

What Determines Satisfaction with Graduate School and Intentions to Complete it Among Modern PhD Students?

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The article focuses on the role of motivational factors in the successful completion and satisfaction with postgraduate programs. PhD students (N=155, M=26,8, SD=4,2, 63% women) participated in the study. The theoretical framework is based on self-determination theory, which provides an understanding of the sources of autonomous and controlled motivation for research activity. A battery of questionnaires was used to assess autonomous and controlled motivation for postgraduate programs (the Universal Perceived Locus of Causality scales, UPLOC, and the Doctorate-related Need Satisfaction Scale, D-N2S), publication activity, intentions to complete the postgraduate program, and satisfaction with it. The results of the study demonstrated that autonomy need satisfaction was a predictor of autonomous motivation and satisfaction with the postgraduate program, whereas competence and relatedness needs satisfaction were predictors of intentions to complete the postgraduate program. Path models also showed that autonomy need satisfaction is a predictor of low levels of controlled motivation, which in turn is a negative predictor of intentions to complete the postgraduate program and satisfaction with it. It is concluded that it is important to study and monitor motivational factors, considering their predictive power in relation to PhD students' performance. Recommendations are offered to supervisors and faculty to support PhD students' basic psychological needs for autonomy, competence, and relatedness to foster their voluntary engagement and success in the research process.

Keywords: motivation, PhD students, self-determination theory, basic psychological needs, program satisfaction, intention to complete program.

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От чего зависят удовлетворенность аспирантурой и намерения ее завершения у современных аспирантов?

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Представлены результаты работы, посвященной роли мотивационных факторов в успешном завершении аспирантуры и удовлетворенности ею. В исследовании приняли участие 155 аспирантов ($M=26,8$, $SD=4,2$, 63% женщин). Теоретической основой работы стала теория самодетерминации, позволяющая понять источники автономной и контролируемой мотивации научно-исследовательской деятельности. Автономная и контролируемая мотивация обучения в аспирантуре оценивались с помощью батареи опросников (шкал мотивационной регуляции UPLOC, удовлетворенности базовых психологических потребностей D-N2S), а также фиксировались публикационная активность, намерения завершения аспирантуры и удовлетворенность ею. Результаты показали, что удовлетворенность потребности в автономии является предиктором автономной мотивации обучения и удовлетворенности аспирантурой, тогда как удовлетворенность потребностей в компетентности и связанности является предиктором намерений завершения аспирантуры. Также с помощью путевых моделей показано, что удовлетворенность потребности в автономии является предиктором низкой выраженности контролируемой мотивации обучения, которая в свою очередь является негативным предиктором намерения завершения аспирантуры и удовлетворенности ею. Делается вывод о важности изучения и мониторинга мотивационных факторов с учетом их прогностических возможностей в отношении результатов деятельности аспирантов. Предложены рекомендации по поддержке научными руководителями и факультетами базовых психологических потребностей аспирантов в автономии, компетентности и связанности с целью добровольной вовлеченности аспирантов в исследовательский процесс и достижения в нем успешных результатов.

Ключевые слова: мотивация; аспиранты; теория самодетерминации; базовые психологические потребности; удовлетворенность обучением; намерения завершить обучение.

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Introduction

In recent years, the number of scientists and PhD students in Russia has been decreasing. The efficiency of postgraduate education, calculated as the ratio of thesis defenses on time to the number of those completing their studies, has been below 13% for the last five years [2]. It is important for science to replenish the talent pool of scientists and to understand the reasons behind the desire of postgraduate students to engage in scientific activity.

The activities of PhD students are complex and the goal of defending a thesis has become difficult to achieve. Motivation is a factor in the completion of PhD studies, academic achievement and well-being of postgraduate students [20]. Current research on motivation is based on self-determination theory (hereafter referred to as SDT) [17]. The value of SDT is that it allows to describe the characteristic types of human motivation to be described in terms of their strength, quality (different types of motivation) and combination of motivation types (motivation profile), and it establishes basic psychological needs for autonomy, competence and relatedness as sources of intrinsic motivation [26].

Meta-analyses show that intrinsic motivation is associated with academic achievement, high levels of satisfaction, positive affect and low levels of negative affect in students. Closely related identified regulation (personal value) is associated with effort, persistence, engagement, vitality, and low levels of depression [11]. These two types of motivation have been referred to as autonomous motivation, and those discussed below will be referred to as controlled motivation.

Introjected regulation (motives related to guilt and shame) shows an intermediate position between intrinsic motivation and amotivation on measures of success, well-being, and adaptive functioning. It is associated with the pursuit of

achievement (demonstrative) goals and avoidance goals of various kinds. External motivation, driven by external control, desire for reward, or avoidance of negative consequences, is related to anxiety, depression, and negative emotions and is not related to achievement and persistence. Amotivation is associated with low academic achievement, absenteeism, boredom, higher levels of anxiety, low self-efficacy and low self-esteem [11].

The learning activity of undergraduate students, whose aim is to assimilate learning material, differs from the scholarly and practical activity of PhD students. Their activity is focused on thesis defence, publications, conference reports, so these patterns may not be fully reproduced. The aim of the present study is to identify the role of autonomous and controlled motivation and basic psychological needs in satisfaction with PhD studies and intentions to complete them.

Postgraduate students' motivation research

Based on SDT and using the Motivation for PhD Studies scale (MPhD) developed by Litalien and his colleagues [14], studies have been conducted on the relationship between motivation types and burnout and complaints about teachers and the learning process [19], perceived competence, probability of completing PhD studies and dropout intentions [13], stage of study and demographic variables [21].

The research shows that autonomous motivation is a positive and controlled motivation is a negative predictor of perceived competence. Postgraduate students who perceived themselves as more competent were more likely to graduate. Those with autonomous motivation were more likely to present at conferences, had more publications, and had lower dropout rates

than PhD students with controlled motivation [13]. The largest shift in postgraduate students' motivation (from autonomous to controlled) occurred between the first (learning) and subsequent stages of study [21].

The latent profile analysis of PhD students' motivation shows the presence of three or four profiles. In the solution with three profiles such as highly motivated, demotivated and amotivated [19], and with four profiles — low and highly self-determined, introjected and identified [12] are highlighted.

Russian studies of PhD students have addressed motives for enrolment [5], environmental sources of intrinsic motivation [15], postgraduate plans at different stages of study, and socio-demographic characteristics of postgraduates [1; 4]. For example, Terent'ev and his colleagues conducted one of the first SDT-based studies of PhD students' motivation by analysing their extended interview responses [5]. They found that intrinsic motivation, such as an interest in conducting research and a desire to do science, remained the most common motivations for enrolment. However, there are PhD students who enter due to a lack of meaningful alternatives (16%) or due to a coincidence of circumstances (17%), i.e. those who have no meaningful reasons for admission, who are initially amotivated.

Due to the lack of a Russian version of the postgraduate motivation questionnaire, it is impossible to compare Russian studies with foreign ones, to assess their motivation profiles and environmental predictors. The inclusion of the amotivation scale in the PhD student motivation questionnaire is important because studies show its significant expression [5].

Sources of PhD students' motivation research

One of the statements of SDT is the position on the role of the basic psychological needs satisfaction as a source of intrinsic motivation. Basic psychological needs include the needs for autonomy, competence and relatedness [17]. The basic psychological need for autonomy is the desire to control one's own actions and behaviour, to be their independent initiator. The basic psychologi-

cal need for competence is the desire to feel effective and able to cope with complex tasks. The basic psychological need for relatedness is the desire to build relationships that provide a sense of acceptance, understanding, and support. The ways in which basic psychological needs are satisfied may vary, but they themselves remain universal and necessary conditions for development, integration and well-being [23].

PhD students' autonomous motivation was related to the support of their basic psychological needs by their supervisor, faculty and other postgraduate students. PhD students who felt that their basic psychological needs were supported perceived to be more competent. They were more likely to complete their studies successfully [13] and showed persistence and engagement [22].

A number of studies suggest an unequal contribution of PhD students' basic psychological needs satisfaction to their motivation and performance [8; 19; 21]. Autonomy and competence satisfaction play a crucial role in determining the motivational profiles of PhD students [19]. Analyses of the relationship between basic psychological needs satisfaction and various indicators (exhaustion, progression, persistence and probability of completing postgraduate studies) showed their consistent relationship primarily with competence satisfaction [8].

In addition to the factors of PhD students' efficiency, the factors of intention to complete postgraduate studies and satisfaction with studies, scientific supervision is also examined. The contribution of the relationship with a supervisor and working as an assistant on research projects to PhD studies satisfaction have been confirmed [7; 9; 18]. The question of the correlation between satisfaction with PhD studies and intentions to complete them and different types of postgraduate students' motivation and their basic psychological needs satisfaction remains open.

The empirical hypotheses of the study were:

1) satisfaction with PhD studies and intentions to complete them will be positively related to autonomous motivation and negatively related to controlled motivation and amotivation;

2) the quality of motivation, satisfaction with PhD studies and intentions to complete them will

be related to: a) basic psychological needs satisfaction, b) especially — to the basic psychological need for competence.

Participants and methods

Participants

Participants in the pilot study in spring 2021 included 69 postgraduate students aged 23 to 47 years ($M=26.96$; $SD=4.07$), including 52% women.

Participants in the main study in winter 2021/2022 were 155 postgraduate students from Russian universities aged 21 to 48 years ($M=26.78$; $SD=4.22$), including 63% women.

Methods

Motivation Diagnosis. Two scales of PhD students' motivation (MPhD and UPLOC) were used in the pilot phase. The second was selected for the main phase according to the criteria of the best fit with the theory and the pattern of intercorrelations of the subscales.

The Universal perceived locus of causality scales (UPLOC) [6] are modified for postgraduate students and consist of 29 statements and six scales (intrinsic, identified, positive and negative introjected, external motivation and amotivation). Participants were asked to rate on a 5-point Likert scale the response options to the question, "Why are you currently in PhD studies?" Example statement: "Because I enjoy working on my thesis" (intrinsic motivation). All scales had acceptable reliability ($\alpha=0.75$ — 0.93).

Needs satisfaction. The basic psychological need satisfaction scales of the Doctorate-related Need Support and Need Satisfaction short scales (D-N2S) [22] were used. Participants were asked to mark their agreement with statements on a 7-point Likert scale, e.g.: "In the context of my PhD studies, I have confidence in my ability to finish my PhD studies" (competence satisfaction). All scales have acceptable reliability ($\alpha=0.69$ — 0.73).

Satisfaction and performance indicators were measured as follows:

1) Satisfaction with postgraduate studies was assessed using a modification of E. Diener's Life Satisfaction scale, adapted by E.N. Osin

and D.A. Leontiev [3]. The scale has acceptable reliability ($\alpha=0.89$);

2) Life satisfaction was rated on a graphic scale with smiling faces from 1 (not satisfied) to 7 (very satisfied);

3) Self-assessment of the probability of completing PhD studies on time — 0—100%;

4) Publication activity: total number of published, in press and forthcoming publications.

Sociodemographic factors included age, gender, university, and year.

Methods of statistical data processing included descriptive statistics, correlation and regression analysis, structural modelling, calculation of reliability indices. Statistical procedures were performed in SPSS AMOS 26.0 and jamovi software packages.

Results

Correlation analysis showed that satisfaction with PhD studies and intentions to complete them are significantly strongly directly related to intrinsic and identified motivation, basic psychological needs satisfaction and negatively related to external motivation and amotivation. Publication activity is significantly positively related to autonomous motivation and basic psychological needs satisfaction, especially the need for competence. Life satisfaction is positively related to intrinsic motivation, needs satisfaction, especially the basic psychological needs for competence and autonomy (see table).

Regression analysis showed that amotivation was the strongest significant negative predictor of both satisfaction with PhD studies and intentions to complete them ($\beta=-0.62$, $p<0.001$; $\beta=-0.38$, $p<0.001$ respectively).

In order to test the assumption of the influence of motivational factors on the dependent variables, two structural models were constructed. PhD studies satisfaction and intentions to complete them were considered dependent variables. Basic psychological needs satisfaction was considered as their predictor, with direct and indirect effects through autonomous (intrinsic and identified motivation) and controlled motivation (external motivation and amotivation).

Descriptive statistics and correlation analysis (Spearman) of the correlation between motivation, basic psychological needs and performance indicators

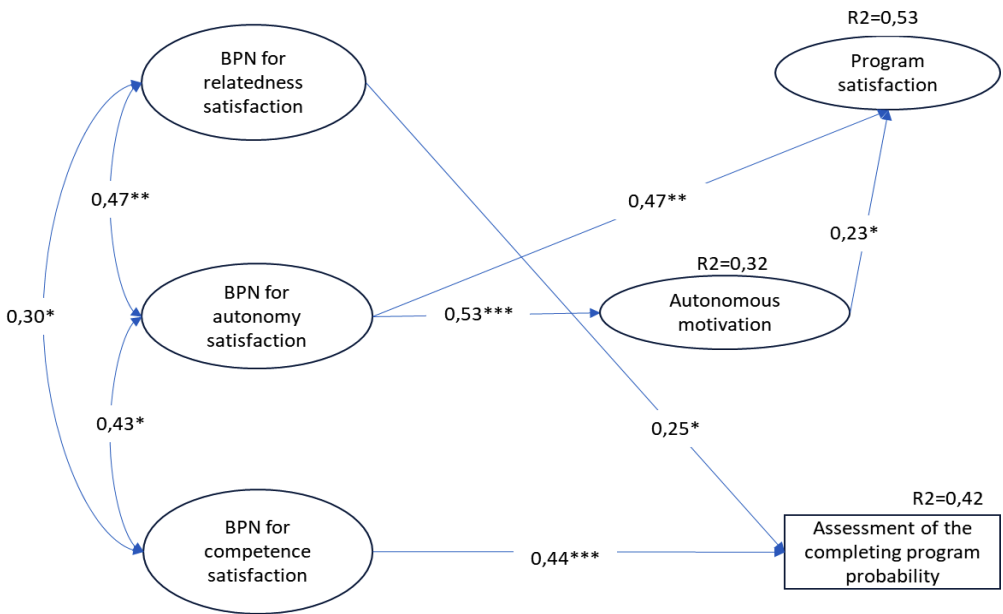
№	Variable	1	2	3	4	5	6	7	8	9	PHD studies satisfaction	Probability to complete PHD studies	Life satisfaction	Publications
1	Intrinsic motivation	—									0,55***	0,31***	0,21**	0,21**
2	Identified	0,81***	—								0,52***	0,29***	0,18*	0,21**
3	Positive introjected	0,18*	0,32**	—							0,16*	0,03	0,00	-0,09
4	Negative introjected	-0,07	-0,01	0,46***	—						-0,07	-0,10	-0,08	-0,06
5	External	-0,50***	-0,46***	0,10	0,38**	—					-0,40**	-0,21*	-0,12	-0,15
6	Amotivation	-0,71***	-0,69***	-0,11	0,16*	0,53**	—				-0,69**	-0,39***	-0,18*	-0,19*
7	Competence satisfaction	0,36**	0,32***	-0,11	-0,29**	-0,24**	-0,34***	—			0,30**	0,57***	0,35***	0,38**
8	Autonomy satisfaction	0,49***	0,39**	-0,04	-0,25**	-0,42**	-0,51***	0,36***	—		0,56***	0,24**	0,28**	0,18*
9	Relatedness satisfaction	0,25***	0,28***	-0,11	-0,12	-0,26**	-0,27**	0,25**	0,36***	—	0,27***	0,20*	0,17*	0,23**
10	M	3,85	3,82	2,93	2,12	2,06	2,23	4,15	5,32	5,24	19,70	68%	4,99	3,71
11	SD	0,93	0,88	0,99	1,00	0,95	1,16	1,34	1,25	1,28	7,13	27%	1,57	3,83
12	Cronbach's Alpha	0,92	0,90	0,78	0,81	0,75	0,93	0,69	0,70	0,73	0,89	—	—	—

Note: * — p<0,05, ** — p<0,01, *** — p<0,001.

Model evaluation showed an acceptable fit to the data [10]: $\chi^2=492$; $df=292$; $p\leq 0.001$; $CFI=0.919$; $TLI=0.903$; $SRMR=0.075$; $RMSEA=0.068$; 95% confidence interval for $RMSEA$: 0.058-0.079 (Fig. 1) and $\chi^2=411$; $df=220$; $p\leq 0.001$; $CFI=0.910$; $TLI=0.887$; $SRMR=0.065$; $RMSEA=0.076$; 95% confidence interval for $RMSEA$: 0.065-0.088 (Fig. 2). Figures 1 and 2 show only the structural parts of the models and the significant coefficients. The results showed that autonomous motivation was a significant predictor of PhD studies satisfaction and controlled motivation was a negative predictor of both dependent variables. Autonomy satisfaction is a direct and indirect predictor of PhD studies satisfaction, being a positive predictor of autonomous motivation and a negative predictor of controlled motivation. Needs for competence and relatedness satisfaction were significant predictors of intentions to complete PhD studies, especially competence satisfaction.

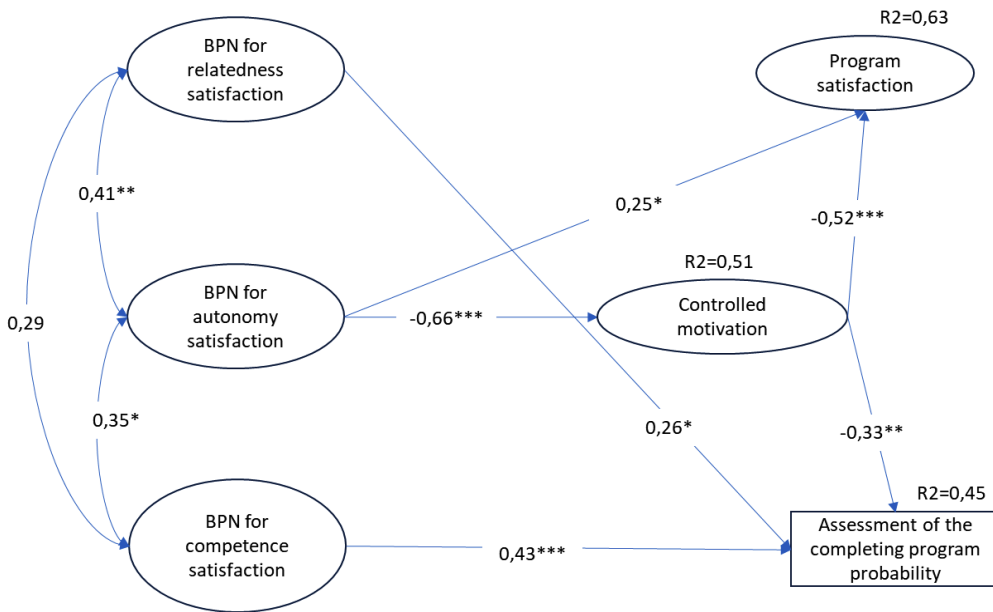
Discussion

Hypotheses regarding the relationships of autonomous and controlled motivation with basic psychological need satisfaction and PhD students' performance were confirmed. Regression analysis and structural equation modelling showed that autonomy satisfaction was a predictor of satisfaction with PhD studies and intentions to complete them successfully (via reduced controlled motivation), whereas competence satisfaction was a predictor of postgraduate study completion intentions. These findings are consistent with research indicating the importance of these two basic psychological needs for PhD students' performance [19]; our study adds to this the fact that each basic psychological need may predict its own specific outcomes. Consistent with hypothesis 2b, the importance of competence satisfaction was confirmed, with the results also indicating the importance of autonomy satisfaction and some importance of relatedness satisfaction.



* $p<0,05$, ** $p<0,01$, *** $p<0,001$

Fig. 1. Structural model of the relationship between satisfaction with PhD studies and completion intentions, basic psychological needs satisfaction and autonomous motivation



* p<0,05, ** p<0,01, *** p<0,001

Fig. 2. Structural model of the relationship between satisfaction with PhD studies, completion intentions, basic psychological needs satisfaction, and controlled motivation

The assumption of amotivation as a characteristic type of motivational regulation of PhD students was confirmed. In contrast to the data obtained from undergraduate students [11], our data indicate a slightly greater predictive power of controlled motivation, which is a negative predictor of both dependent variables.

The main limitations of the study are its cross-sectional nature, which does not provide sufficient grounds for inferring about causal effects; the characteristics of the sample with a high proportion of first-year postgraduate students from metropolitan universities; and the lack of data on objective indicators of their performance.

Summarising the theoretical and empirical data on the influence of environmental factors on PhD students' motivation and basic psychological need satisfaction, it is possible to recommend practices to supervisors and faculties to support them:

Competence support: providing tasks of optimal complexity; helping to plan and structure research activities; paying attention to the quality, mode and timing of feedback; praising progress and effort; showing hope and optimism; advising on professional development and building an academic career; recognising of professional achievements;

Autonomy support: respecting research interests, ideas; encouraging independence; encouraging choice, decision making, leadership;

Relatedness support: paying attention to psychological well-being; demonstrating understanding; effective communication and dialogue; coherent communication style; creating opportunities for academic collaboration, an environment for active communication and socialisation.

Conclusion

The research highlights the importance of the variables studied. It shows that autonomous motivation is a predictor of satisfaction with PhD

studies, while controlled motivation and amotivation are negative predictors of both satisfaction and intentions to complete PhD studies. Autonomy satisfaction is a predictor of PhD studies satisfaction, and competence satisfaction is associated with higher publication activity and is a predictor of intentions to complete PhD studies. The monitoring of PhD students' in universities could use data on amotivation, external, intrinsic and identified regulation, competence and autonomy needs satisfaction, as they provide the most important information on the PhD students'

motivational functioning. Prospects for further research could include analysing the environmental factors supporting basic psychological needs and the quality of PhD students' motivation, assessing their motivation profiles and basic psychological need satisfaction at different stages of their studies. PhD students' basic needs support underlies their intrinsic motivation for scientific activity. Informing academic supervisors about such support strategies can reduce amotivation and dropout, and increase their performance and satisfaction with PhD studies.

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