I am capable of doing physical work for a long time without tiring*.

(2) **Intellectual Ergonicity** – intellectual capabilities, learning ability, the desire for intensive mental activity.

- *I do not get tired of prolonged mental work*.

(3) **Social Ergonicity** – need for communication, a wide range of contacts, craving for people, striving for leadership.

- *I talk easily in large social gatherings*.

(4) **Motor Plasticity** – flexibility when switching from one form of motor activity to another, high desire for a variety of ways of physical activity, smoothness of movements.

- *I successfully carry out tasks requiring subtle and fine movements*.

(5) **Intellectual Plasticity** – flexibility of thinking, easy transition from one form of thinking to another, the desire for various of forms of intellectual activity, a creative approach to solving problems.

- *I find it easy to switch from one mental operation to another*.

(6) **Social Plasticity** – easiness of entering into new social contacts, easiness of switching in the process of communication, a wide range of communicative programs.

- *It is easy for me to make new acquaintances*.

(7) **Motor Tempo** – rate of psychomotor behavior, speed in various types of motor activity.

- *I prefer to do my physical work at a fast pace*.

(8) **Intellectual Tempo** – speed of thought processes.

- *I am able to make intellectual decisions quickly in any situation*.

(9) **Social Tempo** – easiness and fluency of speech, speed of verbalization.

- *I like to speak quickly*.

(10) **Motor Emotionality** – sensitivity to the discrepancy between the expected and the real result of manual labor, a feeling of incompleteness of the product of physical work.

- *I worry if I can't master a handicraft*.

(11) **Intellectual Emotionality** – sensitivity to discrepancies between the expected and the actual results of mental work, anxiety about the work associated with mental tension.

- *When I start solving even a simple intellectual problem, I feel insecure*.

(12) **Social Emotionality** – sensitivity in case of communication failures, a feeling of anxiety in the process of social interaction; insecurity in communication situations.

- *I am very worried when I have to sort things out with my friends*.

The *Fundamental Personality Dimensions* were evaluated with Russian modified, validated, and shortened version of Eysenck PEN-questionnaire (Slobodskaya et al., 2006):

(13) **Extraversion/Introversion** (EXTR) – extraverts are sociable, joyful, and lively. They like being in big companies. They are the life of the party. On the other hand, Extraverts are often unreliable. They frequently change friends and sexual partners. They are bored with uninteresting and hard work. Introverts are opposite to extraverts (7 items).
- *I am a talkative person.*
(14) **Neuroticism/Emotional Stability** (NEUR) – neurotics are emotionally unstable. They have such traits as low self-esteem, depression, anxiety, and guilt feeling (7 items).
- *It is easy to offend me.*
(15) **Psychoticism/Soft-heartedness** (PSYCO) – psychotics have such behavioral attributes as aggressiveness, stubbornness, goal-directedness, manipulation, sensation seeking, dogmatism, and masculinity (7 items).
- *I respond to rudeness with the same.*

Character Traits were scored with shortened version of the questionnaire (Rusalov, 2012). This questionnaire contains 20 items with maximum values from the full-version questionnaire (2 items on each scale):
(16) **Hyperthymicity** characterizes optimistic, initiative, sociable person with a stable positive mood.
- *I charge people with optimism.*
(17) **Stuckness** describes a person with a high sensitivity to any criticism, is a vindictive and uncompromising individual.
- *I hardly forget minor grievances towards me.*
(18) **Emotivity** expresses a person with a high sense of compassion and sensitivity to other people.
- *Tragic films can move me to tears.*
(19) **Pedanticity** reflects such Character Trait as accuracy, conscientiousness, and punctuality in business and relationships.
- *I am striving to bring order always and everywhere.*
(20) **Anxiety** indicates anxiety, vulnerability and difficulty with decision-making in uncertain situations.
- *I am a scared person.*
(21) **Cyclothymicity** reflects sociability and intellectual activity during the period of mental elation, and isolation, passivity during the period of mood decline.
- *Sometimes, I have unreasonable mood swings.*
(22) **Demonstrativeness** characterizes people who strive to being in the spotlight, they are artistic and know how to get along with others.
- *I like to be constantly in the spotlight.*
(23) **Excitability** means stormy emotional reactions to minor events.
- *I am ready for striking a person when I am insulted.*
(24) **Dystimicity** describes a person who is focused on the dark and sad sides of his/her own life.
- *I can be sad for a long time.*
(25) **Exalitveness** characterizes a person with high emotional instability and violent reaction to various life situations, is sometimes delighted with joyful events and then falling again into sadness.
- *I am subject to frequent mood swings from happiness to deep sadness.*

Achievement Motivation, *Accessibility Motivation*, and *Value Motivation* were estimated with Motivation Questionnaire (Rusalov, 2012). The motivation questionnaire contains 48 items (24, 12, and 12 items in the Scales, respectively).
(26) **Achievement Motivation** characterizes the subjects who focus their activity on high performance.
- *I try to achieve excellence in my work.*
(27) **Value Motivation** reflects high social value of profession activity and its significance for my personal growth.
- *I have always dreamed of mastering my profession.*
(28) **Accessibility Motivation** describes personal assessment of accessibility of gaining future profession.
- *Mastering my future profession does not require much efforts.*

(29) **IQ level** was evaluated by speed and precision of solving simple logical problems (Rusalov, Volkova, 2021). The special study showed that there is significant correlation between this test (ELO-test) and the Raven's Standard Progressive Matrices (SPM). As well known, SPM is a well-validated test of fluid intelligence (gF) (Carpenter, Just, & Shell, 1990). The ELO-test has 24 statements. The respondents were offered to compare the ratio among the values (segments) of A, B, and C and to draw a conclusion from the analysis of this ratios. The test time is limited to four minutes.
- *If A is equal to B and B is equal to C then "C is equal to A".* This conclusion is true. And the conclusion "C is not equal to A" under the given conditions is false.

(b) Attitudes to life:

Meaning in Life was evaluated with the Russian modified, validated version of Purpose-in-Life Test (Crumbaugh & Maholick, 1969) by D.A. Leontiev (Leontiev, 2000):
(30) **Purpose in Life** means the existence of goals in my life that give my life meaning (6 items).
- "*My personal existence is utterly meaningless, without purpose" 3 2 1 0 1 2 3 "My personal existence is purposeful and meaningful".*
(31) **Life Process** means that the process of life itself is perceived as something interesting and filled with meaning (6 items).
- *"My life seems to me completely routine" 3 2 1 0 1 2 3 "My life seems to me always exciting".*
(32) **Life Performance** means how productive and meaningful my life is (5 items).
- *"In achieving life goals, I have made no progress what so ever" 3 2 1 0 1 2 3 "In achieving life goals, I have progressed to complete fulfilment of most of them".*
(33) **Locus of Control "Self"** means that I have a self-image of a strong and a free person capable of building his/her life in accordance with his/her goals (4 items).
- *"I am usually bored" 3 2 1 0 1 2 3 "I am usually enthusiastic".*
(34) **Locus of Control "Life"** means that I belief that I am a person who controls over his/her own life (6 items).
- *"If I could choose, I would prefer to have never been born" 3 2 1 0 1 2 3 "If I could choose, I would live my life again as I live now".*

Axiological Orientations were studied by the Axiological Orientation Survey (Kaptsov, 2011), namely, a person's orientations towards such values as Collectivity, Spiritual Satisfaction, Creativity, Life, Achievement, Tradition, Material Well-being, Individuality, Profession, Education, Family, Social Life, and Leisure:
(35) **Collectivity** describes significance of the surrounding people and society for an individual (5 items).
- *The communality of the team's goals I work is important for me.*
(36) **Spiritual Satisfaction** means significance of the satisfaction from activities (5 items).
- *It is important for me to get satisfaction from any activities.*
(37) **Creativity** reflets significance of novelty in activities (5 items).
- *It is important for me to create something new in my activities.*
(38) **Life** means the importance of the very process of life, the acceptance of both sorrows and joys of life (5 items).
- *Participation in any social events is significant for me.*
(39) **Achievement** indicates significance of the achieved results (5 items).
- *It is important for me to achieve the results I intended.*
(40) **Tradition** shows the importance of rules, customs, rituals for the person, everything that society has accumulated so far (5 items).
- *Compliance with the traditions adopted in our society is valuable for me.*
(41) **Material Well-being** means the value of material things for the person (5 items).
- *The high level of material well-being of my family is important for me.*

(42) **Individuality** describes the values of uniqueness of human life and the importance of the interests of each individuality (5 items).
- *It is important for me to maintain my individual style.*

Spiritual Personality Traits were estimated with the Spiritual Personality Inventory (Husain & Anas, 2017). The Inventory was validated for the Russian sample by G. V. Ozhiganova (2019). Spiritual Personality Inventory consisted of 28 items which measure Spiritual Virtues, Positive Outlook in Life, Spiritual Discipline, Goodness, Spiritual Services, and Moral Rectitude:
(43) **Spiritual Virtues** describe a person who is fulfilling promises, is trustworthy, kind, purity and clean, truthful, and has good etiquettes and manners (6 items).
- *I fulfil my promises.*
(44) **Positive Outlook on Life** characterizes spiritual power, satisfaction with life, feeling of compassion, sense of sacredness, and steadfastness (5 items).
- *I have spiritual strength.*
(45) **Spiritual Discipline** means self-control, firmness and patience; humbleness and calmness in the face of adversities (4 items).
- *I keep calm when facing adversities.*
(46) **Goodness** reflects a person who is doing deeds of righteousness, is recognizing good things, is adopting the path that is straight and is enjoying what is right (4 items).
- *I like what is fair.*
(47) **Spiritual Service** means a person who is caring, treating and helping those people who are in need (4 items).
- *I live not only for myself but also for others.*
(48) **Moral Rectitude** describes a person who is focusing on high moral guidelines, is showing condescension, sincerity, generosity and forgiveness (4 items).
- *I am capable of forgiving.*

(c) Patterns of behavior and cognition:

The *Cognitive Styles* were estimated with the Cognitive Personality Styles Questionnaire (CPS-Q) (Volkova & Rusalov, 2016). The questionnaire contains 60 items (5 items on each scale):
(49) **Dependence** (FD) expresses person's orientation to the external world when solving problems. The people of this type trust more in external impressions.
– *I easily agree with my friends' opinion.*
(50) **Field Independence** (FI) reflects individual's ability to rely on one's own knowledge and experience, ignoring the other people's opinion.
– *My own experience is more important for me than the opinion of my friends.*
(51) **Narrow Range of Equivalence** (NRE) characterizes an individual who orients him/herselves to the differences between objects of activity. These people are highly sensitive to details and nuances.
– *When retelling the content of a movie, I like to describe it in details.*
(52) **Wide Range of Equivalence** (WRE) reflects personal bent to find a general strategy, general evaluation of the objects of activity (black/white, good/bad), to classify objects based on certain generalized foundations.
– *I easily divide people into good and bad.*
(53) **Flexibility of Cognitive Control** (FCC) shows person's easiness of passing from some cognitive functions to others (from abstract-verbal to imaginary ones), which ensures a high degree of automation of analysis of the complex environmental influences.
– *I memorize equally well both pictures and texts.*
(54) **Rigidity of Cognitive Control** (RCC) characterizes a degree of individual's difficulty in changing the ways of information processing in situations of solving complex problems.
– *It is difficult for me to pass from an image to an abstract word and vice versa.*
(55) **Impulsivity** (IMP) points out a spontaneous and high tempo of decision making in complex and uncertain

situations and orientation to emotionally meaningful attributes. Such persons quickly put forward a great number of hypotheses in choice situations and, as a rule, commit many erroneous solutions.

– I often make many decisions at first impression.

(56) **Reflectivity** (REF) indicates a person with slow decision-making tempo, his/her individual's inclination to a careful systematic check-up of facts as well as the use of more elaborate and balanced solving problem strategies.

– I carefully check and recheck all the facts before making any decision.

(57) **Concrete Conceptualization** (CC) reflects a person's preference for clear-cut instructions when performing complex tasks.

– I prefer performing tasks which have clear-cut instructions.

(58) **Abstract Conceptualization** (AC) expresses an individual's tendency to cross the limits of the instruction. The persons of this type choose unusual ways of solving problems and easily establish various interrelationships between different objects of reality.

– I suggest many versions of solving problems in complex tasks.

(59) **Tolerance of Unrealistic Experience** (TUE) means the individual's inclination to be open to new information. The person evaluates the environment primarily according to its factual characteristics, even if these characteristics contradict or do not correspond to the earlier acquired notions.

– I do not object to listening to other people's ideas.

(60) **Intolerance of Unrealistic Experience** (IUE) expresses individual's tendency to perceive information primarily in terms of the expected and the usual. Such persons, as a rule, block the unexpected and controversial elements of information.

– People who think differently upset me.

Ways of Coping were estimated with Ways of Coping Questionnaire (WCQ) (Folkman & Lazarus, 1988), validated for the Russian population by T. L. Kryukova (Kryukova, 2010):

(61) **Seeking Social Support** means person's desire to share his/her concerns with others, and to get support, approval, and advice from others (5 items).

- I seek encouragement from others.

(62) **Focus on Solving Problems** describes a person who systematically thinks about the problem from different points of view (5 items).

- I use different ways of dealing with the problem.

(63) **Working Hard and Achieve** characterizes a person who is working hard and achieving high standard (5 items).

- I work hard and try to succeed.

(64) **Worry** reflects a person who worries about the future and about his/her personal happiness (5 items).

- I worry about what will happen to me.

(65) **Invest in Close Friends** means a person who is spending much time with close friends and in making new friends (5 items).

- I ring up a close friend every free time.

(66) **Seek to Belong** describes a person who is concerned with other people, thinks of them and does things to gain their approval (5 items).

- I try to make a good impression on others who matter to me.

(67) **Wishful Thinking** reflects a person who is hoping for the best, for the things that sort themselves out, for the miracles that will happen (5 items).

- I wish miracles would happen more often.

(68) **Not Coping** means a person who is not doing anything about the problem, who surrenders (5 items).

- I quit solving the challenge.

(69) **Tension Reduction** means a person who tries to feel better by "letting off steam", blaming others, crying, screaming, drinking alcohol, smoking cigarettes or drugs (5 items).

- I always find a way to let off my steam: to cry, to scream, and etc.

(70) **Social Action** characterizes a person who organizes group actions to deal with social concerns (4 items).
- *I organize actions and petitions regarding social problems.*
(71) **Ignore the Problem** reflects a person who consciously blocks out the problem, who pretends the problems does not exist (4 items).
- *I throw the problem out of my mind.*
(72) **Self-Blame** characterizes a person who is critical of him/herself, who regards him/herself responsible for the problem (4 items).
- *I often blame myself.*
(73) **Keep to Self** describes a person who is concerned with his/herself and avoids other people (4 items).
- *I keep my feelings to myself.*
(74) **Seek Spiritual Support** shows a person who prays for help and guidance reading the holy books (4 items).
- *I regularly read holy books.*
(75) **Focusing on the Positive** indicates a person who looks on the bright side of things (4 items).
- *I look on the bright side of things and think of all that is good.*
(76) **Seek Professional Help** characterizes a person who seeks professional helps from highly qualified experts (4 items).
- *I seek for professional help or counselling on my personal problems.*
(77) **Seek Relaxion Diversions** means a person who takes his/her mind off the problem by finding ways to relax such as reading books, watching TV, going out, and having a good time with other people (3 items).
- *I find a way to relax by listening to music, reading a book, playing a musical instrument, and watching TV.*
(78) **Physical Recreation** shows a person who plays sports and keeps his/herself fit (3 items).
- *I regularly go for a work-out at the gym.*

Hardiness was measured with the Russian version of the Hardiness Survey (Maddi & Khoshaba, 2001) in adaptation by D.A. Leontiev and E.I. Rasskazova (Leontiev & Rasskazova, 2006):
(79) **Commitment** means involvement in what is happening and allows the person to enjoy his/her own activities (18 items).
- *As rule, I am always involved in what is happening around.*
(80) **Control** describes a person who is independently chooses his/her own life paths (17 items).
- *I always control situations as much as it is necessary.*
(81) **Challenge** indicates a person who is convinced that everything that happens contributes to the development of his/her personality (10 items).
- *Any challenges give me interest in life.*

2.3. Statistical Methods

All the raw scales were converted to the S-scales based on the percentile standardization. The criteria for normality are extremely sensitive in case of large samples. Therefore, distribution normality assessment was based on Skewness and Kurtosis (George & Mallery, 2016). The groups of respondents with a similar psychological profile were identified on the basis of Hierarchical Cluster Analysis (HCA). As is known, a large set of variables in cluster analysis leads to a blurring of content and noise accumulation (James, et al., 2013). One of the requirements for cluster analysis is the independence of indicators, but the scales of the questionnaires are often intercorrelated. This problem was solved by preliminary Factor Analysis (Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization).

Descriptive Statistics (KMO = 0.937; Bartlett sphericity values = 110316.7; df = 3240; $p < 0.001$) showed that we have sufficient grounds for applying Principal Component Analysis (Tabachnick & Fidell, 2013). The number of components which reflected the generalized personality traits was determined according to the Cattell's scree test: the optimal number of components (factors) lies above the inflection point of the curve

where the graph turns into a straight line (Cattell & Vogelman, 1977; Cattell, 1978). Absolute loadings of 0.40 or stronger were taken as significant.

Hierarchical Cluster Analysis (Ward's method, Euclidean distances) was carried out on the reduced variables or the generalized personality traits. Then we revealed the number of clusters using the NbClust package which allowed us to determine the optimal number of clusters or the type of psychological profiles.

We used MANOVA and ANOVA to compare the psychological profiles of the clusters of people.

Significance of the generalized personality traits for differentiation of the clusters was evaluated by the Random Forest method. The entire sample was divided into training and test samples in the ratio 2 to 1. The test sample was used for cross-validation. The best model was used to assess the importance of predictors by the Mean Decrease Accuracy test.

The results are presented in the Supplementary materials (https://osf.io/7tdh6/).

3. Results

3.1. The results of the Principal Component Analysis

H1: Theoretically, we hypothesized that there are three Factors with common mental mechanisms of behavior regulation which are based on (a) activity (integration, in Eysenck's terms; strength of nervous system, in Pavlov's terms), (b) emotionality (dysthymia, in Eysenck's terms; the ratio of an excitatory and inhibitory processes, in Pavlov's terms), and (c) value-meaningful attitudes to life (verbal-meaningful control of behavior and activity). These hypotheses are based on the analysis of numerous empirical data reflected in psychological literature (Bould, Joinson, Sterne, & Araya, 2013; Eaves, Eysenck, & Martin, 1989; Eysenck, 1944; Eysenck, 1990; Parks-Leduc, Feldman, & Bardi, 2015; Rusalov & Trofimova, 2007; Rusalov, 2012; Vollrath & Torgersen, 2002; Walker, Ammaturo, & Wright, 2017; et al.).

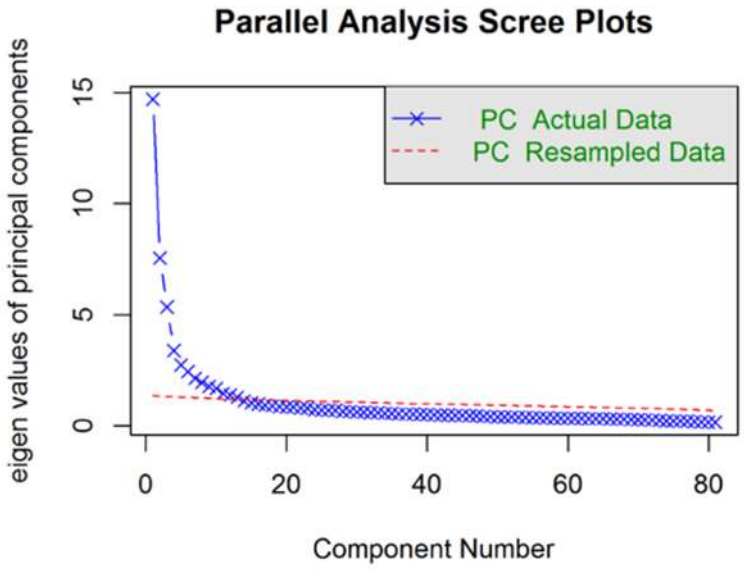


Figure 1. Scree plot with the results of parallel analysis

Principal Component Analysis allowed us to reduce 81 variables into three main components (Figure 1.), cumulatively explaining 34.04 % of the variance of the primary scales. Percentage of the explained variance for each factor was 13.38, 10.38, and 10.28, respectively.

The first significant factor covered:

- Values of Achievement (0.82), of Spiritual Satisfaction (0.82), of Life

(0.77), of Collectivity (0.73), of Individuality (0.70), of Creativity (0.65), of Material Well-being (0.65), and of Tradition (0.64);

- Focus on Solving Problems (0.63) and Working Hard and Achieve (0.62);
- Spiritual Virtues (0.63), Moral Rectitude (0.59), Spiritual Service (0.56), Positive Outlook on Life (0.55), and Goodness (0.50).
- Locus of Control "Self" (0.50), Purpose in Life (0.49), Locus of Control "Life" (0.48), Life Performance (0.47), and Life Process (0.46);
- Psychoticism (-0.44); negative value is interpreted as Soft-heartedness.

This factor united the indicators reflecting the value-meaningful attitude to life which pronounced in persons with Soft-heartedness. We called this factor Wisdom (W).

The second factor included one fundamental personality trait Neuroticism (0.72) and several temperament properties such as Emotionality in Social (0.55), Intellectual (0.44), and Motor (0.39) Spheres as well as other characteristics:

- Not Coping (0.61), Self-Blame (0.61), Wishful thinking (0.59), Tension Reduction (0.56), Worry (0.48), and Ignore the Problem (044);
- Cyclothymicity (0.61), Exalitveness (0.60), Dystimicity (0.51), Anxiety (0.49), Emotivity (0.48), and Stuckness (0.47);
- Field Dependence (0.40);
- Purpose in Life (-0.41), Locus of Control "Self" (-0.42), Locus of Control "Life" (-0.43), Life Process (-0.45), and Life Performance (-0.47);
- Challenge (-0.53), Commitment (-0.61), and Control (-0.64).

Apparently, the second factor covered different aspect of human Emotionality. We named this generalized factor as Emotionality (E).

The third factor contained the fundamental personality trait Extraversion (0.72) and several temperament properties such as Social Plasticity (0.61), Tempo (0.58), and Ergonicity (0.55); Intellectual Tempo (0.57) and Plasticity (0.43); Motor Tempo (0.55) and Ergonicity (0.42) and other characteristics:

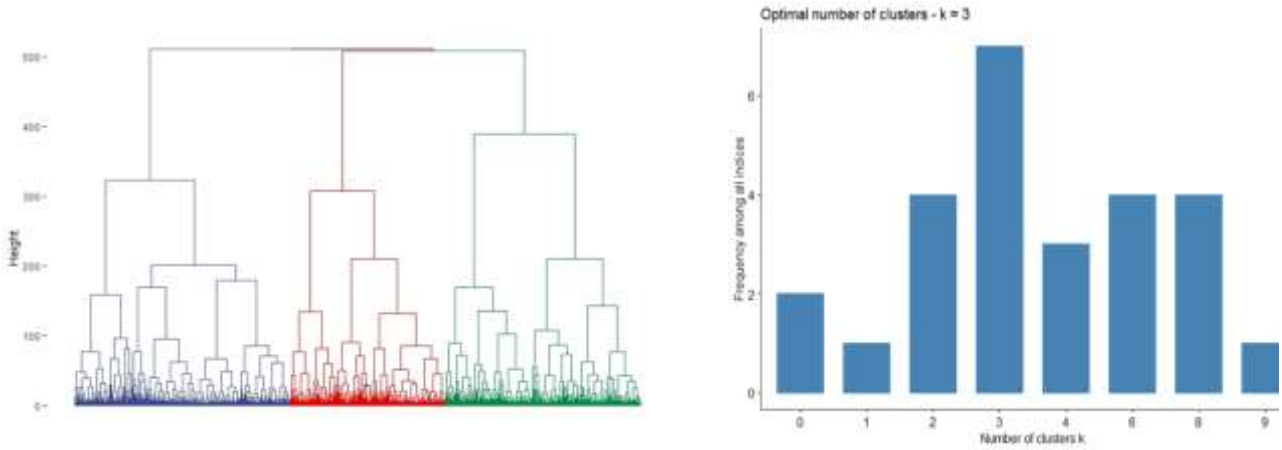
- Hyperthymicity (0.64) and Demonstrativeness (0.59);
- Achievement Motivation (0.54);
- Abstract Conceptualization (0.55), Flexibility of Cognitive Control (0.55), Impulsivity (0.51), Field independence (0.49), and Tolerance of Unrealistic Experience (0.46);
- Control (0.42) and Commitment (0.40).

Obviously, the third factor united the various attributes of human productive activity. We called this combination of variables as Activity (A).

Each respondent was assigned with individual normalized factor scores in accordance with these components (W, E, and A). The Skewness and Kurtosis of these new generalized variables had values close to zero (0.01 ÷ 0.26). Thus, hypothesis *H.1* that there are three Factors with common mental mechanisms of behavior regulation based on activity (A), emotionality (E), and value-meaningful attitudes to life (W) can be accepted.

3.2. The results of the Cluster analysis

In the next part of our investigation we used Cluster analysis. The suggested hypotheses (H2) was: the combination of the three variables (W, A, and E) can describe eight possible variations in psychological profiles of our respondents. But in reality, Hierarchical Cluster Analysis identified only three groups of respondents who differed in the manifestations of the above-described generalized variables: W, E, and A (Figure 2 a). The optimal number of clusters, according to 30 criteria, testified three clusters (Dendrogram, Figure 2 a; NbClust package for R, Figure 2 b).



(a) (b)

Figure 2. Results of the Hierarchical Cluster Analysis: (**a**) Dendrogram; (**b**) The optimal number of clusters.

The first cluster included 985 people (60.5% males), the second – 707 (43.7% males), the third – 891 (31.8% males). Thus, *H2* can be partially accepted.

3.3. The results of the Cluster analysis

The further analysis was to compare the identified types of respondent's psychological profiles. We assume that the used scales (Personality Traits, Attitudes to Life and Patterns of Behavior) are significantly different in the revealed groups of respondents (H3).

With this aim we used MANOVA. The results of multivariate one-way analysis of variance were statistically significant (Table 1). The first cluster includes people with pronounced psychotic features, high excitability and average values of activity and emotionality. The accessibility of professional activity is important for them. They possess by lower values of indicators of spirituality and value-meaning attitude to life. The findings suggest that these individuals in their behavior rely on "raw" estimation of people and events and, when faced with a difficult situation, they prefer to ignore the problem or address to social action. We conditionally called such a group of persons Psychoids.

The second cluster unites respondents with higher indicators of activity, higher value of extraversion, hyperthymicity, demonstrativeness, pedanticity and average indicators of temperament emotionality. They are characterized by higher achievement motivation value and the higher value of professional activity. The core of these individualities is spirituality and value-meaning attitudes to life. These individuals use the wide range of cognitive-style regulation in their behavior. They are field independent, tolerant of uncertainty, and open to new experiences. They have a high flexibility in cognitive control. They are able to act not only quickly, but also accurately, carefully checking the facts. They are able to both follow instructions when solving complex problems, and go beyond the instructions, suggesting unusual ways in solving problems. When faced with difficult situations, they implement a wide range of copings. Apparently, such personality traits and value-meaning attitudes to life provide a higher hardiness of individuals. We called the cluster of persons as Social Adaptoids.

The third cluster includes respondents with pronounced neurotic traits, higher emotionality and lower activity. They possess above average values of spirituality, value-meaningful attitudes to life and lower indicators of motivation. Cognitive-style regulation is not expressed in them. Their preferred coping is self-blame. Their low activity, pronounced emotionality and neurotic traits are associated with lower indicators

of hardiness. We conditionally called such group of persons as Neuroids. Thus, the hypotheses H3 can also accepted.

Table 1. The results of the multivariate ANOVA (Tukey's post hoc test).

Effect	Pillai's trace	approx. F	p	η^2
Intercept	1.00	10098.6	<0.001	1.00
Clusters	1.06	20.3	<0.001	0.53

Note. η^2 - partial eta-squared, degrees of freedom for effect = 208, degrees of freedom for residual = 3746.

3.4. The results of the assessment of the importance of variables as predictors of individuality typology

In the fourth part of our investigation, we try to revealed the importance of each variable under study as a predictor of individuality typology. We assumed that (H4) the initial non-aggregated personality scales (n=81) predict with sufficient accuracy the same cluster structure which was obtained on the basis of generalized variables (W, E, and A). If this hypothesis is confirmed, this will be additional evidence in favor of identical generalized personality variables. The respondents were divided into training and test samples. The most optimal hyperparameter settings for the Random Forest Model were determined on the training sample. The highest level of accuracy was obtained by "growing" 1300 decision trees and selecting a subset of predictors for each partition equal to 5. The quality of classification was checked on the test sample. Cohen's Kappa was 0.73 which indicates a good match (Lanz, 2019, p. 324). The accuracy of the classification was 0.82. A summary of Sensitivity, Specificity and Accuracy of predictions for different clusters are presented in Table 2. Thus, hypothesis H4 can be accepted. The importance of all predictors for distinguishing among three clusters of individuality are presented in Table S4.

Table 2. Characteristics of classification quality obtained on the test sample

	Cluster 1	Cluster 2	Cluster 3
Sensitivity	0.81	0.85	0.81
Specificity	0.92	0.93	0.88
Precision	0.87	0.81	0.77
Balanced accuracy	0.86	0.89	0.84

4. General Discussion

The main idea of the present research was to embrace the holistic nature of human being. It is obviously that solving this problem requires the development of fundamentally new approaches through the integration of different areas and traditions in research policy on personality and individual differences. To start implementing this idea, we used three data sets on one sample: (a) personality traits, (b) verbal-meaningful attitude to life, and (c) patterns of behavior and cognition. Such a wide range of descriptions of multi-level personality traits (81 scales) allowed researchers to come closer to finding the mechanisms underlying human individual differences. The hypotheses which were put forward at the beginning of our research found full or partial support. Principal Component Analysis revealed three generalized personality variables which we called Wisdom (W), Activity (A), and Emotionality (*H1*). Based on these generalized variables, we assumed the existence of eight different

personality profiles (types). However, the optimal number of clusters proved to be equal three (*H2*). The question of whether this is a manifestation of a general humankind pattern or is due to the specifics of the Russian sample requires further cross-cultural studies.

Indicators of Personality Traits, Attitudes to Life and Patterns of Behavior and cognition among revealed groups of respondents were significantly different (*H3*). The generalized variables of the psychological profiles of clusters are shown in Table 3 below. The results obtained testified that the basic fundamental patterns of human behavior are determined not only by the factors of the nervous system (A&E), and also by value-meaningful attitudes to life (W).

Table 3. Summary characteristics of psychological profiles (in ten-point S-scales)

	Wisdom (W)	**Emotionality (E)**	**Activity (A)**
Cluster 1 (N=985, 60.5% males)	3.76	5.52	5.99
Cluster 2 (N=707, 43.7% males)	7.13	5.21	7.11
Cluster 3 (N=891, 31.8% males)	6.13	5.71	3.68

The respondents of the first cluster were characterized by low values of Wisdom and average values of Activity and Emotionality (Psychoids). The respondents of the second cluster were distinguished by high values of Wisdom and Activity and average values of Emotionality (Social Adaptoids). The respondents of the third cluster had high values of Wisdom, above average values of the Emotionality and low values of Activity (Neuroids).

It should be noted that the clusters differ by sex composition: in the first cluster, which characterized psychopathic personalities, men were predominated (60.5%) whereas in the third cluster, which includes emotional and anxious people, the number of women were greater (68.2%). The second cluster contained about the same number men and women.

Three personality types were also identified in others study, for examples of the study by P. T. Costa, et al. (Costa, et al., 2002).

Assessment of the importance of predictors showed that not all indicators are equally responsible for distinguishing clusters. The biologically based properties (first of all, Extroversion, Tempo and social aspects of Plasticity and Ergonicity) as well as value orientations make the greatest contribution to the differentiation of clusters. Cognitive styles and Hardiness also play an important role. In general, clusters differ at all the level of personality traits, life attitudes and patterns of behavior and cognition.

We do not know yet what mechanisms underlie the formation of these personality profiles. We dare to assume that namely different quantitative combinations of Wisdom, Activity, and Emotionality determines the whole variety of human individual differences. But this issue requires further research.

It should be noted that our research has some limitations. In particular, the results obtained cannot be extrapolated to population beyond the 18-40 age range. The data were collected on the Russian sample, therefore, without additional research, we cannot maintain that the identified psychological profiles are present in other cultures.

Ethics Statement: The gathering of empirical data was organized in accordance with generally accepted ethical standards. Participants signed an informed consent form before the study.

CRediT author statement:

Volkova E.V.: Conceptualization, Methodology, Investigation, Data Collection, Validation, Resources,

Writing-Original Draft Preparation, Writing-Review & Editing, Supervision, Project Administration, and Funding Acquisition.

Kalugin A. Yu.: Conceptualization, Methodology, Investigation, Data Collection, Software, Formal Analysis, Validation, Writing-Original Draft Preparation, and Visualization.

Rusalov V.M. : Conceptualization, Methodology, Writing-Original Draft Preparation, and Writing-Review & Editing.

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Highlights:

- A wide range of descriptions of multilevel personality traits (81 scales) was presented.
- PCA revealed three generalized personality variables which was called Wisdom (W), Activity (A), and Emotionality (E).
- Three groups of respondents differing in the manifestations of W, E and A were identified: Psychoids, Social Adaptoids, and Neuroids.
- Psychoids characterize by low values of Wisdom and average values of Activity and Emotionality.
- Social Adaptoids are distinguished by high values of Wisdom and Activity and average values of Emotionality.
- Neuroids have high values of Wisdom, above average values of the Emotionality and low values of Activity.

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Cognitive Rigidity in Solving Mental Problems

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Abstract: This article presents the study results of cognitive rigidity as a mental model of personality which manifests itself in the influence of past experience on problems solving. The empirical study involved 138 volunteers, humanities and technical education programmes, different majors (nursery school teachers, teachers, speech therapists, accountants, customs officers, architects, builders). The results of the study when solving setting and critical tasks have revealed features reflecting the tendency to rigid action of respondents in both groups. Respondents of humanities education programme when solving setting tasks have shown a formation of cognitive rigidity (perseveration) that has not allowed to use more effective and adequate ways while solving critical tasks. Technical education programme respondents, on the contrary, have been notable for their abilities to critically rethink the use of habitual ways of action which resulted in finding alternative solutions to a number of critical tasks. Despite the identified differences, the examinees of both groups showed similar results in solving setting tasks. The fact of manifestation for thinking peculiarities in specialists with various profession orientation becomes evident.

Keywords: Cognitive Rigidity, Problem–solving Strategies, Mental Model, Perseveration, Attitude

1. Introduction

The relevance of the research is determined by the theoretical and practical need to study the nature of rigidity, the psychological characteristic of which synthesizes various cognitive, emotional, volitional and motivational mental processes as well as the personality. They are complex in structure and contribute to adaptation in an unstable environment associated with the transition "from life in a stationary society to life in a rapidly and irreversibly changing world" [37, p. 9], in the world ("digital society", "fluid modernity", "cognitive capitalism") the characteristic of which should integrate three components – emergence, complexity and flexibility – "into one whole, without losing the depth and plurality of their interpretations" [17, p. 31]. This, in turn, raises the question of "the reasons for the preservation and development of human productivity" which determines the need to mobilize mental resources [37, p. 15], the formation of which defines the ability of an individual to adapt flexibly to the requirements of the situation [12]. The inability of an individual to change their behavior, even if the situation demands it, is regarded as rigidity (Gorman; cited in Concise Encyclopedia of Psychology, 2006, p. 763).

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The attention of scientists from classical and modern scientific schools and directions is turned to the problem of rigidity. In the works of L.S. Vygotsky, K. Goldstein, K. Duncker, G.V. Zalevski, J. Kettel, R. Kettel, K. Levin, G. Maier, Z. Freud rigidity is represented as stiffness of thinking, intellectual stiffness, rigidity of cognitive schemes, stereotype, perceptual and functional fixation. G.V. Zalevski presents rigidity as perceptual, psychomotor, cognitive, affective and motivational one depending on the individual personality features [40, p. 55]. In German Psychological Dictionary F. Dorsch states motor, affective and cognitive rigidity (from German rigidität) [30, p. 668]. At the same time various researchers consider a similar set of types of rigidity and often modern psychological literature distinguishes and interprets cognitive, emotional (affective) and motivational types of rigidity. Thus, B. Meshcheryakov and V. Zinchenko cite cognitive, affective and motivational rigidity as the inability to adjust the activity programme in accordance with the requirements of the situation [31, p. 477].

Affective (rigidity of affect) rigidity is characterised by the manifestation of monotonous emotional responses to changing objects of emotion and is determined by the constancy of the events evaluation. Affective rigidity also has its parallels in the inflexibility of motivational needs and the habitual ways in which they are met. Motivational rigidity is evident in the "motivational failing" syndrome [41]. The inability to change perceptions of the environment, the lack of willingness to reflect and, therefore, to readjust actions when receiving new information is associated with cognitive rigidity. M.J. Zakreski defines cognitive rigidity as the difficulty in changing mental attitudes and describes it as a decrease in cognitive switchability, a desire for novelty [39, p. 208].

Cognitive rigidity in medicine and psychophysiology (G.V. Zalevski, E. Kretschmer, N.D. Levitov, K. Leongard, A.R. Luria, A. Maslow, V.S. Merlin, R. May, V. Reich, M. Rokeach, E. Fromm) is associated with a psychopathological state caused by a lack of mobility of mental processes. Thus, the rigidity of attention in A. R. Luria's research is defined by the ability of a person to change "the natural laws of the flow of the orienting reflex" by making "the state of activation more stable" which causes "persistent, long–lasting states of tense attention" [20, p. 219]. Memory rigidity is designated by the scientist as a process for the "consolidation" (imprinting) of its traces [20, p. 240]. Perceptual rigidity occurs in mild to moderate extent of Parkinson's disease (Zmigrod, 2019).

The concept of rigidity of thinking is dominant in psychology. M. Rokeach (1960) refers to rigidity and dogmatism in thinking as "a limited mind" [33]. According to E. Kretschmer, rigidity, as it manifests itself in thinking and acting, is a sign of schizotypal character [15] and, according to R. May, it is a marker of obsessive–compulsive neurosis [24]. In psychiatry it is a sign of visceral thinking in epilepsy characterised by a predominance of concrete ideas in problem solving, a lack in "comprehending the contingent nature of the task" [2, p. 46]. E.P. Ilyin characterizes it as the "ossification and even fixedness or stagnation of thinking". E.P. Ilyin characterises inertia, rigidity of thinking as consisting in the difficulty "to move quickly and easily from one class of phenomena to another, distant in content" [9, p. 164].

Contemporary medical, clinical, and physiological approaches present cognitive rigidity in terms of the transdiagnostic approach used in clinical psychology and cognitive therapy. Within this approach rigidity is understood as a mechanism present in all disorders (Harvey, Watkins, Mansell, Shafran, 2004). For example, thought rigidity in the form of fixation on the same thought (rumination) due to negative events and experiences acts as a transdiagnostic process underlying various forms of psychiatric pathology including anxiety

and depression. Rigidity based on psychological components, metacognitive, emotional, volitional, motivational processes and personality traits can be a risk factor for changes in mental (psychological) health (Rogers, 1951), psychological well–being (A.V. Voronina (2006), the emergence of emotional and cognitive problems (G.V. Zalevski) and as a consequence of the neuropsychiatric disorders (P.B. Gannushkin, G.V. Zalevski, K. Leongard, A. E. Lichko, R. May, W. Reich). According to K. Rogers, the result of the transformation of mental integrity and the mental health of the individual is the manifestation of rigidity in the assessment by the individual of themself, in the reassessment of the system of values, in the differentiation of meanings in their internal experience, in the verification and correction of "their hypotheses in real actions in the real world" [32, p. 25]. In this perspective, the emphasis is placed on rigidity as a transdiagnostic process that renders other processes pathological [25]. In general, the maximum representation of the subject expressions indicates the fundamental importance of this problem for the psychology of personality.

In psychological science cognitive rigidity is accompanied by a change in the "ability to adequately perceive an object in a changed situation" [31, p. 477] and is expressed in perceptual illusions (cognitive, temporal, optical, temporal) [41, pp. 23–25]. According to J. O'Connor and I. McDermott, illusions exist in thinking, in mental models through which a person perceives the surrounding reality. They consist of general ideas, beliefs that ideate a person's thoughts and actions, visions about desired outcomes and are a source of stability [28, pp. 80–83]. Along with this, scientists describe a number of cognitive mechanisms through which mental models are formed and maintained. The generalization mechanism manifests itself in the perception of an isolated incident in life experience as a typical phenomenon. The distortion mechanism results in exaggeration of some characteristics, features of phenomena and objects while downplaying the significance of others. The construction mechanism involves developing a rational explanation in a situation of ambiguity passing it off as reality. The mechanism of elimination ignores information that is inconsistent with current personal perceptions and opinions about what is happening.

V.M. Voskoboynikov considers rigidity of views and attitudes to be a counter–suggestive barrier to creativity [38]. Studying the mechanisms of formation and manifestation of creative thinking A.M. Isen, K.A. Daubman and G.P. Nowicki come to the conclusion about its connection with humour that causes positive emotions, reducing tension and, as a consequence, the manifestation of rigidity [10]. Understanding rigidity of thinking as stereotypical thinking, a set of habits to solve one–type tasks in a standard way A. Maslow singles it out as one of the barriers that block creative approach to problem solving [23].

From the above, it should be noted that the experimental study of cognitive rigidity is carried out in solving thinking tasks. In this aspect it represents the fixation of thinking on habitual ways that have been formed and are available from the past experience as well as the lack of ability to respond to a new situation in a more productive way (Scott, 1962). The concept of "functional fixity" was introduced by K. Duncker and is understood as the inability to solve problems in a non–standard way caused by previous experience [5, 6]. During the analysis of the problem–solving process there arise "functional solutions" which are subject to "fixing when handling the solution approach" along with "fixing the context" and "fixing the structure" "thereby eliminating the possibility for decision–making of other equally acceptable ranges and functional solutions" [6, p. 238–239]. The scientist concludes that inertia of thinking prevents or inhibits the manifestation of unusual/nonstandard ways in solving

thinking tasks using familiar objects [5]. According to W. James (1890), there is a blocking of other reactions formation as a result of the learned reaction excitation [11].

Functional fixation is a problem–oriented variant of the attitude (Einstellung from German), readiness that determines tendency and propensity [16] which is generated by the negative influence of long–term memory on the solution of cognitive tasks, thus preventing the discovery of a new, original solution [8, p. 362]. Attitude in a problem–solving situation, according to Luchins, appears in preference of the habitual way of action over a more effective one [18]. In the course of the experiment the scientist concluded that the respondents preferentially used the techniques practiced in previous trials along with accessible and more productive ways of solving problems to measure a certain amount of water using different in volume vessels. This experiment is called the Luchins' effect that consists in the tendency of "the brain to concentrate on the most familiar way of problem solving, stubbornly avoiding alternatives" [1, p. 32]. As noted by M. Bilalic and P. McLeod, "usually such a way is getting to be useful".

As a result of the induced interest in the Luchins' effect, a number of researchers have identified various artifacts that enhance or weaken the above–mentioned effect: motivational and stress ones (Cowen, 1952; Van De Geer, 1957), interactivity in physical space or manipulation, restructuring of physical space (Kirsh, 1995, 2006), cognitive distortion in which any information not fitting into a theory "that we have already latched on to is ignored or discarded" [1, p. 33]. Thus, the artifacts in solving thinking tasks are varied and modifiable. Sometimes they can be opportunistic or strategic in nature which in one way or another transforms the possibilities of problem solving.

In this study, one of the factors in solving tasks is the specifics of the cognitive processes that manifest themselves differently in specialists with different profession orientations (bionomic professions of "Man – Nature" type, technomic professions of "Man – Technics" type, signomic professions of "Man – Symbolic System" type and artnomic professions of "Man – Artistic Image" type) [14, p. 175– 196]. In particular, such cognitive processes as mechanical, motor memory, the ability to concentrate for a long time on abstract (sign) material and accuracy of perception ensure the efficiency of solving specific tasks with a clearly defined algorithm in the process of boring, monotonous and rigidly regulated "performing" work. On the one hand, in order to ensure effective participation in professional activities such qualities of a specialist as reactivity, adaptability and variability in response to the impact of external and internal environment factors are necessary. On the other hand, these qualities should be stable and sustainable [36, p. 266]. In general, cognitive rigidity can contribute to higher efficiency, effectiveness of a specialist. The above–mentioned provisions served as the basis for setting the goal of the research to identify cognitive rigidity of a personality.

2. Material and methods

2.1. Procedure and Participants.

Participants in the study were volunteers, first–year students (N = 138) of the full–time mode of study: humanities education programme from "Yanka Kupala State University of Grodno" (GrSU, Grodno) and the technical profile of the education from "Belarusian State University of Transport" (BelSUT, Gomel). The group of GrSU students (G1) consists of representatives of the humanities education profile (Pedagogical Faculty) and is represented by 75 students aged 17.40 ± 0.69 years, where 2.66% (2 people) are male and 97.33% (73 people) are female. The number of technical major students from BelSUT (G2) includes 63 students (17.85 ± 0.49 years), where 41.26 % (26 people) are male and 58.73 % (37 people) are

female (Faculty of Economics and Business Technology, Civil Construction Engineering, Construction and Military Transport Faculties). The participants individually performed the tasks provided without any time limits.

2.2. Measures

An empirical study of cognitive rigidity was carried out using Luchins' method "Investigating the influence of the past experience on the way of solving tasks" [3, 18, 19]. The participants were each presented with a Luchins' task form. Then an instruction was given with sequential problem solving and its fixation in the form of an arithmetic action where the participants had to make calculations visualizing vessels with a liquid in mind. For example, three empty vessels with the volume of 37l, 21l and 3l should be used in order to measure 10l using an unlimited number of times only fully filled vessels. There was no time limit for the tasks. In processing, the number (%) of perseverative (not rationally solved tasks) responses and unsolved tasks were counted bearing in mind that perseveration is associated with high levels of cognitive rigidity including tendencies to insist on certain behavior that was the norm in the past and when this behaviour is no longer acceptable under new circumstances. As may be supposed, the rational problem solving for tasks 1–5 includes three steps (A – B – C – C), and the next 5 tasks are even fewer (B – C – C; B – C; B + C) or require no calculation at all.

2.3. Statistical Methods

Qualitative and quantitative analyses of the results were conducted during the study. Fisher's angular transformation test (φ*) was used as a criterion to assess the significance of differences between the two samples. In order to verify the hypothesis of the existence of differences in the formation of rigid action when solving problems by students of the humanities and technical profiles the method of differences significance (Student's t–test) presented in Statistica 6.0 package of statistical programs was used.

3. Results

When presented with a set series of five problems solution of which included only one rational (A – B – C – C) method, 60% (45 people) of the pedagogical profile G1 and 66.70% (42 people) of the technical profile G2 solved the problems in a rational way but making some mistakes in the form of calculations in a non–rational way, committing from 5 to 0 errors ($\varphi^*_{emp.} = 0.81$; $p \leq 0.05$). The results are shown in Figure 1.

There followed the analysis of the results obtained in solving subsequent critical 5 problems which had two options of calculation, i.e., application of the strategy of problem solution by the previous method or by a new one. It has been found that the majority of respondents in G1 group 38.70% (29 people) made calculations using the developed method in the process of solving setting tasks making from 2 to 4 mistakes. However, in G2 group respondents of technical profile this number of mistakes was made by 23.80% or 15 respondents while solving problems by using the "old" method. On the whole, it can be stated that the Luchins' effect is not characteristic of all examinees but only for the respondents of humanities profile, and on the contrary, its expression is rather atypical for the technical profile examinees ($\varphi^*_{emp.} = 1,89$; $p \leq 0,05$).

For 9.50% (6 respondents) students of technical profile and 2,70% (2 respondents) of humanities profile 0–1 task from 10 tasks were solved in a non–rational way. This indicates that technical profile students tend to solve problems more rationally ($\varphi^*_{emp.} = 1.78$; $p \leq 0.05$) under the influence of the past experience.

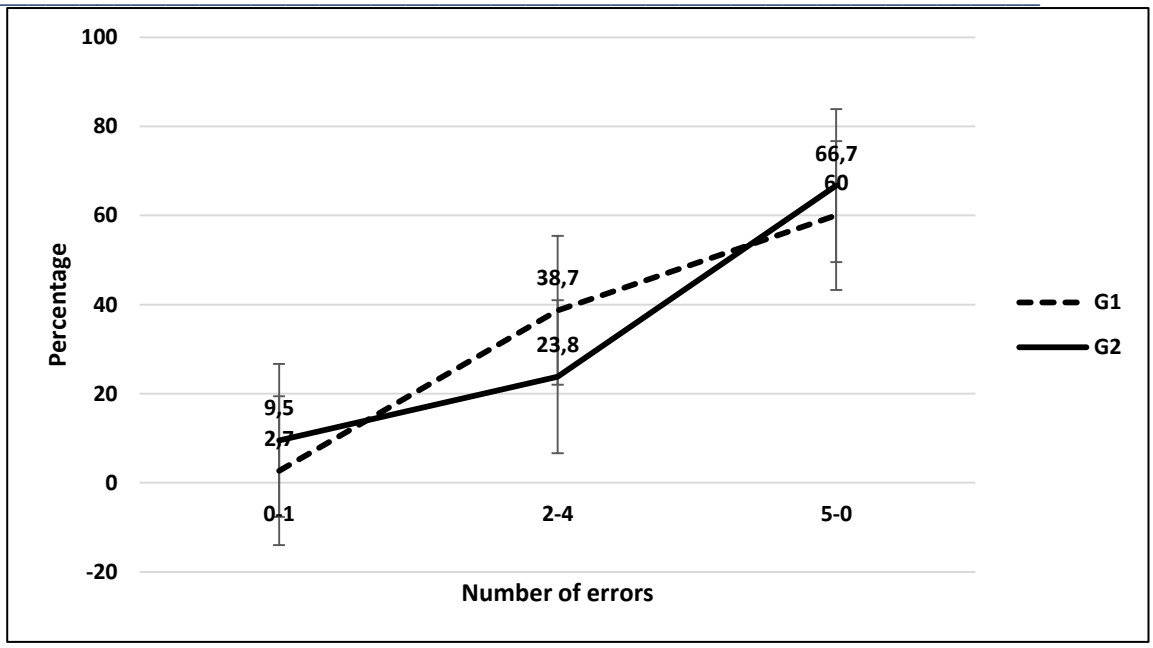

Figure 1. Number of errors (%) in solving tasks of G1 and G2 groups.

The differences between the obtained results of perseverative (not rationally solved problems) solutions in the respondents of G1 and G2 groups reach statistical significance (according to Student's t–test at $p < 0{,}0001$). In general, the tendency to rigidity in solving problems is a characteristic feature for the students of the humanities profile rather than technical one.

4. Discussion and conclusion

Cognitive rigidity, according to R. Francis, D. Hawes, M. Abbott [7], does not allow a person to consider, generate alternative possibilities, explanations of events or situations that makes it difficult to find an optimal solution to problems. This phenomenon is documented in A. Luchins' famous experiment [18, 19] with water transfusion that clearly demonstrates the tendency of an individual to use a familiar solution method and ignore a more effective one. Analysis of the results of a study of personality cognitive rigidity using A. Luchins' "Investigating the influence of the past experience on the way of solving tasks" methodology showed ambiguous results.

During the study the participants of G1 and G2 groups have shown the same results when solving setting tasks, which, on the one hand, confirms the already available data from experimental studies of setting (Bilalic, McLeod, 2014; Luchins, 1942; Uznadze, 2001). On the other hand, it points to certain regularities related to adaptive abilities manifested in the search activity for a certain algorithm of problem solving by adolescent respondents regardless gender, age and education profile (either humanities or technical) as well as their belonging to the same social which is equally important for general psychology. According to K.W. Schaie, cognitive rigidity represents the ability to adapt to new conditions, environments and situations [34, p. 604–610], in connection with which it eventually develops the concept of "attitudinal flexibility" [35] which is a polar opposite of rigidity.

However, already when presented with a series of critical tasks, humanities and technical profile test takers showed differences in problems solving. Thus, respondents of G1 (humanities profile) group continued to use the developed strategy of problems solving in the previous series that indicates the

formation of perseverative behaviour and inclination to rigid behaviour. When solving problems in life situations, the participants of the humanities education profile are characterized by the use of habitual ways of thinking and strategies of overcoming the problem. Though, J. Piaget states that reliance on previous experience when solving tasks without a detailed, critical analysis of the current situation [29, p. 19] indicates that a personality uses "centered" cognitive strategies (syncretism, transduction, insensitivity to contradiction). At the same time, N. Maier proves the positive effect of previous experience in using a non–standard way of solving problems [21, p. 245–300; 22, p. 144–155]. According to D. Norman, the conceptual model underlying the subject can be used "to predict the result of action on it" [26, p. 286]. Along with this, the use of the already existing problem–solving strategy by a person allows them to reduce the situation of uncertainty in order to avoid information overload which leads to dispositional motivation on the cognitive structuring of the surrounding reality by simple, unambiguous ways, i.e. to "the personal need for structure" [27, p. 113–131].

The respondents of the technical education profile, on the contrary, are characterized by the development of new strategies for problems solving that indicates that past experience does not have a predetermining influence on the way of problems solving. The results obtained correlate with psychological requirements with different professional orientations (bionomic professions of "Man – Nature" type, technomic professions of "Man – Technics" type, signomic professions of "Man – Symbolic System" type and artnomic professions of "Man – Artistic Image" type) by E.A. Klimov [14, p. 175–196]: good operative and mechanical memory; ability to a long–time concentration on abstract (sign) materials; good distribution and switching of attention; accuracy of perception; diligence, patience; logical thinking, developed visual perception, observation, visual memory and visually imaginative thinking.

Thus, based on the data obtained, it can be stated that the manifestation of cognitive rigidity of the student's personality observed when solving different types of tasks is due to the specifics of cognitive processes which manifest themselves differently in future specialists with different educational profiles.

Students of humanities education programme tend to develop a perseverative, rigid mode of action. To solve problems, they use the solution that has been accumulated through previous experience, thus disregarding simpler, alternative ways of performing tasks. Students of technical education programme are inclined to think critically about the existing way of action which gives them the opportunity to change once chosen strategy of problems solving.

Highlight:

- Humanities and technical profiles students use similar mental operations for solving setting tasks.
- Humanities profile students apply framed methods of mental operations in solving critical tasks.
- Cognitive rigidity in solving mental tasks is caused by the past experience influence.
- Technical profile students are capable of critical reframing the habit methods for solving critical tasks.
- Pros and cons of cognitive rigidity define the further decision contents and modes of action development for students with various profession orientation.

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Filimonchyk V. M.: data collection, writing – reviewing and editing.

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BRIEF REPORT

Web Version of the "Great Chemist" Technology

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Abstract: The test shell "Great Chemist" is designed to carry out an actions' set for testing subjects using various test methods. The application areas of the shell are professional and psychological assessments of the personality, pedagogical and psychological testing, examination and monitoring in the education system and chemistry thinking development.

Web version of the test shell is currently being developed. This publication provides a brief report on the development process, including an indication of the technologies stack used, a results description of the web application information architecture design processes and the main design decisions for its software implementation.

Keywords: Chemical Intelligence, Chemistry Thinking Development, Architecture of a Web Application

1. Introduction

The Great Chemist technology was developed by the team of authors E. V. Volkova and A. A. Raskovalov [1]. This technology is a laureate of the IVth Congress of the Russian Psychological Society competition in the nomination "Innovative psychological technologies in the new century" (September 2007), awarded with a quality certificate No. 20070005, issued on the basis of the decision of the expert council for the certification of psychological technologies Russian Psychological Society (RPS) No 125 dated September 12, 2007. The computer program "Great Chemist" has a Certificate of official registration No. 2006614415 dated December 28, 2006.

The Great Chemist technology is designed to diagnose and develop of chemical intelligence. The main area of this technology is a professional psychological assessment of a person (assessment of chemical intelligence). Based on the test results, it is possible to determine the quality of knowledge of the basic topics of chemistry in a person, the zone of actual and zone of proximal development of his/her chemical intelligence, the core of which is chemical thinking; to evaluate the effectiveness of the development potential of innovative programs in chemistry [2, 3]. Neurophysiological studies show that the Great Chemist technology improves the neuroefficiency of cognitive activity in solving various chemistry problems, which leads to a decrease in school overload [4].

However, the software of the test method has been local to date, making it difficult to distribute to other computers and making it difficult to collect general statistics. In this regard, it was problematic to conduct testing of students in a remote format and it was impossible to automate the process of collecting statistics on testing for each student. A new task was set to develop a test shell web application for the Internet. To do

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this, it was necessary to develop a technological platform for the website and implement the functions of authorization, testing and data collection on it according to the algorithm of the existing desktop version of the "Great Chemist" software.

Designing the information architecture of a web application

The main page of the web application consists of the following functional sections: registration of a new user, login of an authorized user, reference information about the site.

The client-server technology was chosen to implement the multi-user access mode. Differentiation of access rights is implemented at the server level for the following roles of the client level: student, teacher, manager. A user with the "student" role, when logging into the system, has access to the following functional sections: a section for taking tests, a section for viewing test results, and an information page about the site.

A user with the "teacher" role, when logging into the system, has access to functional sections: a section for taking a test, a section for viewing the results of their own testing, a section for viewing test results for each student in a group, a section for viewing / adding / deleting their own groups, reference information about the site.

A user with the "manager" role, when logging into the system, has access to functional sections: the section for passing the test, the section for viewing test results, the section for administering the accounts of all registered users, and reference information about the site. When administering user accounts, the manager can delete and edit them, including assigning the role of teacher to the necessary users.

A typical approach with a login (e-mail address) and a password is adopted as a data for authorization.

As registration meaningful information, a user indicates the full name, date of birth, information about the predominant hand, belonging to the training group or class.

The beginning of each block of tasks in the testing mode is accompanied by instructions on the actions required from the test subject. A typical dialogue with the application while answering a task in particular is to choose one of the proposed options. Then the application immediately displays the next task without pause.

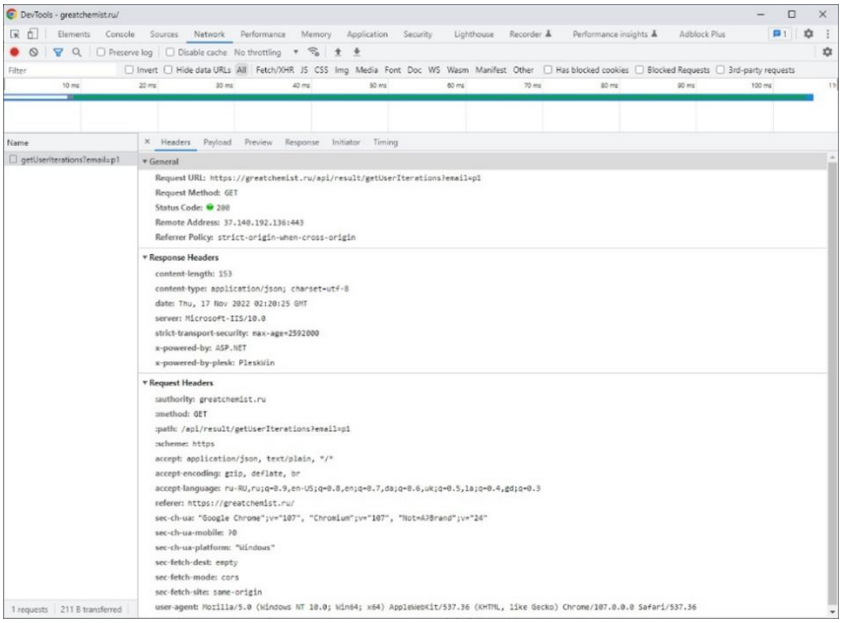

Figure 1. Get-request received from the server.

Design solutions for the software implementation of a web application

The following technologies were used to implement the client side: HTML, CSS, JavaScript, Vue.js. These technologies were used to implement the server part: ASP.NET Core, Transact-SQL.

The whole mechanism of the web application is based on the style of interaction between the components of a distributed application in the REST network, for the information secure exchange over the Internet.

The server is contacted at a certain address, indicating the controller, method (Figure 1), as well as the necessary additional parameters each time, when any action on the site are been performed.

The client part of the developed application consists of the following components:

- datePicker.vue – Picker by dates;
- groupUsers.vue – displaying a list of students by group;
- result.vue – test results;
- snackbar.vue – system notification;
- studentResult.vue – format for outputting results in the interface;
- taskType1.vue – the first type of tasks;
- taskType2.vue – the second type of tasks;
- taskType3.vue – the third type of tasks;
- taskType4.vue – the fourth type of tasks;
- taskType5.vue – the fifth type of tasks;
- taskType6.vue is the sixth task type.

The above components are linked to the following pages:

- About.vue – information page about the site;
- Admin.vue – administration page;
- Groups.Vue – page for adding/deleting a group from a teacher;
- Home.vue – main page;
- results.vue – page with the output of the results;
- SignIn.vue – authorization page; SignUp.vue – registration page; TeacherGroups.vue – page with student results;
- Test.vue – test page.
- Information on the client is queried from the database using the following controllers:
- GroupController.cs – work with groups;
- ResultController.cs – work with test results;
- TestController.cs is the operation of the testing system;
- UserController.cs – work with users.

According to the testing algorithm, it is necessary to count the time spent by the student to complete each task. In addition, some tasks have a time limit for solving. Therefore, a special algorithm was implemented, that starts the timer immediately after the start of testing, to calculate the time (Figure 2). A timer is displayed on the screen in tasks where there are time limits so that the tested person can see the remaining amount of time. The time is calculated by the timer without displaying it in other types of tasks. If the student did not send his answer after the specified time, then the content of the input fields is sent to the server automatically and the transition to the next task occurs. Time is recorded in the system in milliseconds, with automatic conversion to seconds and minutes.

3. Results

Currently, the administration and testing mode of the test shell "Great Chemist" is fully implemented in the web system [5, 6]. The developed design and technological solutions for the implementation of a network inter-level client-server interaction in the form of packages made it possible to minimize the influence of external factors related to the client network bandwidth. The work on the selection and configuration of the hosting platform has been completed, the site has been launched in trial operation mode.

Author contributions. All persons entitled to authorship are listed. The contribution of both authors is roughly equal. The authors approved the final

version and bear responsibility for all aspects of the work.

Competing interests. None.

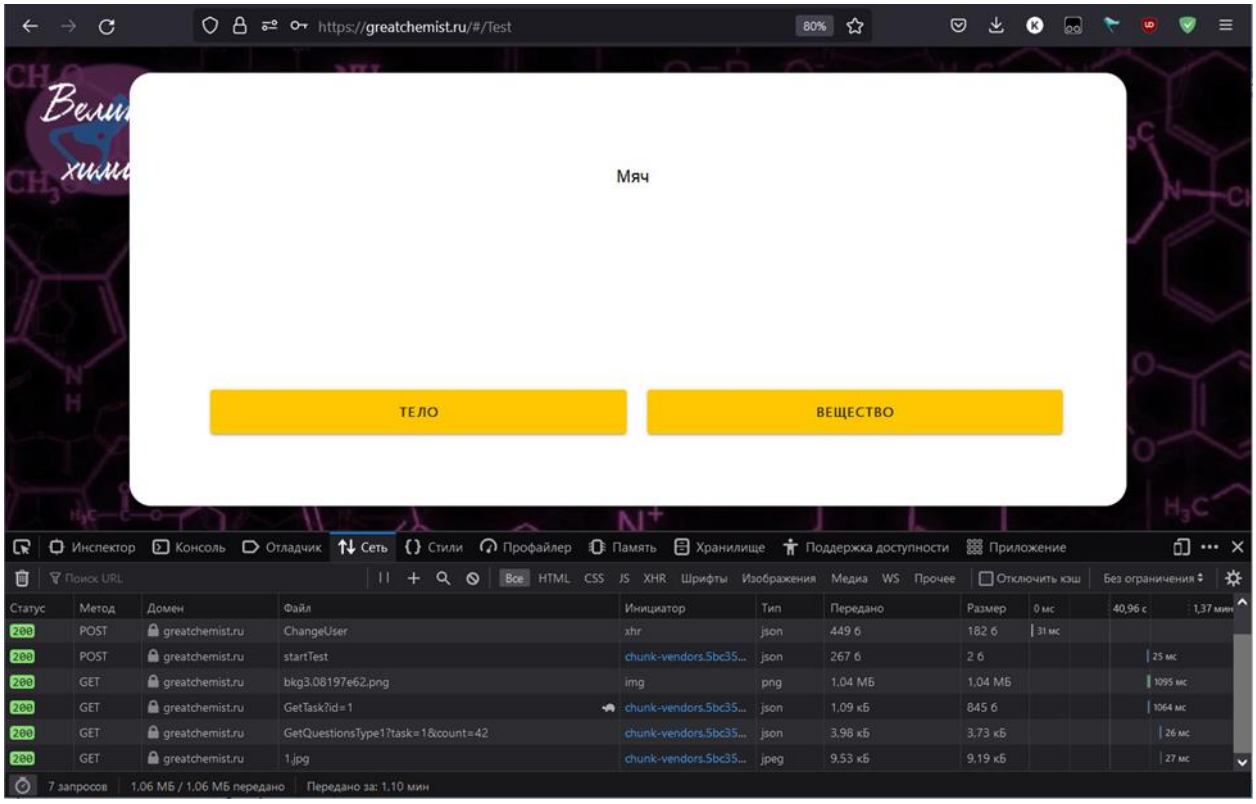

Figure 2. The process of debugging a web application in a browser.

Highlight

- The administration and testing mode of the test shell “Great Chemist” is fully implemented in the web system.
- The developed design and technological solutions for the implementation of a network inter-level client-server interaction in the form of packages made it possible to minimize the influence of external factors related to the client network bandwidth.

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BOOK REVIEW

Shadrikov V.D. (2021). The return of the soul: Theoretical foundations and methodology of psychological science. M.: Publishing House "Institute of Psychology of the Russian Academy of Sciences"

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Abstract: The monograph "The Return of the Soul: Theoretical Foundations and Methodology of Psychology" return psychological science to a paradigm under the name of the mentalism, in which the subject matter of psychology is defined in terms of the patterns of organization of the human mental world. In the mentalistic paradigm intelligence acts as a system that provides the construction of mental representations of what is happening based on the processing of information coming as from the side of the external environment, and from the side of individual mental experience (accordingly, the unit of analysis is object-related thoughts as a special kind of mental structures). V.D. Shadrikov suggests a way to implement this new paradigm to understand the nature of the soul. The author illustrates his theoretical positions with empirical results using the author's methods.
Keywords: Subject Matter of Psychology, Mentalism, Soul.

1. Introduction

The monograph "The Return of the Soul: Theoretical Foundations and Methodology of Psychology" occupies a special place among the numerous publications of V.D. Shadrikov, since an attempt to generalize knowledge about the nature of the mind is made in this work. The book discusses the methodological and theoretical foundations of a new definition of the subject matter of psychology. The idea of thought as the main category of the inner life of a person and the belief in the need to return the concept of "soul" to the system of scientific categories of psychology is the basis of the proposed approach.

Paradoxically, although the word "psychology" in ancient Greek literally means "the science of the soul" (psyche – "soul", logos – "teaching"), nevertheless, psychologists, regardless of their affiliations, defiantly left from the soul as a subject of study. V.D. Shadrikov does not merely state that the soul should become the subject of scientific psychology. He suggests a way to implement this new paradigm, namely, to understand the nature of the soul, it is necessary to study the inner world of a person, the unit of analysis of which is thought. The study of the patterns of generation of thoughts and their functioning is, in his opinion, a real tool for studying such a complex mental phenomenon as the soul.

Thought operates as the main category that characterizes the content of a person's inner life. V.D. Shadrikov identifies the following distinctive characteristics of thought:

1. Thought expresses the unity of the image and attributes of an object.

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2. Thought is an ideal construct.

3. Thought always has a subjective character. The process of subjectivation of thought proceeds along three lines: (1) the need of the thinking subject is objectified in thought; (2) thought forms the moral position of the subject; (3) a socio-cultural transformation of thoughts takes place.

4. The structure of thought includes three components such as content, need, and experience. It is in the unity of these three components that makes the thought to appear as a living knowledge.

5. Thought is born from the desires and experiences of a person. Consequently, each thought contains not only the qualities of the objects of the external world, but also the qualities of the person, therefore each thought is personal thought.

Accordingly, new definitions of thinking and intelligence are offered.

Thinking is a qualitatively specific psychological process, the essence of which lies in the generation of thoughts and in working with thoughts using a system of intellectual operations aimed at solving a problem by revealing objective properties, connections and relationships. The most important characteristic of thinking is object-relatedness. Intelligence is the ability to generate thoughts and establish relationships between the images of perceived objects (phenomena, events) and their attributes. The author identifies a common basis for object-related thought, the inner world and the soul of a person: both thoughts, and the inner world, and the soul are a need-emotional-content entity. When analyzing the world of the inner life and soul of a person, according to Shadrikov, several factors come to the fore.

Firstly, the role of past individual experience is emphasized, during the formation of which both its enrichment and its individualization (in the form of individual preferences) take place, up to the development of one's own lifestyle. Accordingly, the complexity of the inner world and the unpredictability of its manifestations increase: a mild person, outwardly timid and dim, performs a heroic act, and a nice person turns out to be a scoundrel, etc.

Secondly, it is noted the special role of understanding in realizing the content of the mind. Understanding is realized in three ways: (1) understanding is implemented through the establishment of personal meaning, (2) understanding is carried out through the disclosure of functional significance, and (3) understanding is performed through the establishment of logical connections with previous experience.

Thirdly, the mind presented as a totality of objective thoughts, manifests itself in communication and activity primarily through cognitive, motivational, and emotional abilities. Personal qualities begin to be part of abilities, and abilities penetrate into the composition of personal qualities. The intellectual qualities of a person such as far-sighted, inventive, curious, wise, gifted, sensible, and others develop on the basis of abilities. Thus, personality traits and abilities determine each other and develop in a single process of genesis of individuality as a system. In other words, abilities are part of the content of the human soul.

It should be emphasized that the author illustrates his theoretical positions with empirical results using the author's methods.

Empirical research 1. Individual differences in thought generation.

The task of the study is to investigate the process of generating thoughts that arise in the person when perceiving a particular object. In order for the process of generating thoughts to have a detailed character, it is necessary that the object of perception is not familiar to the respondents and that it is possible to freely manipulate the object, revealing its potential features (feel, shake, examine from different angles, etc.). A souvenir of an oil corporation was used as a stimulus-object, which by function is a timer that measures a strictly defined period of time of one of the phases of oil distillation

equal to 27.3 seconds. The object has a cylindrical shape 12 cm high and 5 cm in diameter, inside the cylinder there is a spiral, along which, when turned from top to bottom, black liquid flows down, and air rises from the bottom upwards along the spiral, compensating for the changed pressure in the middle of the vessel.

According to the instructions, the respondent is to describe this object as completely and accurately as possible, highlighting all of its signs (properties) that he/she can detect. During the experiment, any manipulations with the object can be carried out. Respondent has 15 minutes to complete the task.

Main results:

1. The generation of thoughts decreases over time from 5.6 attributes to 0.05.

2. First of all, the respondents identify the attributes of the shape and size of the object, then the signs associated with less common categories (temperature, stability, smoothness, etc.), the signs that begin with the words “similar to ...” have the least frequency.

3. Those respondents who made a guess about the functional purpose of the object identified more thought-related attributes than those who did not make such guesses.

Empirical study 2. Productivity of thought generation in individuals with different levels of intelligence.

Method "Working with thoughts". As a stimulus object, we used a CD, known as an optical information carrier, in the form of a flat plastic circle with a hole in the center, designed for recording and reading information using a special device.

According to the instructions, it was necessary to describe this object as fully and accurately as possible, highlighting all its features that the respondent could detect. They were allowed to carry out any manipulations with the disk. Execution time is 20 minutes. R. Cattell's "Culture-Independent Intelligence Test" was used to assess the level of intelligence.

Main results:

1. Respondents identify the following types of features: (1) attributive (flat, two-sided), (2) functional (storage, read, reproduce), (3) subjective (dull).

2. The higher is the IQ score of the respondents, the longer they retain the ability to produce thinking associations.

3. Respondents with a high level of IQ reproduce attributive and subjective features when describing an object; respondents with lower IQ level more often identify subjective and functional features.

4. Mental activity is accompanied by the emergence of specific experiences which lead to an increase in the energy component (gaiety, optimism, ardor).

So, what, in our view, is the significance of the monograph by V.D. Shadrikov?

Firstly, Shadrikov's research return psychological science to a paradigm under the name of the mentalism, in which the subject matter of psychology is defined in terms of the patterns of organization of the human mental world. One of the basic directions within the framework of mentalism is the study of the structure and laws of the functioning of the human mind, including intelligence. If in the cognitivist paradigm intelligence is considered as a system that receives and processes information coming from outside (respectively, the unit of analysis is “elementary information processes”), then in the mentalistic paradigm intelligence acts as a system that provides the construction of mental representations of what is happening based on the processing of information coming as from the side of the external environment, and from the side of individual mental experience (accordingly, the unit of analysis is object-related thoughts as a special kind of mental structures).

Secondly, the content of mental activity comes to the fore, which has an individualized character (according to Shadrikov, substantive thought as a mental structure is a deeply personal formation). This leads to an important conclusion about the complicated

relationship between mental experience and behavior. The same mental structure can be associated with different behavioral responses, while the same behavioral response can be associated with different mental structures.

Thirdly, we get an affirmative answer to the question of whether an objective analysis of the nature of the mind is possible through subjective phenomenology, in particular, through the self-reports of the person. Indeed, the person himself is a very accurate source of information regarding mental events, and, therefore, the elements of content reported by the person can be regarded as valid indicators of the features of the organization of his/her inner world.

Fourthly, the problem of developing new research methods is posed - explicative methods that make it possible to unfold (literally "pull out from inside out") the real nature of a mental phenomenon through a certain variety of its manifestations (one of such methodological procedures is the "Working with Thoughts" technique).It is not surprising (and quite right, from our point of view) that the author considersthe theoretical statements and empirical data presented in his monograph as a great contribution to the study of the subject matter of psychology.

Highlights:

- Scientific publications in Russia comply with advanced international standards.
- The Russian bibliometric database has a hierarchical structure. The RSCI core is included in Web of Science.
- Russian psychologists have published more than 4,500 articles over the past five years.

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MEETING ABSTRACT

Psychology of Discourse: New Trends and Achievements

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Abstract: The topic "Psychology of discourse: new trends and achievements" was discussed at the meeting of the scientific seminar "The achievement of world psychological science in 2020-2022", held in IP RAS on May 16, 2022. Current trends and directions of research were considered, from which the main attention was paid to promising developments in the field of communicative impact and new methods of studying of the social networks content.
Keywords: Psychology of Discourse, New Trends.

1. Introduction

At the beginning of the meeting N.D. Pavlova, Doctor of Psychological Sciences, Head of Laboratory of Psychology of Speech and Psycholinguistics IP RAS delivered her presentation. In her message, "Discourse of the Information Society: Trends and Prospects for Research", she dwelled on the research facilities, which developed in the trend of the discursive approach and largely determined the current innovations. The traditions of interdisciplinary interaction of psychologists, linguists, sociologists, philosophers, fruitful connection of artificial intelligence approaches to this complex were noted. The growing attention of researchers to the diversity of social contexts and communicative situations, the psychological characteristics of the subjects of communication was emphasized, which prepared the ground for studying the types of discourse, those are spreading in connection with the new information technologies. As an important trend associated with the requests of practice an appeal to the nonverbal components of the discourse, the shades of meaning that refers to the elements of the social and cultural context was analyzed. Among the current trends the growing interest in speech intentionality, reflecting the significance of the inclusion in the online communication of millions of people with their goals, desires, and needs was specified. At the same time, new opportunities for communication and joint activity of people have focused the attention of researchers on the ability of discourse to adapt to the requirements of the situation, various communication strategies and tactics.

Speaking about the current stage of development of research, N.D. Pavlova identified a number of priority areas of scientific search. Among them are studies of discourse related to information technologies, the formation of social networks and Internet communities. With the development of the Internet, the task of conducting large-scale corpus studies of emotional, cognitive, motivational and other personal manifestations in discourse has become real. Approaches to describing the process of interaction

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between interlocutors, strategies and tactics, which serve for the achievement of communicational goals received a new impulse. At the same time, it was emphasized that in the conditions of constant modification of the forms of influence, the most important are the studies of the influence of discourse on man and society. The issues of the effectiveness of the impact, its social effects, and the possibility of confrontation with negative influences come to the fore. Not less significant is the area of methodological developments that contribute to the creation of tools for automatic processing of texts and speech materials.

The achievements of the recent years in the study of communicative impact and the new possibilities of content analysis were devoted to the reports of employees of the laboratory of the psychology of speech and psycholinguistics IP RAS V.V. Latinov, N.A. Almayev and O.V. Murasheva.

The Leading researcher of IP RAS, V.V. Latinov, PhD, characterized the features of the scientific situation in the psychology of persuasion and formulated the main drivers of modern research in this scientific field. Considerable attention in his report was paid to such an actively studied topic in recent years as a personalized persuasion. The appeal to this topic is caused by both the logic of the development of psychological knowledge and the requests of social practice. Three main directions of personalized persuasion were characterized: subject-object, context-object, and the means-object. The direction associated with the "adjustment" of means of persuasion to the psychological characteristics of a person or group on which it is directed was considered in more detail. Eight groups of psychological characteristics were identified - the grounds for personalized persuasion: the psychological state of a person, the features of his(her) goals and motivation, cognitive characteristics, features of the structure of attitudes, social identity, cultural characteristics, personality traits, subjective vulnerability to tactics of persuasion. Factors affecting the effectiveness of personalized persuasion were considered. On the example of specific studies, the effectiveness of personalized persuasion has been demonstrated. So, in the work (Zarouali et al., 2020), a personalized persuasion made it possible to increase the effectiveness of political advertising via social networks. Its greatest effectiveness was achieved in the case of coincidence of the personality type of the object of influence and the option of an advertising message being addressed to specific personality traits.

V.V. Latinov emphasized that the development of the "big data" industry opens up new prospects in the study of communicative effects. There is an opportunity to study the persuasion in conditions of real life on the material of multimillion samples of respondents. For example, in the work (Ajzenman et al., 2020), the fact of the influence of the "Covid-dissident" behavior of the Brazilian President Jair Messias Bolsonaro on the execution of Brazilians of social distance measures was recorded (geolocation data used 60 million mobile phones of the inhabitants of Brazil). After the "Covid-dissident" speeches of the Brazilian president in those regions where he enjoyed the support of the population, the implementation of social distance measures worsened. The influence of officials on the behavior of the population in the Covid-19 pandemic situation was also demonstrated in the work (Grossman et al., 2020). The correlation of messages via Twitter of the US Governors on the need to comply with COVID-19 prevention measures ("staying at home") with the geolocation of residents of 3,100 US districts (mobile phones) showed a significant decrease in the mobility of the population after the messages of the governors.

In his speech the leading researcher of IP RAS, Doctor of Psychological Sciences, Almayev N.A. outlined the main stages in

the development of computer linguistics over the past 20 years and concentrated on the possible use of these technologies for the content analysis in psychological purposes. The development of computer linguistics is based on the replacement of words with digital values. Even unambiguous compliance with the words of any arbitrary numbers allows to solve such statistical problems as frequency/uniqueness of words, the similarity of one document to another, etc. The community of scientists and developers soon realized that in this way the most diverse information related to both semantics and syntax of words can be encoded in digital form. So the words turned into multidimensional vectors, and the corresponding process was called "vectorisation". Success in solving the problems of computer linguistics depends on how large are the corpora of the texts being vectorized. The larger are the corpora, the more adequately the information about the words and their connections is presented by them. The values of the vectors change during machine learning so that on the basis of the inputed words it is possible to predict their most likely continuations. This process is called "pre training". In a relatively early GloVe model, each vector corresponded to each word, there was no opportunity to choose a more suitable meaning based on the context. In the ELMo model, such an opportunity appeared on the basis of calculating the vectors of entire sentences. A significant step forward was the technology of transformers and the BERT (Bidirectional Embedding Representations from Transformers) model based on them. This model allows to select the most suitable word basing on the context. The most developed contemporary computer linguistics model is GPT3. It is used mainly to create bots, continuing texts and their summarisation. However, its volume is so large that it can function only in cloud services. N.A.Almayev emphasized that the solution of the problems of syntax is well implemented in almost all of the contemporary models, moreover, the analysis of sentences is also used to determine authorship and even for the search of psychological correlates of various ways to build phrases. Nevertheless, in general, content analysis in psychology remains, in his opinion, analysis of the individual unconnected words and, thereby, is the analyses of incoherent contents. Indeed, as already Aristotle noted, the connection of the contents in speech occurs as a result of the statement, respectively, the statements, and not individual words, should serve as the units for analysis of content. This important point is constantly overlooked both during content analysis when searching on the Internet and when teaching neural networks to recognize and sort texts.

Speech by the senior research co-worker O.V. Murasheva, PhD was devoted to the presentation of the results of empirical research, demonstrating the possibility of analyzing texts using contemporary computer linguistics technologies. The study of socially significant phenomena that are expressed in discourse and narratives of a significant number of people requires processing of the impressive volumes of textual information. It was shown that the research task in machine learning is the thematic analysis, with the purpose of the reduction of variables. Correspondingly, the application of statistical methods to the texts that provide decrease in the number of variables similar to factor and cluster analyzes, but adapted for text messages, is relevant. The best, most stable results among such methods are provided by the Latent Dirichlet Allocation (LDA). The presented study (Almayev, Murasheva, 2022) is based on the discussions in the blogs of three different users of LiveJournal for November 2021 selected by the tags «Coronavirus», «Covid-19». They were loaded from the Internet and only comments were processed, but not the initial texts of the bloggers. For each topic, the main terms were presented in the form of two words (bigrams) with a relative weight of this bigram in a selected

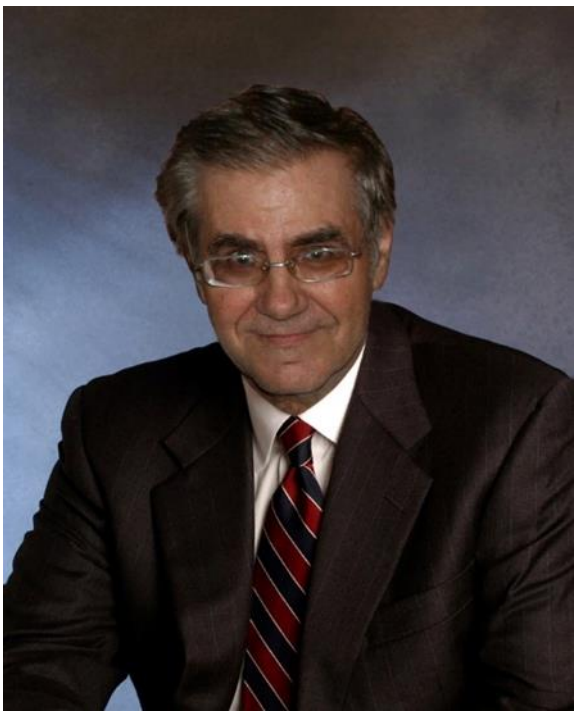
topic. As a result, it was possible to find out that LDA can be applied to the task of thematic analysis of discussions: the method is sufficient for primary familiarization with the texts without reading the textual base by the researcher. With the help of LDA, it was possible to release themes relevant to the corpus that generally retain their uniqueness, regardless of the initially established amount of topics in LDA. Thanks to the separate unambiguous bigrams, the meaningful for the human identification of topics can be created on their basis/ they may be used in recommenders and automatic summaries. At the same time, separate meaningful judgments with this approach are interspersed with a huge amount of "empty breed" - meaningless random bigrams that are not interpreted outside the context of the sentence (subjects without predicates, predicates without subjects). It should be emphasized that the search for thematic contents on the Internet is happening, and neural networks are also trained in a similar way. A similar approach with similar results is implemented in a number of other studies (Hamed, Jelodar et al. 2021). However, the authors do not see the problem in this, which may be partially justified in analytical languages with their stable words order (English, Chinese), where random pair of words with a much greater probability is a statement. In the Russian language (synthetic) with its almost arbitrary words order the transition to judgments seems to be especially relevant. O.V. Murasheva pointed out that for the further semantic filling of this technique, it seems appropriate to include the level of syntactic analysis of the sentence in the first stage of text processing - tokenization, and transmit to further vectorization of the collection of judgments (bigrams related to the subject-predicate pair). According to the speaker, this is not so difficult to implement due to the fact that syntax is "stitched" in the pre trained corpora of the Russian texts. A sentence is grammatically parsed, ligaments "subject-predicate" are allocated, their vectors are summed and then the vectors of these pairs are analyzed. A similar method of analyzing texts allows us to solve the problem of meaningless, random bigrams already at the most basic level.

Therefore, the results presented in the reports of the participants of the seminar "Psychology of Discourse: New Trends and Achievements" indicate significant progress that was achieved in the field of studying communicative impact and the development of new methods of analysis of the social media Internet content.

Highlight

- A new stage in the development of the discursive approach is associated with modern information technologies and the consideration of the types of discourse that are widely used.
- Content analysis in psychology remains analysis of the individual unconnected words.
- The statements, not individual words, should serve as the units for analysis of content.
- Solution of the problems of syntax is well implemented in almost all of the contemporary models.
- Separate meaningful judgments are interspersed with a huge amount of «empty breed» - meaningless random bigrams.
- The greatest effectiveness of the impact was achieved if the variant of the advertising message coincided with the personal characteristics of the object of influence.
- The correlation of messages via Twitter of the US Governors on the need to comply with COVID-19 prevention measures ("staying at home") with the geolocation of residents of 3,100 US districts showed a significant decrease in the mobility of the population.

LEARNING FROM THE PAST



Vladimir Mikhaylovich Rusalov was born 5 October 1939 in Kizlyar (Dagestan, Russia). He is a well-known Russian psychophysiologist and anthropologist who was first to develop a temperament model within the activity-specific approach. He is best known for his work in differential psychophysiology, psychology of personality and intelligence, and temperament (active specific model of temperament). Differential psychophysiology reveals patterns of generation, formation and development of the classes or types of individually psychological differences that emerge and are formed because of the influence of stable biological factors of the individual. Rusalov V.M. developed the differential psychophysiological, or special theory of human individuality in order to revealed the mechanisms of transformation of the biological factors into the individually psychological features. He believes that the individually psychological in relation to the individually biological appears as a strictly regular sequence of processes, each of which proceeds according to biological (physiological) laws, but the sequence of organization and structure within the complex of these processes is subordinate to psychical laws. The core of V.M. Rusalov's special theory of human individuality is formed on the following five proposition:

The first proposition states that it is possible to distinguish the formal-dynamic (also called by some authors as psycho-dynamic) and content aspects of an individual's mind.

The second proposition is that the formal-dynamic characteristics of the individual human mind are based on the integrated totality of all biological properties.

The third proposition is that formal-dynamic properties of the human mind are formed gradually, as a new systematic property of the generalized integration of biological properties optimally associated with activity: if generalization occurs due to the generality of neurophysiological, and more broadly, all structural and functional biological properties of a person, then we are dealing with temperament; if the generalization is based on the dynamic and content features of cognitive mechanisms, we are dealing with intelligence; if the dynamic and content characteristics of motives are generalized, then such a psychological formation should be attributed to character.

The fourth proposition concerns the relationship between the formal-dynamic formations of the mind and other, "more organized" structures of integral individuality: the formal-dynamic properties of the mind, being incorporated into "higher organized"

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mental structures, in particularly into intelligence and character, are essential components of the dynamic properties of these structures.

The fifth proposition is that formal-dynamic features of mind not only serve as the preconditions and conditions of activity, not only affect the dynamics and style of activity, but may also determine the results of activity.

From the proposed theory V.M. Rusalov identified seven criteria which can be considered as belonging to the domain of temperament: (1) refers not to the content but to formal characteristics, (2) reflects the dynamic aspect of behavior, (3) is expressed in all kinds of behavior, (4) is present since childhood, (5) is stable across a long period of life, (6) has close relationship with biological systems, and (7) is inherited.

Rusalov distinguishes the four temperamental traits: ergonicity (endurance), plasticity, tempo (speed), and emotionality. Ergonicity is associated with "Wide" or “Narrow” afferent synthesis (probably due to the large or lower energy potential of "capturing" the external world), which applies to the excitatory processes of the CNS. Plasticity refers to Anokhin's decision-making component, in that it characterizes the ease or difficulty in switching from one decision (behavioral program) to another. Tempo is associated with the degree of speed in realization of behavioral programs. Emotionality refers to the acceptor of the results of the action and their evaluation. A more complete coincidence of the acceptor and the result leads to the formation of more emotionally stable forms of behavior, while their mismatch may underlie the genesis of emotionally labile forms of behavior. Rusalov’s activity-specific approach offers to differ manifestation of temperament traits in physical, intellectual, and communicative aspects of activities.

Rusalov developed a questionnaire known as the Structure of Temperament Questionnaire (STQ) aimed at measuring the twelve temperamental traits.

Some Theoretical Problems of Constructing of a Special Theory of Human Individuality

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Rusalov B.M. Some Theoretical Problems of Constructing of a Special Theory of Human Individuality. Psikhologicheskii Zhurnal, 1986, 7(4), 23-35.

Abstract. The article attempts to propose several foundations for constructing of a special theory of individuality. Its main purpose was to identify the mechanisms of generation, formation and development of those classes or types of individual psychological differences, that are formed due to the action of individually stable biological factors within the human life activity. The starting point for the construction of a proposed theory is the concept of "systemic generalization”. It is assumed that the biological components (primarily properties of the nervous system) in the process of human development through systemic generalization form a special class of properties: the so-called formal-dynamic features of human behavior, or temperament. The article proposed several objective criteria for distinguishing temperament, a topic poorly developed in modern psychology.
Keywords: Human Individuality, Temperament, Formal-Dynamic Characteristics

One major problem of modern science and, first and foremost, of modern psychology, is to determine the possibilities, means and methods of forming and developing a person's individuality; in this connection, the solution of this problem is of the utmost importance [1, 12-17, 23]. We understand the individuality of a person as a multidimensional and multilevel system of relations that covers all the sets of conditions and stable factors of a person's individual development [12]. This approach regards human individuality as a particular case of a self-developing and self-regulating system that consists of a hierarchical series of properties of all stages of matter development – from physical, biochemical, physiological, etc. to socio-group and socio-historical ones [1, 11, 12, 15, 16].

Due to the enormous variety of factors influencing the formation of a person's individuality, Merlin introduced a special definition for this concept – "integral individuality", thereby emphasizing that all natural and social properties of an individual are integrated in the concept of individuality [13-16]. This approach states that individuality is a special form of existence of an individual person, within the framework of which he or she lives and functions as an autonomous and unique bio-social system, that maintains the integrity and identity of himself or herself in the conditions of continuous internal and external changes [12, 14-16, 21, 23].

The mechanisms of the formation, development and regulation of a person's integral individuality require knowledge of the interaction, mediated transformation, and integration of all the levels, all the components that comprise a person. The fundamental task involves not only a thorough multilevel abstract analysis of the entire set of the determinants of the integral individuality of a person, rather than the disclosure of the nature of the interaction between them based on specific experimental studies designed to find stable dimensional relations between the components that make up the individual behavior of a human being. Undoubtedly, that this complex task can be only solved by the joint efforts of many sciences that study humans, such as genetics, and anthropology, up to psychology, to political economy, philosophy, and so on.

Thus, the most important place in the solution of this problem must be assigned, according to the ideas of Teplov and Nebylitsyn [17, 30], to a new scientific direction – differential psychophysiology, the subject matter of which can be designated on the level of a formal scheme as an intersection zone of two circles, one of which symbolizes our knowledge about individual variations of the mind, and another one about individual variations in the biological organization of a person in the broadest sense of this word.

The latest advances of sciences that study biological aspects of man – anthropology, genetics, physiology of higher nervous activity, and etc. – convincingly demonstrate that man was able to reach such a high developmental level because he/she was born with such bodily, or rather, biological organization, that initially included, preprogrammed possibilities of his/her universal socio-societal functional development [29]. Hence it means that knowledge of the biological organization of a human being – its levels, structure, peculiarities of physiological processes, functions and states, regularities of their functioning, etc. – is the most important element in the disclosure of the development mechanisms of the human integral individuality which includes the psychological individuality level.

The task of the study of the psycho-physiological aspects of human individuality may be formulated as following: to reveal the objective biological foundations of the psychological level of human individuality, or, in other words, to discover the underlying biological elements (and their characteristics) that,

when organized into a particular system, form the level of individual-psychological differences. Based on Ponomarev's ideas about structural levels of matter development [20], we can assume that the individually psychological in relation to the individually biological appears as a strictly regular sequence of processes, each of which proceeds according to biological (physiological) laws, but the sequence of organization and structure within the complex of these processes is subordinate to psychical laws.

Therefore, differential psychophysiology, due to the specifics of the study's subject matter, reveals patterns of generation, formation and development of the classes or types of individually psychological differences that emerge and are formed because of the influence of stable biological factors of the individual.

It is important to construct a differential psychophysiological, or special, theory of human individuality in order to understand the mechanisms of transformation of the biological factors into the individually psychological features. In my opinion, such a special theory of individuality, unlike the general theory, must contain propositions that reveal the regularities and specifics of the formation of the individual-psychological differences under the influence of stable biological factors.

The present work attempts to generalize several known propositions and formulate new ones, that can form the foundations for constructing a special theory of individuality. The essence of the first preposition, which is basic for differential psychophysiology, is present practically in any empirical research, is as follows. It is stated that at a certain level of scientific research, it is possible to distinguish the formal-dynamic (also called by some authors as psychodynamic [5, 13-17, 23, 30]) and content aspects of an individual's mind. The content aspect appears through the subject-meaning psychological structures-knowledge, motives, goals, and so on. The content aspect represents a set of properties, attributes, and traits of the individual mind, that are formed because of human interaction with the subject world and its social environment. On the contrary, the formal-dynamic aspect covers a set of other traits and properties in the human mind, namely those features which emerge as a result of systemic generalization of psychophysiological characteristics regardless of their specific motives, goals, ways, behavior programs, etc. due to innate individually stable neurophysiological (or more precisely, all biological) components involved in individual-specific types of the human activity.

From the first preposition it follows that only formal-dynamic properties of the human mind are connected with human biological properties. In the most general form, the correlation between the biological characteristics of man and the formal-dynamic properties of his/her mind can be represented as follows: biological characteristics are components of a system of a higher order, the system of formal-dynamic properties of the human mind.

The second preposition of the special theory of individuality is that the formal-dynamic characteristics of the individual human mind are based not on a separate biological subsystem, but on the integrated totality of all biological properties. I will illustrate this statement by the example of studying the history of the change of the biological basis of temperament as the most general characteristic of the formal-dynamic aspect of the human mind [26].

At different times, different biological subsystems of the human body were proposed as the basis of temperament: (a) humoral theory (Hippocrates) associated temperament with different ratios of blood, bile, black bile, and mucus; (b) somatic (E. Kretschmer, W. Sheldon, S. Stevens) and nervous theories associated human temperament with features of the central nervous system, types of higher nervous activity or, in recent years, with a different ratio of the brain structures properties [27].

According to the second position of the special theory of individuality, at the base of temperament are the properties not of a partial biological subsystem, and the general constitution of the human body, which I consider as the set of all private constitutions, that is, the totality of all the physical and physiological properties of the individual, fixed in his genetic apparatus [23].

However, the foregoing does not imply that all the elements of the human biological system are equivalent and equally contribute to determining the formal-dynamic properties of the human mind.

In present it has been firmly established that the human biological system is characterized not only by multidimensional self-organizing subsystems (biochemical, somatic, neurophysiological), but above all by the fact that these subsystems have unequal importance in the general hierarchy of the body's functional systems, differ in structural complexity (including unequal number of leading links in determining their activity), different possibilities of autonomous activity, special peculiarities. Based on the hierarchical structure of biological properties, it can be assumed that the significance of structural and functional properties of a higher level (such, for example, properties of the central nervous system as the level of activation, interhemispheric relationships, mobility, lability of the nervous processes of the brain and its individual “blocks” etc.) will apparently be more significant in the formation of formal-dynamic properties, including temperament, in comparison with the properties of other subsystems of the body.

The experimental evidence supports this hypothesis. For instance, the correlation coefficients between the characteristics of temperament and properties of the nervous system in general are higher than those between temperament and properties of somatic (bodily) organization [23].

The third preposition of the special theory of human individuality refers to the possible mechanisms that would explain the process of "inclusion" of biological properties of different levels in the formation of formal-dynamic characteristics of the human mind. The main idea of the third preposition is that formal-dynamic properties of the human mind are formed gradually, as a new systematic property of the generalized integration of biological properties optimally associated with activity. We introduce the concept of systemic generalization to clarify how the development of the formal-dynamic properties of the mind unfolds. From this principle, we can trace the formation of all those properties of the mind that can be characterized as formal-dynamics.

Unfortunately, despite the fact that the concept of generalization, which denotes one of the fundamental mechanisms of formation of stable psychological qualities and attributes, has been used in psychological science, no consistent analysis has been performed so far to identify the formal-dynamic aspects of the mind. Piaget widely applied the concept of generalization as one of the most valuable mechanisms of formation of skills and intelligence. Generalization was defined as “extending the schema” to new objects through inclusion of new elements, formation of a higher-order schema that is deeply rooted in a lower-order schema, “strengthening”, “transferring”, “forming a new structure”, “transpositive”, and “generalizable assimilation” [19]. Rubinstein also used the concept of generalization. Specifically, he defined a person's character as a system of generalized motives in the personality [22].

The notion of generalization is apparently applicable beyond the content characteristics of the mind. The dynamic characteristics are also generalized, but we assume that the logic and mechanisms of generalization for dynamic and content characteristics are different. Whereas formal-dynamic characteristics are

generalized predominantly by logic of the "biological", i.e., by the logic of the "body" (under the influence of the general human constitution), the generalization of the content properties of the psyche is mainly based on "social" logic, or the logic of the "object" of socially determined human activity.

According to the third preposition, the basis for differentiating a psychological formation in the individual mind, as we see it, should be the specificity and level of generalization: if generalization occurs due to the generality of neurophysiological, and more broadly, all structural and functional biological properties of a person, then we are dealing with temperament; if the generalization is based on the dynamic and content features of cognitive mechanisms, we are dealing with intelligence; if the dynamic and content characteristics of motives are generalized, then such a psychological formation should be attributed to character.

Hence, the systems principle of hierarchy within the framework of the special theory of individuality is implemented in relation to the specific complexly organized object of reality, as human individuality is, through a sequence of transition from lower structural and functional levels of order to multiple elements (meaning biological properties, above all properties of the nervous system) to higher formations – formal-dynamic properties. New integral systems qualities of a person are formed as a product of this progressive motion: temperament as the first psychological level of formal-dynamic properties, followed by dynamic aspects of intelligence and character.

Assuming the proposed understanding of the nature and mechanisms of formation of formal-dynamic properties of the individual mind, it becomes quite evident that only formal-dynamic characteristics can be the subject of direct comparison with biological properties and characteristics of a person. The attempts to detect the correlations between biological properties and cognitive characteristics of personality, intelligence, or character, that are frequently undertaken in a series of foreign studies, appear to be totally groundless in this regard [33].

It is important to emphasize that formal-dynamic properties do not form a system that is strictly fixed once and for all, but rather are formed, restructured, and "generalized" as the individual develops. Development of the formal-dynamic properties of an individual can occur for two reasons: (1) as a result of biological age development as well as (2) as a result of successive socially organized types of activity (play, learning, work, etc.), i.e. in the process of upbringing and training. The sources of development of cognitive characteristics can be found in the structure of the subject of activity, or rather, in the succession of some socially organized forms of activity with others.

The existence of stable generalized formal-dynamic characteristics in the human mind – for example, temperament, formed in the process of activity influenced by biological factors – enables a person, as we see it, the most optimal use of his or her formal-energy-dynamic capabilities. The individual level of energy-dynamic capabilities (a certain level of metabolism or hormonal activity as well as peculiarities of nervous processes, etc.) that is set from birth (i.e. genetically determined), being constantly involved in functioning regardless of motives, goals, etc., inevitably leads to an optimally connected with activity generalized integration of all biological properties of an individual. Having emerged as a new systems quality, the generalized integration of biological (or in other words, the system of formal-dynamic) properties begins to act as a regulator of human energy-dynamic capabilities in the process of new types of activity.

The fourth preposition of the special theory of human individuality concerns the relationship between the formal-dynamic formations of the mind and other, "more organized" structures of integral individuality. The meaning of the

fourth preposition is that the formal-dynamic properties of the mind, being incorporated into "higher organized" mental structures, in particularly into intelligence and character, are essential components of the dynamic properties of these structures. Integration of formal-dynamic characteristics into the structure of both intelligence and character does not mean that the latter are the only more generalized and more complex dynamic formations of the mind: both intelligence and character, alongside with generalized dynamic properties, also have specific generalized substantial content (subject-meaningful) characteristics.

A distinctive feature of the formation of intelligence, or general abilities, is, by all accounts, the emergence of so-called balanced cognitive patterns due to the generalization of mechanisms of cognitive structuring. Differential psychophysiology considers this systems quality of intelligence, that reflects its formal-dynamic aspect, similar to the notion of intellectual self-regulation [9, 10].

Our study identified specific neurophysiological factors that also act as natural prerequisites of general abilities [24]. The conducted research resulted in a new understanding of many indicators used in practice of differential-psychological research. For example, the speed or plasticity can be viewed as formal-dynamic indicators of temperament, assuming that the neurophysiological side of their genesis is generalized, independent of the content of activity, and as indicators of intelligence, when we understand both speed and plasticity as dynamic indicators of the deployment and restructuring of generalized cognitive structures in the performance of a particular mental activity. Moreover, the dynamic indicators of intelligence are not limited to the formal-dynamic characteristics, i.e., temperament [38].

A distinctive feature of character formation in our view is the generalization of the most diverse forms of motivation – ranging from needs, motives to interests and ideals. This is exactly how Rubinstein interpreted character [22]. Character includes not only the essential, subject-meaningful characteristics of the motivational sphere, but also the dynamic features that include, as mandatory components, the formal-dynamic characteristics of emotionality. The generalized emotional characteristics, in Piaget's opinion, give "to action the necessary energy" and thus serve as a source of behavior [19]. The emotional (affective, dynamic, energetic) characteristics always serve as a necessary component of all motivations, but they do not exhaust, according to Aseev [4], the entire structure of motivation.

Thus, formal-dynamic mental formations, for example, temperament, can be regarded as an independent level of integral individuality, that corresponds to the Merlin's views [14], as well as a required component for more organized structures of personality, for example, intelligence & character.

The fifth preposition of the special theory of individuality, in its turn, addresses the role of formal-dynamic characteristics of the mind in a person's activity. The essence of this preposition is that formal-dynamic features of mind not only serve as the preconditions and conditions of activity, not only affect the dynamics and style of activity, but may also determine the results of activity.

The effect of formal-dynamic characteristics on the end result of activity until now has practically not been the subject of special research. One of the possible reasons for this is that such influence is difficult to trace in the individual activity. One of the reasons for this is that in individual activity, the content characteristics of the mind at certain stages of activity (the structure of motives, relations, goals, etc.) can suppress the formal-dynamic characteristics (individual tempo, plasticity, etc.), leading to the fact that activity efficiency became almost unambiguously associated with the content characteristics, rather than with

the formal-dynamic characteristics of the mind.

The solution of the problem of the relationships of the formal and dynamic properties of activity is important not only from a practical point of view, it allows us to substantiate the selection for joint activity of the mind as well as because (for example, operators, other things being equal in their temperamental characteristics), it is important above all theoretically as enables us to explore the complex relationship between the formal-dynamic and content characteristics of the mind at different levels of human individuality.

In a special study [25] it was found that the effectiveness of probabilistic prediction in joint activity is somewhat higher when the formal-dynamic properties of the partners in the dyad are opposite in structure (the properties of extraversion-introversion and emotional stability were evaluated according to Eysenck).

We were able to demonstrate an influence of formal-dynamic characteristics on content characteristics becomes more distinct and significant in joint activity: the motivation strengthens, the general knowledge stock grows, and the purpose of activity is specified, that is reflected in the effectiveness of activity. We can assume that in joint activity different mechanisms of regulation are formed based on the temperamental characteristics of partners. The dynamics of mental processes and states changes in different ways, mutual adjustment, correction and control over the activity occurs in different ways.

In order to explain the higher performance of people with opposite formal-dynamic characteristics, the following assumption can provide the basis for future detailed studies. Based on the P.K. Anokhin and his colleagues' theory of the functional system [2, 31] on integral mechanisms of holistic behavior, we can suggest that such a temperamental trait as extraversion-introversion (by Eysenck) is formed as a result of generalization of the neurophysiological characteristics of that part of functional systems which is connected with the primary phases of behavior, namely with afferent synthesis. "Wide" afferent synthesis (probably due to the large energy potential of "capturing" the external world) appears to be one of the main reasons for the formation of extroverted behavior. On the contrary, "narrow" afferent synthesis (lower energy potential of "capturing" the outside world) can be the basis of a new introverted type of temperament.

The scale of neuroticism probably reflects the individual mental characteristics that are associated with the final phases of the behavioral cycle. These characteristics are formed due to the neurophysiological generalization of that part of the functional system that is associated with the acceptor of the results of the action and their evaluation. It can be assumed that a more complete coincidence of the acceptor and the result leads to the formation of more emotionally stable forms of behavior, while different degrees of their mismatch may underlie the genesis of emotionally labile forms of behavior.

Based on the proposed genesis of extraversion and neuroticism, it becomes clear why under conditions of joint activity, when the formal-dynamic properties of partners complement each other (i.e., are opposite to each other), the most favorable conditions for activity arise: in this case, not only a more complete and adequate reflection of the external environment, but also a more complete informational and emotional analysis of current activities.

The five prepositions of the special theory of individuality stated above represent only a first attempt to establish the foundations of a differential psychological-physiological approach to the study of human individuality. Nevertheless, despite such a raw form, the proposed special theory of individuality makes it possible to consider in a new way several problems concerning the features of formation and functioning of individual-psychological differences.

As an illustration, let us consider a possible mechanism of formation, the distinctive features and role in the behavior of one of the most important formal-dynamic formations – temperament.

According to the theory that I develop, temperament is mainly formed under the influence of the general constitution. The properties of higher-order biological subsystems such as properties of the nervous system contribute more to the determination of temperament than lower-order biological subsystems (e.g., properties of the corporeal or humoral subsystems). The formation of temperament does not occur out of activity or prior to activity, but in the process of the activity itself, from the simplest forms to complex socially organized forms. However, it is important to point out once again that while the decisive role in the formation of temperament belongs to the general constitution (i.e. biological factors), in the formation of other formations of individuality and such as intelligence, character, etc. – the first place, of course, belongs to social factors (subject activities, social relations, cultural and historical conditions).

The formation of temperament is influenced by two reasons: (1) the general constitution and (2) those specific activities in which the person is included in early childhood. The process of temperament formation, as I understand it, may proceed as follows. Each individual receives from nature (due to his/her general constitution) a strictly defined range of "reaction norms" of biochemical, biomechanical, somatic, neurophysiological, and other properties. As a result of biological development, an individual level of metabolism, muscular development, certain properties of the nervous system, etc. are formed. From early childhood, these individually stable biological components are included in various kinds of activities from the earliest childhood – from sucking and grasping reflexes to play, learning, and work. During the early stages of development of the person (even as a child), there are evidently different rates of activities, different plasticity, different emotional reactions, and so on. Of course, these ideas must be experimentally proven in special studies. I believe, however, that as a person matures and develops through the genetic stability of biological components, each individual gradually develops a certain inherent generalized speed, generalized plasticity, generalized emotionality and other generalized characteristics of temperament.

It is obvious that formed generalized characteristics of temperament, do not only "color" activity, and set limits, protect the body from an extremely large or, on the contrary, extremely small expenditure of energy. "Survival" of the human' organism in the first case will be threatened by excessive exhaustion, and in the second - by a weak passive assimilation of the world. This is what is, in my view, the adaptive role of temperament.

From the proposed theory of temperament and the mechanisms of its formation, I can identify at least seven of its features from other features of individuality. Only such psychological property should be attributed to the temperament, that:

(1) does not depend on the content of activity and behavior, i.e. is independent of the content aspect of activity, its meanings, motives, purposes, etc.;

(2) characterizes a typical for concrete individual degree of dynamic (energetic) tension toward the world, people, oneself, and activity as a whole;

(3) is universal and manifests itself in all spheres of activity;

(4) can be manifested as early as in childhood;

(5) is rather stable during long periods of human life;

(6) correlates with the properties of the nervous system and other biological subsystems (humoral, somatic, etc.);

(7) is inherited.

It is easy to see that the first three distinctive features, or criteria of temperament – (1) independence of the content, (2) the dynamic-energetic aspect of the tension, and (3) universality - are derived from the manifestations due to mechanisms of generalization. The last four criteria –(4) stability, (5) early manifestation, (6) dependence on the biological properties of the organism and (7) inheritance are directly related to the notion of a general constitution as the biological basis of temperament. It should be noted that in recent years more and more data on the heritability of mental characteristics related to the category of formal-dynamic properties of the human mind, i.e. temperament, have been accumulated [7, 35].

Considering the mentioned above seven criteria, I must reconsider the generally accepted "register" of the initial characteristics of temperament. Some parameters will be preserved, while others will likely have to be dropped.

The most fundamental formal-dynamic feature, formed in the presence of constantly same biological components (i.e. individual genetic factors, level of metabolism, peculiarities of physique, peculiarities of central nervous system functioning), as we believe, would be the one that in the generalized form characterizes the extent of human-subject interaction with the environment and other people from the perspective of its dynamic-energetic tension. In differential psychophysiology, this basic formal-dynamic trait is called general mental activity [6, 8, 17]. The basic indicators of general activity, also including motor and speech activity, are tempo, rhythm, speed, intensity, plasticity, endurance, etc.

In our laboratory it was found that many of the mentioned above mental characteristics revealed significant correlations with the person's biological properties. For example, the individual tempo (velocity) positively correlates with the level of spatiotemporal EEG-synchronization. Behavioral plasticity positively relates to the variability of the evoked potential. The mental endurance is negatively associated with the energetic manifestation of the EEG slow rhythm. The correlations that have been revealed provide an important justification in favor of the fact that these psychological characteristics of activity, i.e., individual tempo, plasticity, and mental endurance belong to the temperament category [23].

The significant statistical correlations between the individual variations of the indicated formal-dynamic and neurodynamic properties, which were obtained in my laboratory, clearly testify to the fact that the heterogeneous and multilevel characteristics of a human being belong to one common and genetically primary factor, i.e. to the general constitution, while being its diverse specific forms, that enter into different natural correlations at different stages of the individuality's development.

Other important formal-dynamic characteristics of temperament, according to Nebylytsyn [17], is the emotionality, that includes a set of individual stable human affects and moods: impressiveness, emotional excitability, lability, as well as the predominance of a leading mood of joy, anger, fear or sadness [18]. The formal-dynamic properties of emotionality express the person's attitudes to the objective world, society and the self in the most generalized form. It should be noted that in emotionality, in particular in the modality (sign) of emotion it is already possible to detect generalized cognitive characteristics of the mind. Despite this, I would assume that these characteristics of emotionality reflect stable formal-dynamic properties of the mind, generalized under the influence of, first of all, human natural factors: hormonal and bodily spheres, properties of the nervous system, specific properties of the limbic system, brain hemispheres, etc.

Thus, the search for the basic "elements" of temperament must be accompanied a detailed analysis of the formal-dynamic aspects of general mental activity and emotionality.

In Merlin's school [13], in which the temperament is most thoroughly studied,

nine basic parameters of temperament are identified: (1) emotional excitability, (2) excitability of attention, (3) strength of emotions, (4) anxiety, (5) reactive involuntary movements (impulsiveness), (6) volitional activity, goal-directed activity, (7) plasticity - rigidity, (8) resistance, and (9) subjectivity. I think than not all of the indicators mentioned above are directly related to the category of temperament. For instance, excitability of attention is rather a dynamic characteristic of intelligence than of temperament. Such parameters as volitional activity and subjectivation seem to be related to dynamic characteristics of character.

Belous, follower of Merlin [5], using a special mathematical invariant model, identified two types of temperament A and B. Type A persons are characterized by strong arousal, high or low dynamism of inhibition, extraversion, carelessness, plasticity, high or low emotionality. Type B persons are characterized by weak arousal, high or low dynamic of inhibition, introversion, rigidity, and anxiety. Yet again, among the indicators of temperament there are both indicators of nervous system properties (strong and weak arousal, dynamism of inhibition) and some features of character, such as carelessness; however, many important characteristics of emotionality are missing, and there are no indicators of activity at all.

The concept of temperament by the Polish researcher Strelau [28] also lacks emotional characteristics. The main fundamental dimensions of temperament in the system are reactivity and activity. Reactivity reflects the magnitude of the human body's response to influences, while activity describes the intensity and duration of behavioral acts. I believe, the measurements of temperament proposed by Streliau dimensions of temperament represent different aspects of "general activity", according to the Nebylntsin's terminology, as they reflect different dynamic-energetic characteristics of individual behavior.

The Strelau's separation of temporal reaction characteristics as a special independent parameter of temperament in the context of a special theory of individuality appears inappropriate because temporal parameters (for example, speed), as shown by our studies, are included in the syndrome of general activity [23].

The absence of a unified understanding of the nature of temperament as the main block of formal-dynamic characteristics of the human mind has led several authors to the fact that the concept of temperament has ceased to be used at all or is often used as a synonym of character and personality [32, 33, 37].

The special theory of individuality allows me to resolve the long-standing debate whether or not temperament is an independent concept or not, and how it is related to intelligence, character, and personality. First, temperament, as shown above, is one of the self-sufficient, independent basal and stable dynamic formation of the psyche. Second, the concept of temperament and character are not equivalent because they have different mechanisms and levels of generalization, as well as different correlations with the other properties of the mind. Third, temperament is not identical to personality, since the latter is primarily a set of all forms of human social relations [3].

Vague understanding of the essence and the structure of temperament as the most general dynamic characteristic of the mind has led psychologists to the fact that temperament "dropped out" of many studies aimed at developing methods for diagnosing individual psychological differences. Especially unstudied was the role of temperament in activity. It is believed that temperament manifests itself in a variety of areas of activity and “colors” a variety of behavioral acts, creating one or another individual typological style of activity. Yet, at present, from the perspective of a special

theory of individuality such a statement is not sufficient.

As shown above, temperament does not exist before or beyond activity in the broad sense of the word. It is formed in the process of the activity itself as a result of the generalization of its dynamic psychological characteristics due to individually stable neurophysiological (or, more broadly, biological) components that are included in it.

Consequently, the properties of temperament not only act as general prerequisites, conditions of activity and influence the dynamics and style of activity, but are also related to its final results.

Thus, the special theory of individuality explains the origin of that aspect of individual variations in the mind which are determined by the biological properties of the human organism. The biological properties (especially the properties of the higher, neurodynamic level) serve as the most important necessary components of a system of a higher order, namely the system of individual formal-dynamic features of human mind or temperament.

Formal dynamic features of the psyche, in its turn, are included in more complex systems of individuality - intelligence, character, and other formations of personality. However, a crucial role in the formation of the latter belongs not to biological, but to social causes and factors.

The proposed theory of the special (differential-psychophysiological) theory of individuality is the first attempt to construct a system of views that explain the mechanisms of formation and functioning of the "lower" level of individual-psychological differences, i.e. the level of the individuality that is determined mainly by natural, biological factors.

Revealing the mechanisms of formation and functioning of this basic level of individuality is a most important step on the way to understanding human individuality as a holistic system.

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SUPPLEMENTARY MATERIALS

Personality Traits, Attitudes to Life and Patterns of Behavior

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Table S1. Descriptive statistics

Indicators	Mean	Median	Mode	Standard deviation	Min	Max	Skewness	Kurtosis	Alpha
Temperament Properties									
Motor Ergonicity	5.60	6	6	1.77	1	9	-0.32	0.30	
Intellectual Ergonicity	5.40	5	5	1.76	2	10	0.31	-0.19	
Social Ergonicity	5.39	5	4	1.88	1	9	0.16	-0.29	
Motor Plasticity	5.41	5	5	2.14	1	9	-0.07	-0.76	
Intellectual Plasticity	5.65	6	5	1.92	1	10	-0.02	-0.12	
Social Plasticity	5.49	5	5	1.73	2	9	0.23	-0.32	
Motor Tempo	5.59	6	6	2.00	2	9	0.01	-0.74	
Intellectual Tempo	5.36	5	5	2.09	1	10	0.38	-0.47	
Social Tempo	5.41	5	5	1.60	1	8	-0.15	-0.26	
Motor Emotionality	5.43	5	6	1.86	2	10	0.26	-0.36	
Intellectual Emotionality	5.27	5	5	2.00	1	9	-0.02	-0.65	
Social Emotionality	5.45	5	5	2.06	1	9	-0.16	-0.63	
The Fundamental Personality Dimensions									
Extraversion/Introversion	5.54	6	5	1.98	1	10	0.01	-0.43	0.87
Neuroticism/Emotional stability	5.46	5	5	2.03	1	10	0.00	-0.44	0.71
Psychoticism/Soft-heartedness	5.51	6	5	2.05	1	10	-0.09	-0.31	0.71
Character Traits									

Hyperthymicity	5.32	5	4	1.84	1	9	0.16	-0.17	
Stuckness	5.41	5	5	2.01	2	10	0.37	-0.36	
Emotivity	5.35	6	6	2.00	1	9	0.03	-0.31	
Pedanticity	5.48	5	5	1.88	2	9	0.26	-0.47	
Anxiety	5.41	5	3	1.88	3	9	0.18	-1.20	
Cyclothymicity	5.39	5	7	2.06	2	9	0.03	-0.89	
Demonstrativeness	5.65	6	7	1.94	2	10	-0.13	-0.29	
Excitability	5.42	5	5	1.87	3	9	0.19	-1.00	
Dystimicity	5.36	5	5	1.84	3	10	0.52	-0.55	
Exalitveness	5.39	5	3	1.85	3	9	0.24	-1.03	
Motivation									
Achievement Motivation	5.49	6	6	1.95	1	10	0.01	-0.27	0.91
Value Motivation	5.47	5	6	1.99	1	10	0.01	-0.32	0.92
Accessibility Motivation	5.45	5	5	1.98	1	10	0.12	-0.36	0.63
The Cognitive Styles									
Field Dependence	5.51	5	5	2.03	1	10	0.04	-0.25	0.68
Field Independence	5.59	6	5	1.95	1	10	-0.08	-0.30	0.69
Narrow Range of Equivalence	5.41	5	5	1.93	1	10	-0.01	-0.26	0.60
Wide Range of Equivalence	5.62	5	5	2.01	1	10	-0.06	-0.25	0.50
Flexibility of Cognitive Control	5.59	5	5	2.02	1	10	0.06	-0.47	0.58
Rigidity of Cognitive Control	5.56	6	6	2.01	1	10	-0.01	-0.26	0.51
Impulsivity	5.52	6	6	1.94	1	10	-0.04	-0.22	0.58
Reflectivity	5.52	6	5	1.89	1	10	-0.05	-0.25	0.70
Concrete Conceptualization	5.52	6	5	1.94	1	10	0.08	-0.21	0.62
Abstract Conceptualization	5.52	5	5	1.99	1	10	0.10	-0.38	0.69
Tolerance of Unrealistic Experience	5.50	6	6	1.90	1	10	0.01	-0.24	0.67
Intolerance of Unrealistic Experience	5.43	5	5	2.01	1	10	0.03	-0.37	0.50

IQ level									
Logical problems (LOGOP)	5.37	6	7	1.59	1	7	-0.78	-0.22	0.90
Hardiness									
Commitment	5.44	5	5	1.95	1	10	0.05	-0.25	0.82
Control	5.51	5	5	2.00	1	10	0.02	-0.38	0.79
Challenge	5.52	6	6	1.96	1	10	-0.03	-0.27	0.70
Meaning in Life									
Purpose in Life	5.54	6	6	2.02	1	10	0.03	-0.41	0.82
Life Process	5.46	5	5	1.99	1	10	0.03	-0.35	0.75
Life Performance	5.48	5	4	2.00	1	10	0.01	-0.42	0.74
Locus of Control “Self”	5.61	6	5	2.02	1	10	-0.05	-0.44	0.59
Locus of Control “Life”	5.46	5	5	1.99	1	10	-0.06	-0.50	0.74
Axiological Orientation									
Collectivity	5.46	5	5	1.98	1	10	0.09	-0.32	0.73
Spiritual Satisfaction	5.50	5	5	2.03	1	10	0.09	-0.40	0.81
Creativity	5.49	6	6	1.99	1	10	0.05	-0.30	0.72
Life	5.43	5	6	1.94	1	10	0.11	-0.14	0.71
Achievement	5.51	5	5	1.98	1	10	0.02	-0.24	0.81
Tradition	5.46	5	4	2.00	1	10	0.10	-0.45	0.62
Material Well-being	5.44	5	5	1.89	1	9	-0.07	-0.46	0.80
Individuality	5.60	6	6	2.08	1	10	-0.02	-0.59	0.73
Spiritual Personality Traits									
Spiritual Virtues	5.46	6	6	1.88	1	10	-0.01	-0.39	0.71
Positive Outlook on Life	5.52	6	6	1.88	1	10	-0.04	-0.15	0.72
Spiritual Discipline	5.60	5	5	2.01	1	10	0.05	-0.32	0.68
Goodness	5.41	6	6	2.03	1	10	0.02	-0.15	0.64
Spiritual Service	5.44	5	4	1.97	1	9	-0.07	-0.80	0.69

Moral Rectitude	5.51	5	4	1.93	1	9	-0.07	-0.78	0.62
Ways of Coping									
Seeking Social Support	5.52	6	6	1.95	1	10	0.00	-0.35	0.74
Focus on Solving Problems	5.59	6	5	1.93	1	10	-0.08	-0.35	0.69
Working Hard and Achieve	5.42	5	5	1.97	1	10	0.08	-0.51	0.59
Worry	5.43	6	6	1.99	1	10	-0.09	-0.51	0.71
Invest in Close Friends	5.48	5	5	1.93	1	10	-0.02	-0.38	0.61
Seek to Belong	5.55	6	6	2.02	1	10	-0.09	-0.41	0.59
Wishful thinking	5.57	6	5	1.92	1	10	0.03	-0.20	0.71
Not Coping	5.42	5	5	1.97	1	10	0.00	-0.45	0.68
Tension Reduction	5.37	5	6	1.96	1	10	0.23	-0.45	0.65
Social Action	5.50	6	6	2.06	1	10	-0.08	-0.67	0.77
Ignore the Problem	5.54	6	6	2.00	1	10	-0.24	-0.25	0.70
Self-Blame	5.53	5	5	2.04	1	10	0.03	-0.39	0.78
Keep to Self	5.52	5	5	1.93	1	10	0.02	-0.16	0.66
Seek Spiritual Support	5.55	5	5	1.83	1	10	0.27	-0.75	0.85
Focusing on the Positive	5.37	5	4	1.96	1	10	0.16	-0.47	0.45
Seek Professional Help	5.51	5	5	2.05	1	10	-0.06	-0.31	0.70
Distraction	5.17	5	5	1.82	1	10	0.33	-0.09	0.32
Physical Recreation	5.50	5	5	1.92	1	9	-0.18	-0.34	0.80

Table S2. The results of a Principal Component Analysis of the indicators

Indicators	Component 1	Component 2	Component 3
Temperament Properties			
Motor Ergonicity	0.06	-0.16	**0.42**
Intellectual Ergonicity	0.11	-0.15	0.39
Social Ergonicity	0.06	0.03	**0.55**

Motor Plasticity	0.17	0.02	0.25
Intellectual Plasticity	0.19	-0.19	**0.43**
Social Plasticity	0.09	-0.14	**0.61**
Motor Tempo	0.03	-0.20	**0.55**
Intellectual Tempo	0.03	-0.24	**0.57**
Social Tempo	0.14	-0.11	**0.58**
Motor Emotionality	-0.05	0.39	0.07
Intellectual Emotionality	0.18	**0.44**	-0.04
Social Emotionality	0.19	**0.55**	-0.01
The Fundamental Personality Dimensions			
Extraversion/Introversion	0.10	-0.06	**0.72**
Neuroticism/Emotional stability	0.07	**0.72**	-0.02
Psychoticism/Soft-heartedness	**-0.44**	0.17	0.21
Character Traits			
Hyperthymicity	0.22	-0.09	**0.64**
Stuckness	-0.06	**0.47**	0.07
Emotivity	0.28	**0.48**	-0.04
Pedanticity	0.21	0.10	0.24
Anxiety	0.12	**0.49**	-0.11
Cyclothymicity	0.00	**0.61**	-0.09
Demonstrativeness	0.06	0.02	**0.59**
Excitability	-0.28	0.13	0.27
Dystimicity	-0.18	**0.51**	-0.22
Exalitveness	-0.10	**0.60**	-0.09
Motivation			
Achievement Motivation	0.35	0.01	**0.54**
Value Motivation	0.31	-0.06	0.37
Accessibility Motivation	-0.21	0.23	0.38

The Cognitive Styles			
Field Dependence	-0.01	**0.40**	0.27
Field Independence	0.24	-0.03	**0.49**
Narrow Range of Equivalence	0.26	0.28	0.39
Wide Range of Equivalence	-0.16	0.18	0.39
Flexibility of Cognitive Control	0.24	-0.09	**0.55**
Rigidity of Cognitive Control	-0.16	0.39	0.17
Impulsivity	-0.10	0.30	**0.51**
Reflectivity	0.29	0.13	0.31
Concrete Conceptualization	0.25	0.31	0.24
Abstract Conceptualization	0.30	0.00	**0.55**
Tolerance of Unrealistic Experience	0.39	0.04	**0.46**
Intolerance of Unrealistic Experience	-0.16	0.34	0.30
IQ level			
Logical problems (LOGOP)	0.15	-0.14	-0.04
Hardiness			
Commitment	0.38	**-0.61**	**0.40**
Control	0.27	**-0.64**	**0.42**
Challenge	0.23	**-0.53**	0.28
Meaning in Life			
Purpose in Life	**0.49**	**-0.41**	0.26
Life Process	**0.46**	**-0.45**	0.33
Life Performance	**0.47**	**-0.47**	0.30
Locus of Control “Self”	**0.50**	**-0.42**	0.31
Locus of Control “Life”	**0.48**	**-0.43**	0.22
Axiological Orientation			

Collectivity	**0.73**	-0.01	0.02
Spiritual Satisfaction	**0.82**	0.00	0.02
Creativity	**0.65**	-0.06	0.10
Life	**0.77**	-0.07	0.09
Achievement	**0.82**	-0.03	0.07
Tradition	**0.64**	-0.01	0.08
Material Well-being	**0.65**	0.05	-0.03
Individuality	**0.70**	0.00	0.05
Spiritual Personality Traits			
Spiritual Virtues	**0.63**	-0.07	0.23
Positive Outlook on Life	**0.55**	-0.08	0.32
Spiritual Discipline	0.36	-0.25	0.23
Goodness	**0.50**	-0.09	0.28
Spiritual Service	**0.56**	0.07	0.23
Moral Rectitude	**0.59**	-0.04	0.20
Ways of Coping			
Seeking Social Support	0.36	0.34	0.12
Focus on Solving Problems	**0.63**	0.03	0.13
Working Hard and Achieve	**0.62**	-0.05	0.18
Worry	0.38	**0.48**	0.01
Invest in Close Friends	0.29	0.11	0.39
Seek to Belong	0.27	0.38	0.24
Wishful thinking	0.09	**0.59**	0.04
Not Coping	-0.33	**0.61**	-0.08
Tension Reduction	-0.25	**0.56**	0.10
Social Action	-0.23	0.18	0.32
Ignore the Problem	-0.32	**0.44**	0.02
Self-Blame	0.06	**0.61**	-0.13

Keep to Self	-0.11	0.23	-0.15
Seek Spiritual Support	0.01	0.24	0.18
Focusing on the Positive	0.39	0.05	0.27
Seek Professional Help	-0.02	0.11	0.29
Distraction	0.26	0.18	0.16
Physical Recreation	0.18	-0.20	0.36
Eigenvalue	10.84	8.41	8.33
Percentage of explained variance	13.38	10.38	10.28
Cumulative percentage of explained variance	13.38	23.76	34.04

Note. Absolute loadings of 0.40 or stronger are bolded.

Table S3. Mean of indicators for each cluster, the results of one-way ANOVA and multiple comparisons by Tukey's test

Indicators	Mean			Tukey's test			The results of one-way ANOVA
	Cluster 1	Cluster 2	Cluster 3	2-1	3-1	3-2	
Temperament Properties							
Motor Ergonicity	5.69	6.36	4.87	***	***	***	F(2, 2580) = 146.56; p < 0.001
Intellectual Ergonicity	5.38	6.03	4.9	***	***	***	F(2, 2580) = 106.2; p < 0.001
Social Ergonicity	5.51	6.29	4.45	***	***	***	F(2, 2580) = 236.7; p < 0.001
Motor Plasticity	5.28	6.07	5.05	***	-	***	F(2, 2580) = 46.07; p < 0.001
Intellectual Plasticity	5.59	6.62	5.04	***	***	***	F(2, 2580) = 154.18; p < 0.001
Social Plasticity	5.63	6.52	4.56	***	***	***	F(2, 2580) = 313.35; p < 0.001
Motor Tempo	5.9	6.62	4.58	***	***	***	F(2, 2580) = 250.1; p < 0.001
Intellectual Tempo	5.62	6.4	4.23	***	***	***	F(2, 2580) = 269.5; p < 0.001
Social Tempo	5.44	6.4	4.57	***	***	***	F(2, 2580) = 303.94; p < 0.001
Motor Emotionality	5.5	5.34	5.34	-	*	-	F(2, 2580) = 3.98; p < 0.02
Intellectual Emotionality	4.94	5.2	5.43	*	***	*	F(2, 2580) = 16.73; p < 0.001
Social Emotionality	5.05	5.43	5.71	***	***	-	F(2, 2580) = 20.9; p < 0.001

General activity	5.68	7.09	4.19	***	***	***	F(2, 2580) = 591.85; p < 0.001
General emotionality	5.2	5.42	5.63	-	***	-	F(2, 2580) = 9.5; p < 0.001
Motor activity	5.7	6.69	4.52	***	***	***	F(2, 2580) = 264.41; p < 0.001
Intellectual activity	5.71	6.68	4.72	***	***	***	F(2, 2580) = 263.25; p < 0.001
Communicative activity	5.56	6.8	4.17	***	***	***	F(2, 2580) = 485.4; p < 0.001
General adaptability	5.81	6.94	4.32	***	***	***	F(2, 2580) = 472.55; p < 0.001
The Fundamental Personality Dimensions							
Extraversion/Introversion	5.65	6.85	4.22	***	***	***	F(2, 2580) = 488.93; p < 0.001
Neuroticism/Emotional stability	5.3	5.3	5.66	-	**	**	F(2, 2580) = 8.2; p < 0.001
Psychoticism/Soft-heartedness	6.3	5.04	4.92	***	***	-	F(2, 2580) = 151.6; p < 0.001
Character Traits							
Hyperthymicity	5.17	6.65	4.32	***	***	***	F(2, 2580) = 404.3; p < 0.001
Stuckness	5.57	5.25	5.33	**	*	-	F(2, 2580) = 5.99; p < 0.001
Emotivity	4.87	5.61	5.61	***	***	-	F(2, 2580) = 40.05; p < 0.001
Pedanticity	5.27	6.03	5.22	***	-	***	F(2, 2580) = 54.42; p < 0.001
Anxiety	5.18	5.22	5.76	-	***	***	F(2, 2580) = 22.57; p < 0.001
Cyclothymicity	5.34	5.17	5.72	-	**	***	F(2, 2580) = 14.02; p < 0.001
Demonstrativeness	5.78	6.7	4.58	***	***	***	F(2, 2580) = 282.03; p < 0.001
Excitability	6.02	5.39	4.85	***	***	***	F(2, 2580) = 101.2; p < 0.001
Dystimicity	5.48	4.69	5.85	***	*	***	F(2, 2580) = 80.17; p < 0.001
Exalitveness	5.41	5	5.7	***	-	***	F(2, 2580) = 23.73; p < 0.001
Motivation							
Achievement Motivation	5.06	6.79	4.75	***	***	***	F(2, 2580) = 297.85; p < 0.001
Value Motivation	5.1	6.54	4.98	***	-	***	F(2, 2580) = 173.61; p < 0.001
Accessibility Motivation	5.83	5.57	4.74	**	***	***	F(2, 2580) = 112.55; p < 0.001
The Cognitive Styles							
Field Dependence	5.67	5.71	5.14	-	***	***	F(2, 2580) = 19.52; p < 0.001

Field Independence	5.39	6.72	4.83	***	***	***	F(2, 2580) = 238.4; p < 0.001
Narrow Range of Equivalence	5.14	6.38	4.94	***	*	***	F(2, 2580) = 127.46; p < 0.001
Wide Range of Equivalence	5.95	5.84	4.79	-	***	***	F(2, 2580) = 102.27; p < 0.001
Flexibility of Cognitive Control	5.4	6.88	4.72	***	***	***	F(2, 2580) = 287.47; p < 0.001
Rigidity of Cognitive Control	5.85	5.29	5.24	***	***	-	F(2, 2580) = 29.59; p < 0.001
Impulsivity	5.84	6.04	4.53	*	***	***	F(2, 2580) = 184.31; p < 0.001
Reflectivity	5.18	6.39	5.19	***	-	***	F(2, 2580) = 118.28; p < 0.001
Concrete Conceptualization	5.14	6.28	5.3	***	-	***	F(2, 2580) = 76.9; p < 0.001
Abstract Conceptualization	5.22	6.93	4.69	***	***	***	F(2, 2580) = 324.05; p < 0.001
Tolerance of Unrealistic Experience	5.05	6.86	4.96	***	-	***	F(2, 2580) = 300.81; p < 0.001
Intolerance of Unrealistic Experience	5.78	5.45	4.84	**	***	***	F(2, 2580) = 55.15; p < 0.001
IQ level							
Logical problems (LOGOP)	5.18	5.52	5.49	***	***	-	F(2, 2580) = 24.9; p < 0.001
Hardiness							
Commitment	4.93	6.78	4.68	***	-	***	F(2, 2580) = 308.19; p < 0.001
Control	5.21	6.79	4.66	***	***	***	F(2, 2580) = 258.85; p < 0.001
Challenge	5.12	6.45	4.9	***	-	***	F(2, 2580) = 147.73; p < 0.001
Hardiness	5.05	6.86	4.66	***	**	***	F(2, 2580) = 307.15; p < 0.001
Meaning in Life							
Meaningfulness of life	4.77	6.99	5.03	***	***	***	F(2, 2580) = 361.61; p < 0.001
Purpose in Life	4.83	6.88	5.17	***	***	***	F(2, 2580) = 255.82; p < 0.001
Life Process	4.89	6.87	4.9	***	-	***	F(2, 2580) = 280.27; p < 0.001
Life Performance	4.88	6.91	4.99	***	**	***	F(2, 2580) = 293.31; p < 0.001
Locus of Control “Self”	4.95	7	5.13	***	***	***	F(2, 2580) = 308.44; p < 0.001
Locus of Control “Life”	4.74	6.76	5.24	***	***	***	F(2, 2580) = 256; p < 0.001

Axiological Orientation							
Collectivity	4.21	6.59	5.8	***	***	***	F(2, 2580) = 452.7; p < 0.001
Spiritual Satisfaction	4	7.03	6.02	***	***	***	F(2, 2580) = 760.55; p < 0.001
Creativity	4.46	6.79	5.72	***	***	***	F(2, 2580) = 371.96; p < 0.001
Life	4.2	6.84	5.69	***	***	***	F(2, 2580) = 606.37; p < 0.001
Achievement	4.09	7.03	5.83	***	***	***	F(2, 2580) = 733.66; p < 0.001
Tradition	4.4	6.54	5.62	***	***	***	F(2, 2580) = 331.53; p < 0.001
Material Well-being	4.34	6.46	5.92	***	***	***	F(2, 2580) = 383.44; p < 0.001
Individuality	4.3	7.01	6.01	***	***	***	F(2, 2580) = 494.43; p < 0.001
Profession	4.14	6.99	5.88	***	***	***	F(2, 2580) = 680.88; p < 0.001
Education	4.32	6.85	5.87	***	***	***	F(2, 2580) = 554.83; p < 0.001
Family	4.05	6.6	5.87	***	***	***	F(2, 2580) = 590.26; p < 0.001
Social life	4.29	6.96	5.63	***	***	***	F(2, 2580) = 515.52; p < 0.001
Leisure	4.17	6.92	5.96	***	***	***	F(2, 2580) = 584.04; p < 0.001
Spiritual Personality Traits							
Spiritual Virtues	4.53	6.77	5.39	***	***	***	F(2, 2580) = 357.45; p < 0.001
Positive Outlook on Life	4.8	6.77	5.15	***	***	***	F(2, 2580) = 290.14; p < 0.001
Spiritual Discipline	5.1	6.65	5.21	***	-	***	F(2, 2580) = 145.54; p < 0.001
Goodness	4.65	6.62	5.1	***	***	***	F(2, 2580) = 230.51; p < 0.001
Spiritual Service	4.53	6.6	5.24	***	***	***	F(2, 2580) = 264.12; p < 0.001
Moral Rectitude	4.58	6.75	5.49	***	***	***	F(2, 2580) = 301.17; p < 0.001
Ways of Coping							
Seeking Social Support	5.07	6.21	5.48	***	***	***	F(2, 2580) = 70.04; p < 0.001
Focus on Solving Problems	4.52	6.77	5.76	***	***	***	F(2, 2580) = 392.6; p < 0.001
Working Hard and Achieve	4.43	6.69	5.51	***	***	***	F(2, 2580) = 349.55; p < 0.001
Worry	4.83	5.96	5.78	***	***	-	F(2, 2580) = 85.18; p < 0.001
Invest in Close Friends	5.29	6.62	4.95	***	**	***	F(2, 2580) = 172.74; p < 0.001
Seek to Belong	5.33	6.39	5.37	***	-	***	F(2, 2580) = 75.97; p < 0.001

Wishful thinking	5.47	5.7	5.62	-	-	-	F(2, 2580) = 3.04; p < 0.05
Not Coping	5.95	4.56	5.6	***	***	***	F(2, 2580) = 113.69; p < 0.001
Tension Reduction	5.88	5	5.2	***	***	-	F(2, 2580) = 56.34; p < 0.001
Social Action	6.15	5.65	4.77	***	***	***	F(2, 2580) = 113.33; p < 0.001
Ignore the Problem	6.09	4.93	5.47	***	***	***	F(2, 2580) = 79.02; p < 0.001
Self-Blame	5.34	5.27	6.13	-	***	***	F(2, 2580) = 36.76; p < 0.001
Keep to Self	5.62	5.12	5.9	***	**	***	F(2, 2580) = 34.87; p < 0.001
Seek Spiritual Support	5.67	5.63	5.12	-	***	***	F(2, 2580) = 17.95; p < 0.001
Focusing on the Positive	4.97	6.57	4.94	***	-	***	F(2, 2580) = 166.83; p < 0.001
Seek Professional Help	5.79	5.88	5.02	-	***	***	F(2, 2580) = 45.2; p < 0.001
Distraction	4.86	5.99	5.1	***	*	***	F(2, 2580) = 87.22; p < 0.001
Physical Recreation	5.49	6.5	4.9	***	***	***	F(2, 2580) = 128.93; p < 0.001

*Note. * - p < 0.05, ** - p < 0.01, *** - p < 0.001*

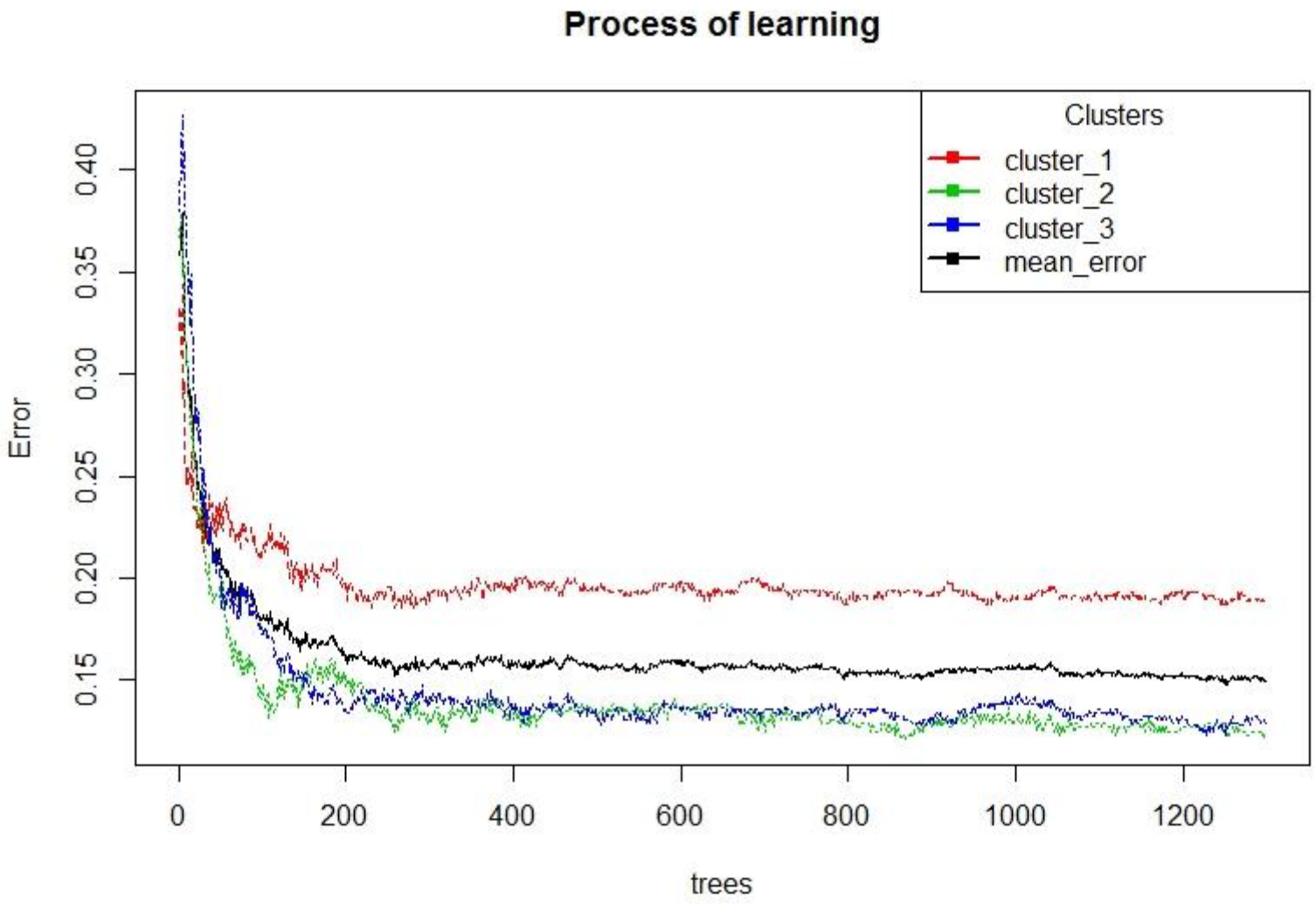

Figure S1. The process of learning a Random Forest Algorithm

Table S4. The importance of predictors based on a Random Forest Method

Indicators	Importance
Extraversion/Introversion	38.0
Achievement	33.9
Spiritual Satisfaction	33.7
Hyperthymicity	31.4
Motor Tempo	28.5
Intellectual Tempo	27.1
Social Plasticity	26.5
Life	26.3
Collectivity	26.1
Individuality	25.9
Material Well–being	25.8
Social Tempo	25.1
Impulsivity	24.7
Social Ergonicity	24.3
Abstract Conceptualization	23.7
Focus on Solving Problems	23.5
Tolerance of Unrealistic Experience	23.3
Control	23.2
Achievement Motivation	22.6
Commitment	22.6
Demonstrativeness	22.2
Locus of Control “Self”	22.1
Flexibility of Cognitive Control	21.9
Tradition	21.5
Life Performance	21.3
Working Hard and Achieve	21.1
Field Independence	19.9

Spiritual Virtues	19.8
Life Process	19.7
Worry	19.5
Motor Ergonicity	19.5
Positive Outlook on Life	18.7
Moral Rectitude	18.5
Locus of Control “Life”	18.4
Creativity	18.2
Accessibility Motivation	18.0
Goodness	16.8
Wide Range of Equivalence	16.4
Purpose in Life	16.3
Spiritual Service	16.1
Psychoticism/Soft–heartedness	16.1
Invest in Close Friends	16.1
Social Action	16.0
Excitability	15.8
Reflectivity	14.9
Spiritual Discipline	14.4
Intellectual Plasticity	14.1
Physical Recreation	13.7
Value Motivation	13.4
Not Coping	13.2
Self-Blame	13.2
Narrow Range of Equivalence	12.7
Challenge	12.4
Seek to Belong	12.0
Distraction	11.4
Focusing on the Positive	11.1
Concrete Conceptualization	10.9
Ignore the Problem	10.1
Intolerance of Unrealistic Experience	10.1

Dystimicity	9.4
Seek Professional Help	9.3
Seeking Social Support	9.3
Intellectual Ergonicity	9.0
Anxiety	8.9
Emotivity	8.8
Tension Reduction	8.0
Wishful thinking	7.3
Neuroticism/Emotional stability	6.7
Social Emotionality	6.6
Cyclothymicity	6.2
Seek Spiritual Support	6.2
Field Dependence	6.0
Rigidity of Cognitive Control	5.9
Intellectual Emotionality	5.7
Exalitveness	4.9
Pedanticity	4.2
Stuckness	3.6
Motor Plasticity	3.6
Keep to Self	3.6
Logical problems (LOGOP)	1.6
Motor Emotionality	1.2