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Gender Peculiarities in the Psychosocial Adaptation of Students to the Pedagogical University Education

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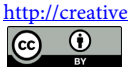

Abstract

This study examines the psychophysiological and personal characteristics of first-year students at the Kuibyshev branch of Novosibirsk State Pedagogical University (59 females and 35 males) across different academic fields. Personal characteristics were assessed using a computer-based program designed to evaluate socio-psychological adaptation and personal potential, based on the methodology of Rogers and Diamond as adapted by K. A. Osnitsky. Psychoemotional state was evaluated using the methods of Ehlers, Buss-Durkee, and Spielberger (adapted by Yu. L. Khanin). The study included assessment of psychophysiological parameters such as simple visual-motor reaction time, reaction to a moving object, and cognitive functions (mechanical, semantic, and imaginative memory, mental performance, and attention). The study identified gender-related differences in psychological and psychophysiological characteristics among students. Male students tended to exhibit higher self-regulation, motivation-related traits, and faster sensorimotor responses, whereas female students showed higher anxiety levels alongside stronger performance in certain cognitive functions such as imaginative memory and attentional flexibility. No meaningful differences were found in the mobility and productivity of nervous processes, semantic memory, or indicators of hostility. Educational specialization was not associated with variations in psychosocial characteristics. The results suggest that gender differences in psychosocial status and psychophysiological traits are determined not only by biological factors but also significantly shaped by socio-cultural influences. Further research is needed to explore the interaction between these factors in the context of higher education.

Keywords

Students, Gender Differences, Mental Health, Educational Environment, Socialization, Adaptability

1. Introduction

Student adaptation to the university educational environment remains a relevant issue in the context of socio-economic instability and increasing academic demands. The transition from secondary school to higher education involves substantial changes in social context, learning formats, and daily routines, requiring the activation of adaptive mechanisms and restructuring of behavioral strategies. First-year students are particularly vulnerable to psychoemotional stress due to increased academic workload, the necessity for independent learning, and the establishment of new social relationships (Abdulina, 2008). The range of issues related to this issue is widely discussed not only in the scientific literature but also among the priority state and public tasks (Aizman et al., 2014; Bonkalo & Polyakova, 2023; Yangirova & Ivanova, 2016). In Russian research papers, attention was mainly paid to the issues of morphofunctional health of students (Baiguzhin, Kirsanov, & Shibkova, 2017; Zhomin & Rubanovich, 2010; Kirsanov & Shibkova, 2013), psychoemotional state (Bulaeva, 1991; Litvinova, 2008; Negasheva & Manukyan, 2016; Yangirova & Ivanova, 2016), physical development (Zhomin & Rubanovich, 2010; Shkurpit & Kazakevich, 2016) and social well-being of young people (Danilenko, Korneva, & Tikhonova, 2016; Polunina & Brun, 2017; Zimina et al., 2016). Foreign authors focus on the relationship between mental health, adaptation, and quality of life, and address issues of gender aspects of a person's psychological state (Cabello & Sorrel, 2016; Gulec Oyekcin et al., 2017; Burger & Scholz, 2018; Teymor AhmadiGatab, Nasram Shayan, & Mahshid Taheri, 2011). However, despite the fact that the problem of optimizing the psychosocial state of young people is described quite widely in the literature (Danilenko, Korneva, & Tikhonova, 2016; Shkurpit & Kazakevich, 2016; Tatarkina & Kopytina, 2010; Wasserman, 2016; Ornek & Esin, 2018), the issues of gender characteristics during the adaptation processes to university education remain insufficiently explored.

The aim of the present study was to examine gender differences in psychophysiological and personal characteristics among first-year students and to evaluate the potential influence of educational specialization on these parameters.

2. Methods

Participants

The study included 94 first-year students (59 females and 35 males) aged 17 & 19 years enrolled in various academic programs (physics-mathematical and biological-chemistry specializations) at the Kuibyshev branch of Novosibirsk State Pedagogical University. Educational specialization did not significantly influence

psychosocial characteristics in either group; therefore, we united all students into only two groups by gender.

To select the students for testing, we used the following criteria: age, medical indicators (health), a coherent educational environment, location and time of testing, and the absence of stressful factors (sessions and acute adaptation) at the time of the examination. All students met these criteria and gave voluntary consent to participate in testing.

At the time of assessment, all participants were classified as medically healthy and assigned to the main or preparatory health groups according to institutional medical criteria. Testing was conducted in October-November between 10:00 and 13:00 outside the examination period and after the first month of study to reduce the potential influence of acute adaptation and academic stress.

Instruments and Procedures

Socio-psychological adaptation and personal potential were assessed using a computer-based diagnostic program developed by Aizman et al. (2013), based on the socio-psychological adaptation scale by Rogers and Diamond as adapted by K. A. Osnitsky.

Psychoemotional state was evaluated using standardized instruments:

- The Motivation for Success Test (Ehlers).
- The Buss-Durkee Hostility Inventory.
- The State-Trait Anxiety Inventory (Spielberger), adapted by Yu. L. Khanin.

Psychophysiological parameters included:

- Simple visual-motor reaction time, msec. Reaction time was assessed by instructing the participant to press on the desktop the "Space" key as quickly as possible in response to the appearance of a visual stimulus on the computer screen.
- Reaction to a moving object, the number of moving arrow coincidences with indicated point that reflects the balance of nervous processes.
- Cognitive functions (mechanical, semantic, and imaginative memory) points. The number of correctly reproduced items after a single presentation on the screen of 10 two-digit numbers (e.g., 13, 87, etc.), 10 logically paired words (e.g., lock-door, day-night, etc.), and the correct arrangement of an increasing number of circles within a table of 16 squares was assessed. Each correct response was scored as 1 point.
- Attention switching, sec. The participant was instructed to identify the location of numbers in the squares sequentially from 1 to 25 as quickly as possible using mouse clicks. The time required to complete the task was recorded.
- Mental performance, conventional units. The number of characters scanned and correctly identified for two target letters within 2 minutes was assessed using a table containing 1600 letters. The number of errors per 200 examined characters was calculated, representing the relative proportion of correctly processed items.

Statistical Analysis

Data were analyzed using Student's t-test for independent samples after a preliminary analysis of the normality of distribution using the Shapiro-Wilk test. Sta-

tistical significance was set at $p \leq 0.05$. Analyses were performed using STATISTICA software (Version 7.0). Data are presented as mean ± standard error of the mean (M ± m).

The study protocol was reviewed and approved by the local ethics committee of Novosibirsk State Pedagogical University, according to the 1964 Declaration of Helsinki. All participants provided written informed consent prior to participation.

3. Results and Discussion

The functional state of the organism is determined by the coordinated activity of various physiological systems; therefore, specific manifestations of individual functions are always interdependent and interrelated (Bezrukikh, 2002; Negasheva & Manukyan, 2016). To identify the features of the systemic organization of personal, psychophysiological, neurodynamic, and cognitive characteristics, a comprehensive assessment of students in both gender groups was conducted.

The psychosocial status of students and their subjective evaluation of personal development were assessed using the socio-psychological adaptation (SPA) scale based on the methodology of K. A. Osnitsky. In **Table 1**, almost all integrative indicators of socio-psychological adaptation of both groups of students are higher or close to the right border of the zone of uncertainty, that indicate the generally high values for most indicators in both groups, alongside significant gender differences. Indicators such as adaptability, self-acceptance, emotional comfort, internality, striving for dominance, and internal control were significantly higher in male students, reflecting a higher overall level of adaptation. In contrast, external control was significantly higher in female students (**Table 1**).

The observed gender differences in adaptation indicators generally correspond to previously reported norms (Bezrukikh, 2002; Polunina & Brun, 2017; Burger & Scholz, 2018). However, they may be influenced not only by age-related psychophysiological characteristics but also by socio-environmental, economic, and cultural factors specific to a small urban setting.

Table 1. Integrative indicators of socio-psychological adaptation of students of CF NGPU.

Indicator, %	*Girls*	*Boys*	*p*	*Zone of uncertainty*
Adaptability	60.8 ± 1.1	**69.6 ± 1.6**	***	40 - 71
Self-acceptance	73.9 ± 1.2	**80.7 ± 1.9**	*	40 - 71
Acceptance of others	63.6 ± 1.5	67.9 ± 2.4	*ns*	40 - 68
Emotional comfort	60.3 ± 1.5	**72.3 ± 3.4**	*	40 - 59
Internality	62.2 ± 1.3	**78.4 ± 1.5**	***	40 - 74
Striving for dominance	55.4 ± 1.7	**78.5 ± 2.7**	***	40 - 66
Internal control	53.5 ± 1.2	**63.7 ± 1.2**	***	49 - 64
External control	**24.3 ± 1.2**	13.5 ± 1.1	***	18 - 24
Integral level of adaptation, score	3.5 ± 0.1	**4.0 ± 0.1**	**	3 - 5

Note: In this and the following tables, the significant differences: $*p \leq 0.05$; $**p \leq 0.01$; $***p \leq 0.001$; ns: nonsignificant.

Thus, the analysis revealed significant gender differences in several psychological and psychophysiological parameters. Male students demonstrated significantly higher levels of self-esteem, emotional comfort, internality, adaptability, dominance motivation, aggressiveness, and achievement motivation compared to female students.

To better understand gender-specific features of socio-psychological adaptation, we analyzed personal characteristics that determine motivational stability, emotional background, and the level of development of cognitive processes, which are essential for successful academic performance. The psychoemotional state of first-year students was assessed using the tests developed by T. Ehlers, G. Eysenck, and Buss-Durkee.

The results showed higher levels of both state and trait anxiety in female students, whereas male students demonstrated higher levels of motivation for success and physical aggression (Table 2).

Table 2. Indicators of the psychoemotional state of students of KF NGPU.

Indicator	*Girls*	*Boys*	*p*	*Mean value for students* (*Aizman, Aizman, & Lebedev*, 2013)
Motivation for success, score	18.0 ± 0.5	**21.6 ± 0.6**	**	11 - 16 (average) 17 - 20 (high) ≥21 (very high)
Situational anxiety, score	**25.2 ± 0.9**	21.3 ± 1.7	*	≤30 (low) 31 - 45 (average)
Personal anxiety, score	**43.1 ± 0.8**	33.6 ± 1.4	**	≥46 (high)
Physical aggression, score	3.9 ± 0.2	**5.6 ± 0.2**	**	4 ± 2
Aggressiveness index, %	15.8 ± 0.5	17.6 ± 1.0	*ns*	21 ± 4
Hostility index, %	10.4 ± 0.4	10.5 ± 0.8	*ns*	7 ± 3

At the same time, despite high motivation for success, levels of anxiety and aggressiveness in both groups remained within average ranges. The absence of significant intergroup differences in overall aggressiveness and hostility, combined with an adequate emotional perception of the new environment, may indicate that gender differences in emotional intelligence will become more pronounced at later developmental stages (Cabello et al., 2016).

The analysis of gender differences in motivational orientation highlights the potential for productive personal and academic development among students. The levels of attention, memory, mental performance, and sensorimotor responses largely determine the success of cognitive activity. Therefore, it was important to assess these parameters in students adapting to a new socio-cultural and educational environment.

Memory, as a fundamental cognitive process, can be considered both a subsystem of personality development and a structural component of intellectual poten-

tial, playing a key role in shaping cognitive abilities (Anokhin, 1968; Litvinova, 2008).

The results demonstrated that semantic and imaginative memory were significantly better developed in female students, with high-level performance in both indicators. In contrast, mechanical memory was higher in male students, although it remained within an average range (Table 3).

Table 3. Psychophysiological indicators of students of KF NGPU.

Indicator	*Girls*	*Boys*	*p*	*Mean value for students* (*Aizman, Aizman, & Lebedev*, 2013)
Mechanical memory, score	4.7 ± 0.2	**7.0 ± 0.4**	**	6 ± 1
Semantic memory, score	**8.6 ± 0.2**	8.0 ± 0.3	*ns*	7 ± 1
Imaginative memory, score	**8.0 ± 0.2**	6.9 ± 0.4	*	6 ± 1
Switching attention, sec	62.4 ± 3.0	**53.8 ± 3.0**	*	40 - 60
Simple visual-motor reaction, msec	202.2 ± 5.5	**168.8 ± 2.7**	**	180 - 220
Reactions to a moving object, the number of coincidences	4.5 ± 0.1	**4.8 ± 0.01**	*	4 - 5 -balance of nervous processes
The coefficient of productivity of mental performance, conventional units	0.52 ± 0.01	0.55 ± 0.02	*ns*	0.4 - 0.6 -average
The coefficient of mobility of nervous processes, conventional units	1.85 ± 0.04	1.78 ± 0.03	*ns*	1.5 - 2.0 -average

Although mechanical memory primarily relies on neural mechanisms of the first signaling system, female students demonstrated greater difficulty with a lower possibility in the perception and reproduction of such information. At first glance, the combination of different types of memory performance in female students may appear contradictory; however, within the context of modern educational approaches, it may reflect a tendency toward more superficial processing of diverse, including academic, information.

Overall, the higher levels of semantic and imaginative memory in female students indicated better development of verbal and figurative-spatial processing.

The results of the visual-motor reaction tests were significantly better in male students, including faster attention switching, quicker simple visual-motor reactions, and more accurate responses to moving objects, which indicated a better balance of nervous processes. All measured parameters of psychophysiological state in both gender groups were within the range of average data for this age and social group (Aizman, Aizman, & Lebedev, 2013). No significant differences were found between gender groups in overall mental performance.

The higher level of integrative parameters of socio-psychological adaptation in male students (Table 1), as well as higher motivation for success, physical aggression (Table 2), switching attention, the faster simple visual-motor reaction, and better balance of nervous processes (Table 3), may indicate the best prerequisites in male students during adaptation to a new environment. In contrast, female students,

characterized by traits such as higher anxiety, external control, and stronger development of imaginative memory, may exhibit greater caution and sensitivity. These differences likely reflect specific features of nervous system functioning rather than cognitive superiority and may represent alternative adaptive strategies within the academic environment (Baiguzhin, Kirsanov, & Shibkova, 2017; Negasheva & Manukyan, 2016; Polunina & Brun, 2017). It should be considered when developing strategies for supporting female students' adaptation to university education.

No statistically significant effects of educational specialization on the measured parameters were identified.

Overall, the findings confirm the presence of gender-specific patterns in psychoemotional status, personal characteristics, and psychophysiological functioning among first-year students.

The higher levels of anxiety observed in female students are consistent with previous studies indicating greater emotional reactivity and stress sensitivity in women (Aizman et al., 2014). Conversely, higher levels of aggressiveness and dominance motivation in male students may reflect a complex interaction of biological predispositions and socio-cultural influences (Negasheva & Manukyan, 2016).

The absence of significant differences related to educational specialization suggests that, during the first year of study, adaptation processes are influenced more strongly by gender-related and individual factors than by academic profile (Anokhin, 1968; Baiguzhin, Kirsanov, & Shibkova, 2017; Bulaeva, 1991; Ingalhalikar, Smith, & Parker, 2014).

Several limitations should be acknowledged. The relatively small sample size and the inclusion of students from a single institutional branch limit the generalizability of the findings. In addition, the cross-sectional design does not allow causal relationships to be established.

Future studies with larger and more diverse samples, as well as longitudinal designs, are needed to better understand the dynamics of adaptation processes and the interaction between biological and socio-cultural factors.

4. Conclusion

The study identified gender-specific patterns in psychoemotional status, personal characteristics, and psychophysiological functioning among first-year university students.

The findings revealed significant gender differences in psychological state, adaptation to the university environment, and several psychophysiological and personal characteristics. Male students demonstrated higher levels of self-esteem, emotional comfort, internality, dominance motivation, adaptability, aggressiveness, success motivation, mechanical memory, and faster visual-motor responses. Female students showed higher levels of state and trait anxiety, as well as better performance in imaginative memory and attention switching. No gender differences were observed in the mobility and productivity of nervous processes, semantic memory, verbal aggression, or hostility. Educational specialization did not

significantly influence psychosocial characteristics in either group.

These differences appear to be shaped by both biological and socio-cultural factors and may reflect distinct adaptive strategies within the higher education environment.

The findings may contribute to the development of gender-sensitive approaches to psychological support and the optimization of educational processes in higher education institutions.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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