

# Creative productivity of elderly scientists at different stages of professional development

*Vladimir M. Postavnev*<sup>1\*</sup>, *Irina V. Postavneva*<sup>1</sup>, *Mikhail L. Dvoinin*<sup>2</sup>, and *Henndy Ginting*<sup>3</sup>

<sup>1</sup>Moscow City University, Institute of Pedagogics and Psychology of Education, Department of Psychology, Moscow, Russia

<sup>2</sup>Omsk State Pedagogical University, Department of Physical Education, Omsk, Russia

<sup>3</sup>Bandung Institute of Technology, School of Business and Management, Bandung, Indonesia

**Abstract.** The article presents the results of research focusing on substantiation and development of the idea of preservation and multiplication of human capital. The issue of psychological prerequisites and social conditions for top achievements made by scientists is of scientific and practical relevance as well as identification of social and psychological factors encouraging the preservation of high productivity in elderly scientists over long periods of time. The objective of this research is to find the correlation between the key events in the academic biography and top achievements made by well-known elderly scientists at different stages of their professional development. The presented data were obtained with the help of the research interview “Life values and life journey” developed by V.S. Mukhina. The information contained in scientometric databases about the top achievements made by elderly scientists were analyzed and interpreted relying on the principles of differential acmeological analysis of professional activities conducted by famous scientists and their achievements made in the acme of their career. The correlation between the key events in the academic biographies of the interviewed elderly scientists and their top achievements has shown that reaching the acme is the result of psychological prerequisites (scientists’ personal qualities and the physical state) and social conditions of their professional activities (social status, belonging to a certain school of thought, access to organizational and financial resources). Over the whole time of academic activity conducted by senior scientists, there are usually a few productive periods called micro-acme in acmeology. It should be noted that top achievements made by scientists are typically spaced out and fall on the times with the best combination of prerequisites and conditions for scientific creativity. Within this research, identification of the most common combinations of prerequisites and conditions leading to top scientific achievements was beyond our focus. One of the promising research directions would be an attempt to identify the criteria for developing periodization of scientific productivity among elderly scientists.

---

\* Corresponding author: [postavnev@mGPU.ru](mailto:postavnev@mGPU.ru)

**Keywords:** multiple acme, differential acmeological analysis, scientific creativity, scientometric databases.

## 1 Introduction

We consider the issue of productivity of professional activities conducted by elderly scientists from the perspective of analysis of scientific creativity potential at different stages of ascent to the acme. It should be noted that in the course of evaluation of productivity shown by research groups and individual scientists, governmental and public scientific organizations, such as the Higher Attestation Commission, the Russian Foundation for Basic Research, and the Ministry of Science and Higher Education of the Russian Federation, rely on certain criteria serving to substantiate the volume of financing allocated for the supported research [1, 2]. According to these criteria, support is provided to the research resulting in a notable theoretical, methodological, or applied contribution to the corresponding scientific branch. Apart from that, the scientific achievement made by a scientist or a research group must possess high socio-cultural or economic significance.

Studies into the prerequisites and conditions for top achievements to be made by scientists and identification of the social and psychological factors encouraging the preservation of high productivity among elderly scientists are of special scientific and practical interest within the sphere of preservation and multiplication of human capital [3-8]. Research into the acmeological aspects of activities carried out by elderly scientists is becoming increasingly relevant in connection with recognition of the crucial role of individuals in the solution of present-day crises [9-13].

Analysis of the results of recent research into the usage of scientometric tools [4, 14-16] has shown that active usage of the information contained in scientometric databases for evaluation of elderly scientists' productivity allows us to get an empirical substantiation of the new optimal timelines of one's functioning in a certain job. In the context of this work, the research carried out by A.I. Savenkov and M.A. Vorontsov [4] based on analysis of scientometric databases is of scientific interest. It shows that the top achievements are made by modern scientists at the age of 58 to 78, which represents a significant contribution to the scientific ideas of human capabilities at later stages of ontogenesis.

At the same time, it should be noted that research based on the nomothetic and ideographic approaches serves the purpose of studying scientific productivity shown by scientists better since together with using information from scientometric databases it includes analysis of biographies, autobiographies, and interviews with scientists [3, 17]. The idea of multiple-peak acme as the methodological foundation of empirical research into the prerequisites and conditions for creative productivity shown by elderly scientists suggested by I.N. Semenov and S.Yu. Stepanov [5, 6] seems viable. Apart from that, we have taken into consideration V.A. Tolochek's critical view on the interpretation of multiple-peak acme and researchers' unjustified optimism regarding "one's unlimited ascent to new heights..." [18].

*Research objective:* to find the correlation between the key events in the academic biography and top achievements made by well-known elderly scientists at different stages of their professional development.

The following assumptions have been selected as the working hypotheses of this research:

- the social factor encouraging creative productivity and its preservation at a high level throughout one's lifetime is represented by one's experience of social interaction with the Teacher received by the creative person during their education and professional becoming;

- personal features distinguishing the people who have reached creative longevity allow them to develop a productive life strategy in different circumstances, remain unique, retain the need for creativity, and react adequately to the changing life requirements;
- the source and driving force for creative activity conducted by a mature creative person are represented by increasingly recognized values and meanings of creativity and life in general rather than impetus hidden in the unconscious.

## **2 Methods**

Differential acmeological analysis of professional activities conducted by well-known scientists and their top achievements [19]. The empirical material was collected in the course of interviewing elderly scientists who are involved in research work. The interview “Life values and life journey” developed by V.S. Mukhina includes eleven questions focusing on the important values and life-purpose orientations of the interviewee [20]. Well-known Russian scientists were interviewed with the help of audio and text rendering equipment (shorthand recording of the given answers). This research presents an analysis of 16 interviews given by famous Russian scientists to V.S. Mukhina. In the course of interviews with seven respondents, shorthand notes, their further decoding, and preparation of the final text were made by V.M. Postavnev.

## **3 Results**

Based on the conducted empirical research into the socio-psychological factors influencing creative productivity among elderly scientists, we have identified significant psychological features common among scientists who have preserved high productivity over their maturity and advanced age.

## **4 Discussion**

The research shows that this category of scientists possesses the ability to take action in the chosen direction despite obstacles; to pursue the scientific search in situations encumbered with social and political conditions; to overcome not only external difficulties but also internal psychological crises by effectively implementing their capability in the sphere of self-regulation and organization of one’s living space. The ability to create and maintain the atmosphere of freedom of scientific search in one’s surroundings distinguishes the majority of scientists who have retained their scientific productivity until advanced age. Their distinguishing features also include a dedication to their professional activities, respect for their teachers, and a careful attitude to the creative potential of their students and colleagues.

Qualitative analysis of the interview results allowed us to conclude that the psychological factors encouraging creative productivity and its preservation at a high level throughout one’s lifetime are the following:

- understanding and recognition of the significant role of the Teacher as a source of scientific knowledge, guide in one’s professional becoming and a Teacher in a broad sense as a value-carrier and spiritual advisor;
- high perceptiveness regarding new experience and openness to the positive influence of outstanding Teachers;
- quite a high level of general life satisfaction and low significance attached to career connected with administrative work regardless of its level;
- being absorbed in creative work, when creativity plays the role of both a significant occupation and one’s reason for existence;

- psychological state of elderly scientists is closely connected with the extent to which the external circumstances and internal conditions allow them to implement their creative plans;
- developed self-regulation and the ability to become the author of one's living space and take responsibility for the achieved results;
- the ability to arrange one's life based on long-term strategic plans as well as short-term planning of current everyday things bringing satisfaction and joy;
- along with intellectual activity, such elderly scientists are distinguished by high social activity;
- developed reflexive ability, being highly critical of oneself and one's creative results combined with being critical of various social stereotypes and social influences;
- the ability to view the growing physical disability not as a total failure but as an obstacle to productive activity;
- the scientist's spiritual abilities and spiritual power coming to the fore and manifested in continuous work on one's creative plans;
- interpreting the phenomenon of self-actualization as taking continuous actions in the chosen sphere and applying one's efforts, the result of which is one's self-enhancement.

In the course of analysis of the research interviews, it has been found that the scientists who remain active at advanced age were supported by their family in terms of their interests and aspirations in their childhood. It should be mentioned that the job of a researcher was one of the most prestigious professions in the Soviet Union in the middle of the 20th century.

No signs of ageism have been found in Russian public consciousness in relation to elderly scientists. The creative potential of elderly scientists is in demand in modern Russian society.

During their university years and in the course of their professional becoming, the interviewees had an opportunity to join active research and get acquainted with the existing scholarly traditions. The scientists whose creative productivity remains high at advanced age were also supported by older colleagues and mentors when they were young.

## 5 Conclusion

The correlation between the key events in the academic biographies of the interviewed elderly scientists and their top achievements has shown that reaching the acme is the result of psychological prerequisites (scientists' personal qualities and the physical state) and social conditions of their professional activities (social status, belonging to a certain school of thought, access to organizational and financial resources). Over the whole time of academic activity conducted by senior scientists, there are usually a few productive periods called micro-acme in acmeology. It should be noted that top achievements made by scientists are typically spaced out and fall on the times with the best combination of prerequisites and conditions for scientific creativity. Within this research, identification of the most common combinations of prerequisites and conditions leading to top scientific achievements was beyond our focus. One of the promising research directions would be an attempt to identify the criteria for developing periodization of scientific productivity among elderly scientists.

## References

1. Polozhenie o Vysheii attestatsionnoi komissii pri Ministerstve nauki i vysshego obrazovaniya Rossiiskoi Federatsii [The Regulation on the Higher Attestation Commission under the Ministry of Education and Science of the Russian Federation] (adopted by the resolution of the Government of the Russian Federation on 26 March

- 2016 no. 237), (n.d.). Accessed on: December 20, 2020. [Online]. Available: <https://base.garant.ru/71363808>
2. The Russian Foundation for Basic Research (RFBR) (n.d.). Accessed on: December 20, 2020. [Online]. Available: <https://kias.rfbr.ru>
  3. V.M. Postavnev, I.V. Postavneva, Sotsialno-psikhologicheskie faktory tvorcheskoi produktivnosti uchenykh preklonnogo vozrasta [The socio-psychological factors influencing creative productivity of elderly scientists] (Izvestiya IPPO, Moscow, 2020). Accessed on: December 20, 2020. [Online]. Available: [http://izvestia-ippo.ru/wp-content/uploads/2017/12/Pechat\\_Monografia-\\_dolgoletie-27.06.20.pdf](http://izvestia-ippo.ru/wp-content/uploads/2017/12/Pechat_Monografia-_dolgoletie-27.06.20.pdf)
  4. A.I. Savenkov, M.A. Vorontsov, Moscow City Pedagogical University Bulletin, Pedagogy and Psychology Series, **2 (36)**, 41–53 (2016)
  5. I.N. Semenov, Akmeologiya, **4 (60)**, 8–22 (2016)
  6. S.Yu. Stepanov, *Psikhologiya bessmertiya i problema tvorcheskogo dolgoletiya [The psychology of immortality and the problem of creative longevity]*, in Proceedings of the Conference “Psychology of aptitude and creativity: the 1st International Research and Practice Conference, Moscow City University, 5–6 November 2019, Moscow, Russia, 50–54 (2019). Accessed on: December 20, 2020. [Online]. Available: <http://ippo.selfip.com:85/izvestia/wp-content/uploads/2017/12/Psikhologiya-odarennosti-i-tvorchestva.pdf>
  7. S. Kwak, H. Kim, J. Chey and Y. Youm, Front. Aging Neurosci. **10 (168)** (2018). <https://doi.org/10.3389/fnagi.2018.00168>
  8. Yu.P. Zinchenko, O.Yu. Zotova, L.V. Tarasova, The European Proceedings of Social & Behavioural Sciences (EpSBS), **64**, 799–808 (2019)
  9. M.L. Dvoinin, A.M. Dvoinin, Tsennostno-smyslovaya orientatsiya molodezhi na zdorovyi obraz zhizni [Axiological orientation of the youth towards healthy lifestyle] (Omsk, Omsk State Pedagogical University Publishing 2007)
  10. G.Yu. Martyanova, Psikhologiya i Psikhotehnika, **10(97)**, 829–833 (2016)
  11. P.P. Soloshchenko, S.G. Karakonisova, A.K. Sharipov, Mezhdunarodnyi Zhurnal Eksperimentalnogo Obrazovaniya, **5**, 97–100 (2017)
  12. C. Montag, J.D. Elhai, Personality and Individual Differences, **147**, 128–134 (2019)
  13. O. Pethel, M. Moist, S. Baker, Journal of Positive Psychology and Wellbeing, **2 (1)**, 45–63 (2018)
  14. V.V. Rubtsov, A.A. Margolis, A.A. Shvedovskaya, V.V. Ponomareva, Kulturno-istoricheskaya Psikhologiya, **15(4)**, 119–132 (2019). <https://doi.org/10.17759/chp.2019150412>
  15. V. Rusalov, Philosophical Transactions of the Royal Society, B: Biological Sciences, **373 (1744)**, 20170166. 266 (2018)
  16. H. Sallis, G. Davey Smith, M.R. Munafa, Philosophical Transactions of the Royal Society B: Biological Sciences, **373 (1744)**, 20170162 (2018)
  17. A.L. Smolka, A. Nogueira, D. Dainez and A. de Laplane, *Vygotsky's Theoretical and Conceptual Contributions to Qualitative Research in Education*, in Oxford Research Encyclopedia of Education (Oxford University Press, Oxford, 2019). <https://doi.org/10.1093/acrefore/9780190264093.013.511>
  18. V.A. Tolochev, Saratov University Bulletin, New series, Series: Acmeology of education, Developmental psychology, **4, 1(13)**, 16–21 (2015)
  19. V.M. Postavnev, E.A. Alisov, I.V. Postavneva, L.S. Podymova, H. Ginting, SHS Web of Conferences **79**, 02021 (2020). <https://doi.org/10.1051/shsconf/20207902021>

20. V.S. Mukhina, *Otchuzhdennye: absolyut otchuzhdeniya* [The alienated: absolute of alienation] (Prometei, Moscow, 2009)