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Doctoral students attrition in Russian Universities:
the role of employment

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Bekova S., Dzhafarova Z. (2019) Who is Happy at Doctoral Programs: The Connection between Employment and Learning Outcomes of PhD Students. *Educational Studies Moscow*, 1, pp. 87-108 (In Russian)

Terentiev E.A., Bekova S.K., Maloshonok N.G. (2018) The Crisis of Postgraduate Studies in Russia: What Bears Problems and How to Overcome Them. *University Management: Practice and Analysis*. 2018; 22(5):54-66. (In Russian) <https://doi.org/10.15826/umpa.2018.05.049>

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Introduction

Highly skilled graduates are considered today as a necessary condition for innovations, technological development, and economic growth and doctoral programs serve as a main provider of these specialists (Auriol 2010). Countries are interested in the development of science and innovation and invest in increasing the number and quality of PhDs (Cyranoski, Gilbert, Ledford, Nayar, Yahia, 2011). Although the number of doctoral students and PhD holders is constantly increasing (Yudkevich, Altbach, de Wit, 2020), a large proportion of PhD students never graduate (Council of Graduate Schools, 2008).

The high attrition rate among doctoral students is seen as a problem for several reasons. First, it is losses on an individual level. In case of dropout, time and efforts spent on training, conducting a thesis project, writing articles and dissertation and other students investments do not pay off in the expected manner. Doctoral students who pay for their training also bear economic losses. (MLA Office of Research 2016). Entering the non-academic labor market, former doctoral students often occupy starting positions and receive lower salaries compared to those who, after finishing master level, immediately started working (Lovitts, 2001). In addition to economic and time losses, dropping out from the program can be viewed by doctoral students as a failure (Lovitts 2001) and can lead to negative psychological consequences (McCormack 2005; Ampaw and Jaeger 2010). Studies showed that dropout at earlier stages is less severe in its consequences (Golde 2005; Lott, Gardner, and Powers 2009); however, many doctoral students leave the program during the final stages (Gardner, 2009).

Second, on the institutional level, supervisors, the department, and the university lose the resources (time, knowledge, money) that were invested into doctoral student training and do not get a specialist with a degree (Ampaw and Jaeger 2012). High attrition rate may serve as a warning about the following problems in doctoral programs: ineffective selection process, issues in advisors' appointments, heavy psychological climate, and insufficient student support

(Golde 2005; Leonard, Becker, and Coate 2005). In the countries with state-funded educational programs, high attrition rate is considered as an inefficient public spending.

There are different ways to determine and measure attrition: the proportion of non-degree holders can be calculated for a cohort of applicants enrolled in the same year and for different cohorts, it also can be measured as the proportion of students who have not received a degree within a certain number of years after their admission (Bowen and Rudenstine, 1992). In fact, in Russia, the latter indicator is used to assess dropout rate, while the length of the normative period of study depending on the form and direction of study plus one year is taken into account. In this work, we will consider one as a dropout student if the degree was not obtained within two years after the end of the normative period of study. The choice of the time period was based on the results of research showing that the majority of PhD students receive their degrees during this time (Bedniy, Mironos, Rybakov, 2019). The research does not take into account the reasons for leaving the doctoral program (non-fulfillment of the educational plan, voluntarily, due to family circumstances), because the administrative data do not always contain complete information and reflect the real situation of leaving.

The proportion of doctoral students who have dropped out varies from country to country. For example, in Spain the dropout rate is estimated at 70-90% (Castello et al., 2017), dropout rates in Australia are around 28-38% (Spronken-Smith, Cameron, Quigg, 2018), US studies estimate dropout rates to average 50-60% (Sowell, Allum, Okahana, 2015). The share of Russian PhD graduates, who did not defend their theses, within the expected period, has been steadily increasing since 2007 and in 2019 was 89,6 % (Federal State Statistics Service, 2020a). It should be noted that the given estimates of attrition rate in Russia are based on the calculation of the share of PhDs only from graduates. Taking into account doctoral student that leave during their training, the dropout rate will be even higher. On the other hand, this indicator does not include degrees received

later than one year after the end of the normative period of study. Studies of selected universities have shown that many doctoral students do not give up their thesis after graduation and more than 40% of graduates receive their degree within two years after graduation (Bedniy, Mironos, Rybakov, 2019), and on this indicator the situation with the dropout rate in Russia is comparable with other countries.

Comparisons of Russia and other countries should be made with caution. A number of challenges faced by doctoral education are common worldwide: the increasing alternatives to PhD career trajectories after graduation (Lee, Miozzo, Laredo, 2010), changes in students' requests for doctoral training (Nerad, 2006), non-competitive salaries at the initial academic positions compared to the external labor market (Woolston, 2019; Wage dynamics and regulations in Russian science, 2017). However, there are a number of differences in Russian doctoral programs, which are crucial for the study of attrition. There are no or very limited practices in Russia that contribute to the retention of students at university. Foreign universities have a wide range of degrees, and there are professional degrees for those who plan to work in a particular professional field (e.g. law, medicine, education). They have a different format of study, thesis and sometimes length of study (Scott, Brown, Lunt, 2004). Some countries also offer a variety of formats for partial or full financial support for doctoral students, as well as teaching or research assistants' positions. Studies have shown that different forms of financial support for doctoral students not only increase the chances of defense, but also reduce the time to degree (Van der Haert et al., 2013; Spronken-Smith, Cameron, Quigg, 2018). In a number of European countries (Netherlands, Scandinavian countries), doctoral candidates are considered rather as employees than students and work on a research project related to their thesis from the beginning of studying process (Bartelse, Oost, Sonneveld, 2007). There were attempts to introduce this model in Russia, but so far, these are only a few universities (Maloshonok, Terentyev, 2019).

Another specific characteristic of the Russian doctoral programs is the excessive state control. Although the attrition rate is high, the state regulation and requirements for the defense are only getting tougher: over the past few years, the number of articles required for defense has increased, and the requirements for journals in which the results of work should be published have been constantly tightened (Resolution of the Government of the Russian Federation, 2013). These changes were motivated by the massification of doctoral education in the 1990s, a decreasing quality of theses and the thesis black market growth (Kallimulin, 2005).

In addition, over the past few years, the number of doctoral students in Russia has been steadily declining (the global trend is reversed), as well as the proportion of young people who go to doctoral programs immediately after graduation (Federal State Statistics Service, 2020a). In such conditions, the high dropout rate raises the problem of replacement and recruitment of research and teaching staff. Average age of university staff in Russia is constantly increasing, and the share of employees over 60 years is steadily growing (Gusev 2015). The ageing of the teaching staff together with the outflow of highly qualified staff from the academic sector can be a significant risk for higher education sector.

Finally, an important characteristic of Russian doctoral education is that many PhD students do not consider study as their main type of activity, since 90% of PhD students combine study with work (Bekova, Jafarova, 2019). State financial support for postgraduate students is very low today: state scholarships for doctoral students are 5-10 times less than the average income (Federal State Statistics Service, 2020b), while there are practically no other sources of funding (Martynova, Ratai, 2019). Despite the fact that the majority of the PhD positions are funded by the state budget (67.3% at universities and 84.8% at scientific institutes) (Berezina, Vasilyeva, Lebedev, Pluzhnova, Prokhorova, Fedin, 2018), support for PhD students is insufficient and many of them are forced to work.

There are different views on how work during training is related to dropout from doctoral programs. Reviews of studies show that doctoral students who have successfully completed their studies believe that employment has contributed to their progress, while those who have dropped out view the combining of study and work as an obstacle (Bair, Haworth, 2004). Surveys of supervisors show that they see external employment as a key barrier to defense (D'Andrea, 2002). There are no studies in Russia showing the relationship between combining study with work and dropout. This research is aimed to fill this gap and seeks to explore how employment during the doctoral training is related to the process and results of doctoral education and what characteristics of employment affect the chances of obtaining a degree.

Objectives of the study

Despite the importance of the dropout problem, there are not many works on this topic (Litalien et al., 2015). Existing research on doctoral student dropout factors can be divided into two categories: those that relate primarily to student characteristics and those that focus on institutional characteristics. Among the individual characteristics, the following parameters are studied: gender (Lott, Gardner, Powers, 2009; Castelló, Pardo, Sala-Bubaré, Suñe-Soler, 2017; Wright, Cochrane, 2000; Ampaw, Jaeger, 2012; Vassil, Solvak, 2012), race (Herzig, 2004), psychological characteristics (Gardner, 2013; Pyhältö, Keskinen, 2012; Litalien, Guay, 2015).

Among the institutional characteristics, the following parameters are studied: field of study (Golde, 2005; Nettles, Millett, 2006; Gardner, 2009; Vassil, Solvak, 2012), mode of study (Ampaw, Jaeger, 2011; 2012; Castelló, Pardo, Sala-Bubaré, Suñe-Soler, 2017), integration into academic community, socialization (Gonzalez, 2006; Boden, Borrego, Newswander, 2011). Interaction with the supervisor (Burmeister, 2015; Ruud, Saclarides, Jackson, Lubienski, 2016; Devos, Boudrenghien, Van der Linden, Azzi, Frenay, Galand, Klein, 2016)

and with peers (Pilbeam, Denyer, 2009; Flores-Scott, Nerad, 2012; Ampaw, Jaeger, 2012) is also studied as a dropout factor. In Russia, dropout factors at doctoral level rarely fall into the focus of researchers. In order to assess the range of potential dropout factors for Russia, as well as subsequently to put the results into relevant context, the **first objective** of this study is to analyze the context of transformation and the current state of the Russian doctoral education.

The dropout studies often appear to be applied projects; those studies that include a theoretical framework are mostly based on the framework of academic suicide (Braxton, Milem, Sullivan, 2000). This approach is rooted in E. Durkheim's concept of suicide, which sees the act of suicide as the result of violations in integration and regulation processes in society (Durkheim, 1994). Durkheim's typology is based on two independent foundations: integration and regulation. The extreme values of each of these bases represent one type of suicide. Lack of integration into society leads to egoistic suicide, while overintegration leads to altruistic suicide (Durkheim, 1994). Insufficient regulation, such as periods of significant social changes when norms are blurred, leads to an increase in anomic suicides and social hyperregulation leads to fatalistic suicides (Durkheim, 1994).

Higher education researchers using Durkheim's approach view dropout as a result of students' interaction with the social and academic environment at the university (Spady, 1970; Tinto, 1975). The degree of students' integration into these areas determines the decision to stay in or leave the university. However, these studies consider only one type of suicide - egoistic (Herzig, 2002; Billups, 2010). This paper is also based on the concept of academic suicide and the **second objective** of the study is to evaluate the possibility of applying this concept to the study of dropout in Russia using the entire Durkheim typology.

The vast majority of Russian doctoral students combine study with work, which affects the process and results of their studies. At the same time, this factor can work in both positive and negative ways. Working during training can

facilitate career choice, development of various skills, career growth. Full-time work is quite common for a number of fields and often enriches students' experience by creating a bridge between theoretical knowledge and practice (Bair, Haworth, 2004). The negative effect of employment on learning outcomes may be related to a lack of time and energy for a thesis, a change of motivation to learn, a reduced involvement in training. There are not so many studies on the relationship between employment during training and obtaining a degree, and the results are not always consistent with each other. For example, doctoral students who have not received a degree consider employment during their studies to be an obstacle, while PhDs, on the contrary, believe that employment has contributed to their progress (Bair, Haworth, 2004).

Later studies shifted to the focus on the differences of funding which is understandable, since universities in Europe and the USA have institutionalized the way in which doctoral students are included in various forms of full or partial funding. Reviews of studies on this topic show the importance of financial support for the completion rate, as well as significant differences in learning outcomes between doctoral students with different types of funding (Bair, Haworth, 2004). Scholarship not only increases the chances to get a degree but also decreases the time to degree (Spronken-Smith, Cameron, and Quigg 2018). The funding that allows a doctoral student to fully concentrate on the thesis (grant, fellowship) is positively associated with a higher proportion of defenses (Ampaw, Jaeger, 2011; Van der Haert et al., 2013). In addition, studies show that PhD funding is positively correlated with publication activity both during and after graduation (Horta, Cattaneo, Meoli, 2016).

Employment during study, especially off campus, as a dropout factor is studied in countries where state funding of the education system has existed for a long time or where other forms of funding have not been institutionalized. These include post-Soviet countries and some Eastern European countries. In these countries, financial support for students is often low, and the issue of financial

support falls mainly on students. Studies show that with insufficient financial support, most PhD students have to work (Vassil, Solvak, 2012). In Russia, financial difficulties are also one of the key problems for doctoral students (Maloshonok, Terentev, 2019), but there are no studies on the relationship between employment and attrition in Russian doctoral programs. The exception is Balabanov's study (2003), which showed that work is not a significant barrier to learning. According to this cross-sectional study, doctoral students working 20 hours a week or more successfully complete their studying plan. Studying the relationship between combining study with work and various aspects of the PhD training process is **the third objective** of this study. Based on the cross-sectional survey data, we will assess the extent of students employment during their training, describe the main options for combining study and work, and explore the relationship between employment and key learning aspects of each stage of doctoral students experience:

- admission (motivation to enter doctoral programs);
- learning (assessment of the learning process, interaction with the supervisor);
- graduation (academic and career plans).

Studying the learning process provides information directly about the experience of doctoral students. However, in order to work with the dropout problem, the most important is to study the relationship between factors and outcomes: the dropout rate, the chances of defense, and the time to degree. Therefore, **the fourth objective** of this study is to examine the relationship between the characteristics of employment during the study (the fact of employment, place and workload, the academic orientation of the postgraduate student, his or her plans) and the learning outcomes (the fact of defense). Most studies of doctoral dropout factors are cross-sectional and usually use plans to complete or drop out or planning time to degree as outcome indicators (Crede and

Borrego 2014; Castelló et al. 2017). A major limitation of such studies is that they cannot provide information on actual dropout rates, and students plans may differ significantly from their actual results. In this study, we will use a longitudinal design: we will combine data from surveys conducted during students' training with administrative data on their results after several years after graduation. This will allow us to measure actual outcomes and examine their relationship to dropout factors.

Research Methodology and Design

I. Two sets of secondary data were used to address the first objective of the study which was to analyze the context of transformation and the current state of Russian doctoral education:

1. "Russian Universities" dataset is the results of national survey of doctoral students at universities conducted in 2016. Respondents from all fields of study and years of study took part in the survey. The response rate varied from 8% to 53% at different universities. The full set included data on 14 Russian universities (N = 2020, which is about a quarter of all PhD students in the universities). There were 12 higher education institutions participating in the "5-100" program and 2 federal universities. For the first objective the subsample of 12 universities (participants of the program "5-100", N = 1866 doctoral students) was used. Colleagues from Center for Sociology of Higher Education designed the questionnaire and performed all the fieldwork were. The author carried out the secondary data analysis.

2. Interviews with heads of doctoral schools at Russian universities and doctoral students (hereinafter - "Context" dataset). Eleven expert semi-structured interviews with those in charge of implementing doctoral programs and 20 semi-structured interviews with doctoral students from 11 universities were conducted in 2016. While selecting doctoral students, we used the following criteria: fields of training, year of study, gender. The sample included seven first year students,

eight second-year students and five students studying in the third, fourth or fifth year. There were 11 female participants and 9 male students. The duration of the interview was between 40 and 90 minutes.

The guide for heads of Grad schools consisted of questions with general information about the informant and six blocks of content: (1) recruitment and selection; (2) problems faced by the university in recruiting and selecting doctoral students; (3) the students characteristics; (4) the educational process; (5) the research environment for doctoral students; and (6) the scientific productivity of doctoral students. Guide for PhD students consisted of questions with general information about the informant and seven blocks: (1) previous teaching and research experience; (2) enrollment; (3) attitudes and motivations for study; (4) studying process; (5) employment; (6) supervision; and (7) career plans.

The interviews were conducted in several ways: face-to-face interviews, online Skype interviews, and telephone interviews. The most common difficulties faced by PhD students were identified during the analysis of the survey data and a thematic analysis of the collected interviews was conducted. The results are presented in the article: Terentiev E.A., Bekova S.K., Maloshonok N.G. (2018) The Crisis of Postgraduate Studies in Russia: What Bears Problems and How to Overcome Them. *University Management: Practice and Analysis*. 2018; 22(5):54-66. (In Russian). Author's contribution: analysis of literature, data analysis and discussion about the issues of doctoral students financial support and employment.

II. A series of interviews with those who studied at HSE doctoral programs was conducted in order to solve the second objective - to evaluate the applicability of the academic suicide theory to the study of doctoral students dropout in Russia to evaluate the possibility of applying this concept to the study of dropout in Russia using the entire Durkheim typology. The basis of the sample was made up of lists of students from 2008 to 2016, who were participants in a longitudinal study of dropout factors (dataset "HSE doctoral students"). We chose from the

initial list those who had not defended their thesis at the time of the study (it should have passed at least two years from the end of the normative period of study). The sampling parameters included year of the admission, gender, and field of study. Respondents were recruited through email invitations. As a result, 17 interviews were collected (among them 12 women, all doctoral students studied in the fields of social science and humanities). Each interview lasted from 30 to 60 minutes. Each participant agreed to the processing and further anonymous use of the data.

The guide included questions about learning experiences, the difficulties faced by students, the context, perception and experience of their departure. This dataset was used to test and expand the concept of academic suicide to analyze the Russian case. Thematic analysis of the collected interviews was conducted. The results are presented in the following article: Bekova S. (2020) Academic Suicide: Scenarios of Doctoral Student Attrition in Russia. *Voprosy obrazovaniya / Educational Studies Moscow*, no2, pp. 83-109 (In Russian)

III. To meet the third objective and to estimate the scale and types of employment of Russian doctoral students, as well as to study the relationship between various options of employment and the studying process - the full version of the data set "Russian universities" was used. The following blocks from the set of variables were used for the analysis:

- motives for entering a PhD program.
- assessment of the learning process (difficulties, satisfaction, assessment of different aspects of learning process).
- interaction with the supervisor (frequency of meetings, assessment of the supervisor student).
- Plans for getting the degree and career plans after graduation.
- employment characteristics (employment, place of employment, workload, position, relationship between work and research topic).

- Other characteristics: field of study, mode of study, course, gender, financial status assessment.

Descriptive analysis, contingency tables were used in the analysis. The results are shown in the paper: Bekova S., Dzhafarova Z. (2019) Who is Happy at Doctoral Programs: The Connection between Employment and Learning Outcomes of PhD Students. *Educational Studies Moscow*, 1, pp. 87-108 (In Russian). Author's contribution: problem statement, data analysis and description of the results, discussion.

IV. Finally, to evaluate the relationship between students' employment during the study and their graduation outcomes (chances to defend the thesis) we built the longitudinal dataset for doctoral students at the National Research University Higher School of Economics ("HSE doctoral students" dataset). The dataset consist of two parts:

1) The cross-sectional data of doctoral students' surveys, conducted in 2012, 2015, and 2016 (N = 655). These surveys were conducted by the Centre for Institutional Research of the National Research University Higher School of Economics. The university conducts doctoral student surveys repeatedly to measure student experience, satisfaction, and assessment of the program during their doctoral training. The respondents were current doctoral students from all the doctoral schools. Data were collected in May of every academic year using an online survey. The response rate was approximately 43% in 2016, 41% in 2015 and 46% in 2012. The response rate varies between 29% and 71% for different programs, and from 38% to 60% for different years of study. Information about previous educational experience, socio-demographic characteristics of respondents, and characteristics of employment during training, characteristics of training were used for secondary analysis.

2) Administrative data about the defenses were gathered at 2018 for those who studied at the Higher School of Economics in the period from 2008 to 2016 and took part in the surveys mentioned above during their training. This data is

collected by departments and accumulated by the HSE Office of Doctoral Studies. This data was updated with information on defenses from the Higher Attestation Committee website and open search results.

To check the relationship between the characteristics of employment and the outcomes we used binary logistic regression, where the dependent variable was the result of training (1 - defense, 0 - no defense), and the following characteristics as independent variables:

- Variables about employment status (dummy, 1 if student is employed), employer (dummy, the university = 1), and workload (dummy, full-time = 1).
- Gender (dummy, female = 1),
- Field of study (recoded to set of dummy variables with 'social sciences' as the referent category),
- Mode of the study (dummy, full-time = 1),
- The advanced doctoral program (dummy, yes = 1),
- Information about prior graduate degree (dummy, 1 if a student obtains a previous degree in the same university),
- Academic career as a motive to pursue a degree (dummy, yes = 1),
- Plan to work in the academia after graduation (dummy, yes = 1),
- Research assistant position in the university (dummy, yes = 1).

Results are presented in the paper: Bekova S. (2020) Does Employment during Doctoral Training Reduce the PhD //Studies in Higher Education doi 10.1080/03075079.2019.1672648. p. 1-13

Limitations of the study

The collected data have a number of limitations that must be taken into account when reviewing and using the findings.

1) Part of the information sources was secondary data collected without authors' input and the objectives of the current study were not taken into account during designing the questionnaire in these studies (datasets "Russian

Universities, "Context" and the survey part of the longitudinal datasets). Consequently, objectives and data analysis are limited by the available set of variables. For example, there was no information about the position for students employed off campus in the cross-sectional dataset and in the survey part of the longitudinal set, so it was impossible to estimate the share of employed in R&D sector off campus and to check the relationship between the position and chances to defend the thesis for these doctoral students. Due to the use of secondary data, many factors associated with dropout in other studies were not studied (role and relationships with the supervisor, relations with peers, students skills and psychological characteristics).

2) Limited number of universities.

The conclusions based on quantitative data should be interpreted with caution, as both data sets do not fully represent Russian universities doctoral programs. The "Russian universities" set includes data on 14 leading universities, while the longitudinal set includes data on one university. The unrepresentativeness of the data was caused by limited access to universities. The national survey was supported by the Ministry of Education and Science. The Universities received letters of invitation to participate in the survey, and the collected database was limited to those universities that responded to the invitation. The choice of one university in the longitudinal set was caused by the need for non-anonymous data for research objectives.

There are some datasets shifts due to the specifics of the data collection. For example, there is a large share of 1st and 2nd year doctoral students in "Russian Universities" dataset (71%), and prevalence (64%) of social sciences students in the longitudinal dataset. Due to a lower response from male informants women prevailed (70%) in the dataset "HSE doctoral students". The overall response rate to the interview was low. This may be due to the sensitivity of the attrition theme that may be perceived negatively by former students.

3) The main source of information in this study, with the exception of interviews with doctoral education department heads, were students, and the work mainly presents their views. Other studies show that, for example, scientific advisors have different views on the dropout problem, considering among the main factors such as students skills and knowledge, their motivation, and interests (Lepp, Remmik, Leijen, 2016, Denis, Colet, Lison, 2019). To overcome this limitation, it is necessary to conduct comprehensive research involving various participants of the doctoral students' training process (students, supervisors, other employees, university management, etc).

4) The study deals only with university doctoral students, although the research institutes also provide doctoral training in Russia. Institutes have been excluded from the research, as only 13% of all doctoral students study there (Federal State Statistics Service, 2020a). In addition, the training process at universities and institutes may vary. For example, the doctoral education in scientific institutions has not faced massification. Institutes comprise more than half of all the organization that can provide doctoral education but the number of students at institutes is 6.5 times less than at universities. On average, there are 6 times fewer doctoral students studying at one institute than at one university. In addition, institute doctoral programs are characterized by a greater focus on training researchers rather than teachers, research work in teams, employment of doctoral students during training, (Zinovieva et al., 2018, Nefedova, Diachenko, 2019). These and other differences may significantly affect the effectiveness of doctoral programs. Perhaps that caused the fact that institutes have a comparatively better situation with defense statistics in comparison with universities. The share of graduates with PhD in scientific institutions has remained stable at around 11% since 2014, while this indicator in Universities has fallen from 19% to 10% (Federal State Statistics Service, 2020a).

Main findings

1. Analysis of the context and potential dropout factors

(Datasets "Context" and "Russian Universities")¹

In order to understand the context of the transformation of Russian doctoral education and to identify potential factors for high dropout rates, we studied the opinion of doctoral students and people responsible for university doctoral programs. As a result, we identified the following challenges for the Russian doctoral education: (1) limitations of admission process; (2) scientific advisors engagement; (3) insufficient financial support of doctoral students.

The limitations of admission process are related to the formality of the existing rules in universities that do not allow assessing adequately the applicants in terms of their academic experience and perspectives. The problem of supervisors engagement is reflected in the following aspects: doctoral students have difficulties interacting with supervisors, poorly assess their performance, and supervisors often neglect their responsibilities. All these issues combined with apprenticeship model where a doctoral student interacts mostly with the supervisor, create risks of dropout and low performance. Finally, the problem of underfunding has many implications. Primarily, it is the problem of combining study with work, as well as the low competitiveness of academic positions in comparison with the non-academic labor market.

2. How to use and widen the concept of academic suicide to study Russian doctoral students attrition ("Interview" dataset)².

On the basis of interviews with doctoral students who did not get a degree, we assessed the applicability of Durkheim's suicide typology to the study of dropout. We showed the possible application of the whole Durkheim typology to

¹ Terentev, E., S. Bekova, and N. Maloshonok. 2018. "Krizis rossijskoj aspirantury: istochniki problem i vozmozhnosti ih preodoleniya" [The crisis of postgraduate studies in Russia: what bears problems and how to overcome them] *Universitetskoe upravlenie: praktika i analiz* [The Journal University Management: Practice and Analysis] 22 (5): 52–67

² Bekova S. (2020) Academic Suicide: Scenarios of Doctoral Student Attrition in Russia. *Voprosy obrazovaniya / Educational Studies Moscow*, no2, pp. 83-109 (In Russian)

the analysis of the Russian doctoral education and based on the interview we described key challenges of doctoral students for each type of attrition:

1. Egoistic suicide: issues in interaction with supervisor, academic and social isolation, closed academic community, off campus employment, non-research position in the University.

2. Altruistic suicide: low value of doctoral students and their work for academic community and administrative staff, shift of emphasis on teaching.

3. Anomic suicide: constant changes of doctoral education, changing rules and requirements, non-transparent requirements and unpredictable learning outcomes, lack of information, formal and irregular control, high uncertainty of the future.

4. Fatalistic suicide: bureaucratization of control procedures, tough requirements, high pressure.

Interview analysis showed that deviations due to insufficient or excessive integration of students into the university, as well as lack of control or hyper regulation of their learning process can increase the risk of dropout, and the doctoral programs should maintain a delicate balance in both processes.

One of the key challenges is to combine doctoral study with work, often acting as a direct barrier to the integration of doctoral students into university. Working outside the university or the large pedagogical or administrative burden at the university limits work on the thesis and affects the motivation of the doctoral candidate for further study.

3. Relations between employment and the process of study (dataset “Russian Universities”)³

Our survey has found that the vast majority (90%) of Russian doctoral students are employed. The most common mode of employment (34% of the respondents) is full-time work outside the university. Those who are employed at

³ Bekova S., Dzhafarova Z. (2019) Who is Happy at Doctoral Programs: The Connection between Employment and Learning Outcomes of PhD Students. Educational Studies Moscow, 1, pp. 87-108.

the University are the most likely to pursue academic jobs (58% are engaged in various kinds of research and another 43%, in teaching) as well as administrative positions (about a quarter of the informants)⁴. Of the PhD students who are employed outside their university, the largest share hold non-academic positions with corporate entities (38%). Only 17% of the respondents indicated that they pursued research jobs outside the academia.

Further, we will focus on how employment is related to students experience along the course of doctoral study.

1) Admission

There are significant differences in employment options among students studying in different fields. There are more researchers among those who study for a PhD in Math and Engineering (75 and 62%, respectively), while the majority of doctoral candidates in Education (70%) are employed in teaching and instruction. A significant portion of those who pursued a doctorate in Social Sciences (35%) and Humanities (38%) have reported to hold various administrative positions.

Doctoral students who are employed at the university initially entered the programs in order to build their careers in the academic sphere, while among those working outside the university there are significantly more people who see doctoral programs as a tool to accelerate their careers outside the academia.

2) Study process

It is easier for doctoral students working on campus to combine study with work than for those who work off campus. However, not all positions in the university are the same. Doctoral students that occupy research position are in the most beneficial situation: more than half of them (55%) have a thesis topic directly related to their work. In this group, the share of those who find it difficult

⁴ The total exceeds 100% reflecting the respondents who indicated they were doing more than one job as of the time of the survey.

to combine study with work is 29%, while among doctoral students that work on campus on administrative position this share is 40% and among doctoral students that teach - 39%.

Students that work full-time off campus experience the greatest difficulties in combining study and work - 89%, among full-time workers on campus this rate is 65%. The perceived difficulty of combining learning with work depends on how the work is related to the topic of the thesis. For those whose work is not related to the thesis, it is more difficult to combine study with work.

Full-time employment off campus can be a source of difficulties but leads to more secure financial position. Contrariwise, those students who work on campus or do temporary jobs will typically report more positive and fulfilling doctoral experiences, but they are likely to be facing more financial pressure. The differences between those who work on campus and off campus are also observed in interaction with the supervisor. Doctoral students who are employed at the university communicate with their supervisor more often.

3) Further plans

Finally, doctoral students with different characteristics of employment have different academic and career plans. The most significant factor of students career plans is a place of employment. Students employed on campus either full-time and part-time are the most oriented on academic career candidates.

Occupied position is also an important factor of further career plans. Students working in research positions have exhibited strong determination to continue their career in R&D, albeit they may be considering finding employment outside the academia once they defend their thesis. PhD students who are instructors or administrative staff have been found to be generally inclined to continue working at the university, however many of them would like to change what exactly they do in the workplace. Those PhD students who at the time of the survey were employed outside the university have mostly reported that they were

unlikely to change their sector of employment or the nature of the work performed after completing their doctoral education

Finally, those PhD students who at the time of the survey were contingent employees doing casual jobs or had no employment have been identified to be the least certain about their professional future (26 and 30%, respectively). For comparison, the PhD students who work full-time either at or outside the university were more likely to express well-defined professional plans: About half of them indicated that they had already decided upon their career. This may suggest that employment of these PhD students can be viewed as a conscious professional choice. Thus, the combining work and study increases the certainty of career prospects, but career plans for students employed at and outside the university are different.

4. Relations between employment and the outcomes

(dataset “HSE doctoral students”)⁵

Only 36% of surveyed students defended their theses up to 2018. Other students graduated without defense (30%), were dismissed (19%), or quit the program before graduation (15%). Most doctoral students who receive their degree defend the thesis within 4 or 5 years after admission (79%).

The results of binary logistic regression showed that the following factors positive increase chances to defend a thesis:

- On campus employment;
- Additional academic and financial support (Advanced doctoral program);
- Previous degree from the same University
- Academic motives to pursue degree (Table 1).

Employment is a negatively related to chances to get a degree.

Table 1. Regression model results

⁵ Bekova S. (2020) Does Employment during Doctoral Training Reduce the PhD //Studies in Higher Education doi 10.1080/03075079.2019.1672648. p. 1-13

<i>Predictors</i>	Модель	
	<i>Odds Ratios</i>	<i>CI</i>
Intercept	0.38	0.14 – 1.03
Employment	0.52*	0.27 – 0.98
Employer	2.02**	1.32 – 3.09
Full-time job	1.39	0.88 – 2.20
Advanced doctoral program	3.23***	1.77 – 5.89
Female	0.75	0.52 – 1.09
Full-time mode of study	1.05	0.66 – 1.68
Field – Humanities ⁶	1.74	0.83 – 3.64
Field – STEM	0.96	0.50 – 1.83
Field – Economics	1.18	0.75 – 1.85
Field – Law	2.03*	1.16 – 3.56
Graduated from the same university	1.42 .	0.98 – 2.06
Academic motives to pursue degree	1.52 .	0.96 – 2.40
Plan to work in academia after graduation	1.37	0.88 – 2.14
Observations		629
Cox & Snell's R ² / Nagelkerke's R ²		0.119 / 0.162

Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

Employment is negatively associated with completion. Employed students have a lower completion rate than unemployed students. To understand the difference between doctoral students employed and not employed on campus, we build the model for two subsamples: employed on campus and not employed on campus (employed off campus and not employed at all) (Table 2).

⁶ 'Social sciences' is the referent category

Table 2. Models for two subsamples.

<i>Predictors</i>	Not employed on campus		Employed on campus	
	<i>Odds Ratios</i>	<i>CI</i>	<i>Odds Ratios</i>	<i>CI</i>
Intercept	0.34	0.10 – 1.15	0.36	0.07 – 1.87
Female	0.72	0.45 – 1.16	0.74	0.40 – 1.39
Full-time mode of study	0.95	0.54 – 1.66	1.43	0.60 – 3.40
Field – Humanities	2.52	0.96 – 6.62	1.16	0.36 – 3.71
Field – STEM	1.14	0.51 – 2.58	0.73	0.24 – 2.25
Field – Economics	1.12	0.60 – 2.08	1.41	0.70 – 2.81
Field – Law	2.16*	1.10 – 4.26	2.01	0.61 – 6.57
Advanced doctoral program	2.72*	1.07 – 6.89	3.49*	1.49 – 8.16
Graduated from the same university	1.59*	1.00 – 2.51	1.15	0.59 – 2.22
Academic career as a motive to pursue a degree	1.74*	1.02 – 2.96	1.14	0.43 – 3.04
Plan to work in academia after graduation	1.66	0.96 – 2.88	0.98	0.43 – 2.24
Employment	0.51	0.25 – 1.06		
Full-time job	1.49	0.77 – 2.90	1.40	0.71 – 2.76
Research assistant at the university			2.27**	1.24 – 4.14
Observations		428		201
Cox & Snell's R2 / Nagelkerke's R2		0.102 / 0.143		0.106 / 0.141

Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

The models showed that different factors are significant for thesis defense in these two groups. For doctoral students not employed on campus, academically oriented students (those who decide to pursue a degree to build an academic career and plan to work in the university after the graduation) have more chances to defend the thesis. In addition, it is important whether they graduated from the university or not. Students who graduated from the same university before entering a doctoral program defend the thesis more often. Employment itself has

a negative impact on the outcomes. Unemployed students have more chances to defend the thesis in comparison with students employed off-campus.

For students employed on campus, no significant relationships with these factors were found. The critical success factor for these students is their positions in the university. Students that occupy research assistant positions defend theses more often than students that work as instructors or administrative staff at the university. Participation in the advanced doctoral program that implies greater financial and academic support has a positive impact for both groups.

In summary, we can observe four groups based on employment characteristics:

- students employed on campus in a research position;
- students employed on campus not in a research position (instructors or administrative staff);
- students not employed;
- students employed off-campus.

Doctoral students that occupy a research position in the university demonstrate the highest completion rate, while students employed off-campus show the lowest completion rate (Table 3).

Table 3. Completion rate in groups of students
with different employment statuses

Category of employment	Completion rate (%)
Research assistants at the university	62
Not employed	44
Non-research position at the university	41
Employed off-campus	27

Thesis statements

1. The widespread theory of academic suicide that links doctoral student dropout with lack of integration into the University needs to be supplemented to apply to the Russian doctoral education and similar countries. The proposed expanded typology of academic suicide has wider explanatory potential because it includes not only the degree of integration of the doctoral student, but also the insufficient or excessive regulation of the educational process.

2. Insufficient financial support and the need to combine study with work is a barrier to the students' integration into the university and the main difficulty faced by doctoral students during their training.

3. The place of employment is a key parameter in determining the relationship between the study process and employment. Students working full time off-campus are the most vulnerable group in terms of the learning process. These students are already less focused on their study, they plan to work in the non-academic field, and they have the greatest difficulties in combining training with work.

4. Combining study with work negatively affects the chances of a postgraduate student to defend the thesis and thus contributes to the dropout rate. The exception is a research positions at the university. Additional academic and financial support by the university is also an important factor of students' outcomes.

Scientific novelty and significance of the results

The presented research is the first attempt to analyze dropout factors in Russian doctoral education and to study the relationship between employment during training with the learning process and the graduate outcomes. Given the limited number and studies data on doctoral education in Russia, this study allows to begin an evidence-based discussion about dropout factors in Russia.

The work contributes to understanding and operationalization of the academic suicide concept in the Russian context. Such features of Russian doctoral education as predominantly state funding, excessive state control over the programs efficiency, numerous reforms in the last decade, as well as the widespread combining of study and work by students, require special attention not only to the integration of doctoral students into the university environment, but also to the peculiarities of regulation of their education. To achieve this, the concept of academic suicide, which is widely used in international literature, has been extended by relying on the original Durkheim suicide typology. These results may be relevant for countries with similar doctoral education characteristics, especially post-Soviet and Eastern Europe.

Calibration of the doctoral training system by integration and regulation parameters can help reduce the severity of the dropout problem. The academic and social integration of doctoral students and the reduction of dropout rates can be facilitated by the implementation of a distributed research guidance, when students receive intellectual and organizational support not only from supervisor but also from other University employees. This will reduce the dependence of the student and academic performance on the supervisor, as well as the supervisor's workload, and will also contribute to the greater students involvement into the academic community. The implementation of doctoral schools that organize and control students' activities, co-supervision and the further development of the existing system of scientific consulting may be examples of this measure.

In the current system of doctoral training in Russia, supervisor is the main, and often the only person who interacts with the doctoral student. This increases the importance of efforts that need to be put to improve the quality of scientific guidance (changing norms of hours for supervision, training system for supervisors). Many of these reforms are relatively easy to implement and do not have legal and regulatory restrictions.

The longitudinal study of dropout factors, which was first conducted on Russian data, allowed us to trace the relationship between doctoral student experience during the training and the actual results of student in a few years. Such factors as place of employment and support for doctoral students are critically important for graduate outcomes. In this regard, such criteria as the opportunities to involve the doctoral student in research projects, the number of research teams in specific fields, and the availability of additional funding, should be paid more attention in the formation of enrolment benchmarks and recruitment process.

In order to support and keep doctoral students, universities often employ them at administrative or teaching positions, but this is not always helpful for their results. A number of universities have various support mechanisms (scholarships, support for academic mobility, etc.). An important initiative was the launch of a special grant program for doctoral students by the Russian Foundation for Basic Research. However, all these initiatives are limited. A possible option in case of limited support from the university is to develop doctoral programs in cooperation with industry. The R&D staff outside the University can work co-supervisors, develop joint research projects, and hire doctoral students.

There are extensive discussions in Russia today about what needs to be done with doctoral programs in order to improve their effectiveness. The project of a new law on doctoral education introduces mandatory defense of a thesis during the normative period of study. The increased requirements for defenses are unlikely to have the expected effect without developing effective students support tools. The research showed that dropout factors relate to many aspects of PhD students experience, and that key challenges for PhD students are not related to the normative definition of graduate outcomes.

Another important characteristic of the Russian context is that the Russian discussion about the challenges and solutions for doctoral education is not always

based on data. The statistics available in the public domain are rather limited and do not reflect the significant aspects of doctoral training and outcomes. In order to obtain complete information for decision-making in this field it is necessary to form the data infrastructure: study of the admission quality, data on the students' progress (by type of organizations, fields of training), sample studies of the students and supervisors experience during the study, tracking the trajectories of graduates with and without a degree.

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