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Satisfaction with Social Life and Academic Adaptation in Students with Different Types of Loneliness in the Process of Distance Learning During the COVID-19 Pandemic

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Abstract

In an age when publicity is the norm, human loneliness is a significant socio-psychological problem. Objective loneliness (e.g., as experienced during the pandemic) does not always result in subjective loneliness. Subjective loneliness directly influences various aspects of the human psyche and activities. Analysis of satisfaction with social life, as a marker of social well-being and academic adaptation of students with different loneliness types, allows determining the magnitude of subjective loneliness and how it influences the well-being and adaptation of students. In this study, we analyzed satisfaction in social life, difficulties associated with distance learning, and academic adaptation in students with different types of loneliness. The sample consisted of 500 students who studied online during the COVID-19 pandemic. The mean age of the students was 19.28 years (SD = 2.16; 16.5% males and 83.5% females). The following methods were used in this study: A differential questionnaire on experiencing loneliness developed by Osin and Leontev; a modified technique for determining the level of social frustration by Wasserman, Iovlev, and Berebin; the academic adaptation scale by Shamionov, Grigoryeva, Grinina, and Sozonnik; scales for subjective evaluation of changes in life during distance learning developed by the authors of the study.

Four types of loneliness were identified based on cluster analysis: positive loneliness, non-accepted loneliness, pseudo-positive loneliness, and neurotic loneliness. Students with pseudo-positive and neurotic loneliness had low levels of satisfaction with their social life, while students with positive loneliness, and those that rejected it, were satisfied with life. Distance learning was most positively viewed by students with a positive perception of loneliness, while students with neurotic loneliness experienced difficulties the most because of distance learning. Under such conditions, the most successful academic adaptation was observed in students with non-acceptance of loneliness, followed by students with positive and pseudo-positive loneliness, respectively, while students with neurotic loneliness adapted the least to the conditions.

Keywords
Loneliness; satisfaction with life; COVID-19; academic adaptation

1. Introduction

Loneliness is a traditional problem for psychology and can be revealed through various aspects. It is prevalent in society. Moreover, loneliness has gained specific traits, which have enabled new approaches to explain this phenomenon and the conditioning factors. It has also influenced other aspects of the life of affected individuals. Loneliness is a global phenomenon and is a cause for concern among researchers and clinical practitioners. Global digitalization has influenced the problem of loneliness and the peculiarities of experiencing it. Although technical progress and digital technology have made communication and interaction highly accessible (irrespective of location and time), they have virtualized communication and enhanced the prevalence of loneliness. Some specialists have discussed the "loneliness epidemic" in the digital community [1].

Experiencing different types and degrees of loneliness can be conditioned by various factors, including age, gender, the professional activity sphere, career, etc. Identifying each important factor and determining their effect under various conditions on the experience of loneliness and its peculiarities might help to better understand the problem of loneliness and elucidate effective trajectories for providing assistance, which is capable of levelling negative tendencies and improve mental health.

The situation caused by the COVID-19 pandemic conditioned a new investigations of loneliness in psychology. The pandemic forced the political leaders of most countries to take certain strong measures, i.e., in many countries, people were forced to limit their physical contact with other people (social distancing and self-isolation) [2]. Under conditions of forced or voluntary isolation, individuals experienced frustration concerning socialization which is a very important human need. This psychological crisis was aggravated by fear for one's own life and health and that of others. Loneliness, along with its impact on mental health, was one of the most negative effects of the COVID-19 pandemic [3, 4]. Subsequently, many people needed psychological help and support during the pandemic. However, providing support is impossible without a thorough understanding of the nature of experiencing loneliness, its incidence, predictors, and the consequences in various social groups [5, 6]. Therefore, it is important to study loneliness.

2. Aspects of Loneliness in the Modern Context

Loneliness is defined as a situation where a person experiences a subjective deficit of social relations quantitatively or qualitatively, irrespective of their social status [7, 8]. It is an emotional, anxiety-inducing, subjective feeling which occurs due to a discrepancy between the desired and the achieved levels of social contact. Experiencing loneliness is unpleasant and painful; this experience is followed by the feeling of rejection by significant individuals, as well as the desire to be accepted by them and to become a part of their life [9, 10]. An absence of a network of social relations leads to social loneliness. It occurs when somebody is not integrated into society, for example, a group of friends that share a common interest. Experiencing loneliness can be caused by the inability to belong to a desired social group, feeling alienated and isolated (i.e., existential loneliness), and the feeling of being misunderstood by others (representative loneliness) [8].

The perception of loneliness is not completely negative. Thus, existentialists such as Soren Kierkegaard, Jean-Paul Sartre, Albert Camus, and their followers viewed voluntary self-isolation as a path to self-knowledge. However, since humans are psychosocial beings, they desire to form relationships and become a significant part of somebody's life [11]. Hence, most researchers emphasize the negative manifestations and consequences of loneliness [12]. Loneliness has negative effects on physical, emotional, and cognitive well-being. Adults who experience loneliness have an increased risk of several negative consequences for their health, including poor ability to self-regulate, poor sleep quality and immunity, and high levels of stress, all of which can promote serious health problems, including depression, cardiovascular diseases [13],

The complexity of loneliness and the subjectivity of this experience allows grouping it into different types. Based on a technique called "Differential questionnaire of experiencing loneliness", we can segregate general experiences of loneliness, dependence on socialization related to non-acceptance of loneliness, and positive loneliness that might help to achieve self-knowledge and self-development [14]. Manakova categorized loneliness as a negative feeling, rejecting the experience of loneliness, experiencing loneliness as a temporary forced event, loneliness as a result of fear of undertaking the responsibility of others, spiritual loneliness as a lack of support and understanding, as well as, loneliness as a consequence of external unattractiveness [15].

3. Modern Studies on the Loneliness of Students

Social transitions from one stage of life to another can promote loneliness. The transition from high school to university is a crucial event regarding structural and social changes affecting relationships, daily routines, assumptions, and roles. University students who rely on their independence and individualization in their new roles start making their own decisions. The beginning of a career in the university is often associated with a change in the place of residence and changes in relationships with family members. Although this change provides many opportunities, it also involves risks, i.e., loneliness in the new environment (for example, in a new city), and not knowing someone can lead to loneliness, which in turn might even lead to illness. Several key factors that can affect health are those related to social functioning, such as the social circle of an individual, frequency of social contacts, social support, social isolation, loneliness, and seclusion [9].

A study on the influence of loneliness on the psychological health of students showed that, in general, 32.4% of students felt moderately lonely, and 3.2% felt very lonely. Emotional loneliness

was more common than social loneliness (severe loneliness: 7.7% vs. 3.2%). Both types of loneliness were positively associated with feelings of depression and anxiety [16]. Hypodynamia and immigration were associated with a higher level of social loneliness. The study also found that loneliness level among those who considered their socioeconomic status as low, and those who had not received any psychological assistance, was higher [11].

Studies on loneliness among university students found an association between loneliness and subjective health status, sleeping disorders [17], tobacco consumption, aggressive behavior, trauma, and behavior linked with sexual risk [18]. Moreover, researchers studied the relationship between loneliness and disease and between loneliness and stress reaction [7]. Among other things, loneliness was associated with increased mortality risk, which included a medical history with various diagnoses [19] and suicidal behavior [20]. Besides somatic problems, students with high levels of loneliness tend to perform poorly academically due to the exhaustion of cognitive resources. Several studies that used memory performance measures as predictor variables, and loneliness, optimism, and academic self-efficacy as predictors found that loneliness negatively affected memory performance, i.e., high loneliness scores were associated with poor memory performance. The effect of loneliness and mindfulness on academic achievement was also studied. The results showed that loneliness negatively affected academic achievement, and students with high loneliness scores were more likely to receive lower grades [8]. According to Monakova [15], all loneliness types in students, except for loneliness as a temporary forced phenomenon, are interconnected with hopelessness and negatively affect individual subjective well-being (to the greatest extent-spiritual loneliness and loneliness as a negative phenomenon, to a lesser extent-loneliness as a temporary forced phenomenon). The feeling of loneliness in students is largely conditioned by social anxiety and social phobia. According to the author, loneliness is better manifested in girls, except for fear of taking responsibilities, which is typical for respondents of both sexes.

Some studies have investigated the relationship between loneliness levels and attachment styles in university students since problems of attachment are one of the main factors leading to the experience of loneliness [2, 21]. Studies have found that people with a dismissive attachment style tend to be more independent individuals [21]. They do not like to depend on others. They refrain from establishing a close emotional connection with other people and have a high opinion of themselves and a low opinion of others. People with an anxious attachment style view themselves as worthless and hold others in high regard [21]. The fact that people who neglect attachments have internal autonomy and do not depend on others, while those who have secure attachments tend to establish rigorous relationship structures in their relationships with others explains these results. People with an anxious attachment style do not perceive themselves as worthy of being loved and constantly seek the approval of others. This explains the positive correlation between loneliness levels and anxious attachment [21].

The academic environment of higher educational institutions presents multiple opportunities for interpersonal interaction among students, both formal and informal. However, due to the COVID-19 pandemic, 87% of university students (particularly in Russia) attended classes remotely [22]. The COVID-19 restrictions involved campus closures, restricted access to offline classes, and cancellation of sports and social events. Students remained in their dormitory rooms or at home. The opportunity to make friends decreased. Students who were 16–24 years old felt lonelier and experienced psychological distress more than the individuals of other age groups. The individuals

who were 18–22 years old are called the “loners” generation. According to the All-Russian Public Opinion Research Center, in 2021, 37% of the individuals aged 18–24 felt lonely at times [23].

Since many universities paused offline classes and switched to the online format, student life underwent radical changes. While social distancing measures might be useful for slowing the spread of infection and relieving public health systems, they might ultimately increase the social isolation of the students and affect their psychological well-being and mental health [24]. The lifestyle changed in 93% of the students [25]. The communication and social interaction spheres underwent the greatest transformation, which caused a slight increase in anxiety and the emergence of negative emotional experiences. Limited social interactions, a lack of social support, and new stressors associated with the COVID-19 crisis negatively affected the mental health of the students. Transforming the social relationships (interaction, friendship, social support, and collective learning) of the students caused by external factors (an epidemic in the country) led to a change in their mental health scores (increase in the level of depression, anxiety, stress, and loneliness). COVID-19-specific challenges (social media isolation, lack of interaction and emotional support, and physical isolation) increased the prevalence of mental health problems among students [26]. According to Zakharova and Vilkova [27], a decrease in the possibilities of external regulation of the educational process during distance learning conditioned actualization of the self-regulation of students, who paid attention to the lack of communication with peers and teachers, as well as, the feeling of loneliness and isolation. Gerasimova and Kholmogorova [28] recorded an increase in stress indicators in 61% of female students associated with experiencing loneliness. Interestingly, a lower level of loneliness was recorded among girls, accompanied by the awareness of the value of social contacts and a low preference for online interaction, as well as among those who communicated more deeply with their loved ones during the pandemic.

The problem of loneliness among students is of special interest for researchers not only from the perspective of studying it in the academic environment but also from a socio-political perspective, which also affects the psychological state of the students. In general, students from different countries (Russia, Poland, Ukraine, Lithuania, and Belarus) did not demonstrate high loneliness levels; the median value on the UCLA loneliness scale was 36 points. The most favorable situation was observed among Lithuanian and Belarusian students, while in Ukraine, Russia, and Poland, the values on the scale were significantly higher, which could be conditioned by various restriction levels introduced by the countries [29].

Loneliness has detrimental effects on mental health and is widespread among college students. To identify psychological distress in students, which is caused by feeling lonely, scientists developed a linguistically oriented technique for further psycho-correction. This technique can determine the presence of limited opportunities to show own mind and certain paralinguistic characteristics in a conversation (speech interruptions, laughter type, prosody, etc.) [21]. Cognitive-behavioral therapy that targets maladaptive cognition also reduces loneliness [30]. Feeling socially connected protects against the development of mental disorders. Being able to get together with other students reduces the feeling of loneliness. Feeling close to others is directly associated with mental well-being. University campuses are ideal for addressing the loneliness of students as a preventive or targeted strategy, as well as to address the surge in demand for mental health/support services. Among the protective factors against loneliness are physical activity (participation in competitions, membership in sports clubs); being married or in a committed relationship is also a protective factor against loneliness [7].

Therefore, the problem of loneliness among students is of great significance. However, to understand the phenomenon of loneliness in the current scenario, for developing preventive measures and ways to support students, it is necessary to pay closer attention to issues of phenomenology and the types of loneliness among students and its relationship with other aspects of individual development and functioning.

In this study, we analyzed satisfaction with social life, difficulties caused by distance learning, and academic adaptation in students who experienced loneliness differently.

The study had the following goals:

1) To present the typology of the loneliness of the students during the COVID-19 pandemic based on cluster analysis;
2) To conduct comparative analyses of the manifestation of satisfaction and various aspects of the social life of the students depending on the type of loneliness;
3) To study the subjective evaluation of changes in academic activity and health during distance learning in students with various types of loneliness;
4) To determine the differences and similarities in the components of academic adaptation in students experiencing various types of loneliness.

Hypotheses. H1. Satisfaction with various aspects of social life has specific features depending on the type of loneliness. Previous studies had established the specifics of experiencing happiness and satisfaction in life among individuals with different types of loneliness [14]. However, it is necessary to determine how satisfaction in social life among students is differentiated depending on the loneliness type, i.e., whether there is any similarity in the assessment of satisfaction with life among single students and students who have partners.

H2. Students with different types of loneliness are characterized by inherent assessments of academic activity and health during distance learning. Forced distance learning (versus campus offline learning) affects the life and learning of the students [31]. However, it is necessary to determine how the transition to distance learning affects students with different types of loneliness.

H3. Academic adaptation of students has peculiarities depending on the type of loneliness experienced. It manifests more in students who deny loneliness and less in students with a positive assessment of loneliness and pseudo-loneliness. Students with neurotic loneliness are characterized by low adaptation scores. Some studies associated loneliness with maladjustment [32, 33]. On the other hand, forced distance education can also reduce certain aspects (components) of academic adaptation, which can affect educational success [34]. Therefore, determining how the experience of students feeling a certain type of loneliness affects their academic adaptation is necessary.

4. Materials and Methods

4.1 Study Design

A comparative design was selected for the study. The study was conducted as follows. First, based on cluster analysis, we used three parameters of loneliness and identified four types of

loneliness. Next, we conducted a comparative analysis of the variables for the groups of respondents who experienced different types of loneliness.

4.2 Participants

Bachelor's degree students (n = 500) with a mean age of 19.28 years (SD = 2.16; 16.5% males and 83.5% females) participated in the study. They attended online classes during the pandemic from 01.11.21 till 31.12.2021. Before enrolling at the university, the respondents lived in rural areas (7.2%), small towns (31.8%), big cities (51%), or metropolitan cities (10%). The income level of the families was evaluated as follows — significantly below average: 1.8%, below average: 15.6%, average: 65.8%, above average: 14.8%, and significantly above average: 2%. The respondents were first-year students (33.3%), second-year students (26.1%), third-year students (22.3%), and fourth-year students (18.3%).

All participants provided their informed consent for inclusion before they participated in the study. The experimental studies were performed following the Ethical Standards (2000) and were approved by the local Research Ethics Committee of Saratov State University (Faculty of Psychological, Pedagogical, and Special Education).

4.3 Measurements

The following questionnaires were used to conduct the study. Loneliness characteristics were studied using the Differential Questionnaire on Experiencing Loneliness [14]. The questionnaire consisted of three scales: general loneliness ($\alpha = 0.91$), dependence on communication ($\alpha = 0.85$), and positive loneliness ($\alpha = 0.85$). There were several additional scales. The questionnaire used a 4-point-scale: disagree, mostly disagree, mostly agree, and agree. The Cronbach's alpha exponents indicated an acceptable level of internal consistency.

To define satisfaction with major aspects of social life, we used the modified technique for Social Frustration Level Determination Technique developed by Wasserman et al. [35]. The modification involved the adaptation of the questions in the questionnaire to the daily life of the students. For example, 'To what degree are you satisfied with your relationship with fellow students?', 'To what degree are you satisfied with your relationship with the instructors?', etc. To measure the satisfaction level, we used a 5-point-scale — 1: completely satisfied, 2: mostly satisfied, 3: hard to say, 4: mostly dissatisfied, and 5: completely dissatisfied. The alpha of the generalized scale was 0.91. The alpha value indicated an acceptable level of internal consistency associated with the social frustration scale.

To assess the components of the academic adaptation of the students, we used the Scale of Students' Academic Adaptation [34]. The scale had 44 points, each of which was evaluated by the respondent according to a Likert scale (from 1 to 5 points). Seven scales were obtained after filling out the questionnaire, including personal, emotional-evaluative, cognitive, motivational, psycho-physiological, communicative, and integral assessments of academic adaptation. The scale demonstrated good psychometric indicators: Cronbach's $\alpha = 0.92$; the normality of the distribution of the integral assessment distribution check produced an acceptable result ($Z = 0.485$, $p = 0.97$).

To analyze the subjective evaluation of the influence of distance learning during the pandemic on learning motivation, e.g., the effectiveness of learning, changes in psychological well-being,

somatic state, etc., we used the scales developed by the authors. For example: 'Try to assess the impact of distance learning on your psychological well-being (1: extremely negative impact, 4: no impact, and 7: extremely positive impact)'.

4.4 Procedure

The empirical data were collected during the first half of the academic year 2021–2022. The poll was conducted with the consent of the university administration. We used the randomized selection method. Student groups were selected randomly; the poll had not been conducted before, which ensured the representativeness of the sample.

The data sources used in this study were accurate and reliable. While developing the tool, we used data obtained from focus groups of psychologists (five people) regarding the problems of adaptation and student learning. The focus group participants were asked to mention the main problems that students experienced during distance learning. The final version of the questionnaire included socio-demographic characteristics (age, sex, place of residence, and family income) and questions reflecting the main problems that students faced during distance learning (difficulties in organizing studies, difficulties in mastering educational material, etc.). We used Google Forms for the survey, and these forms were sent to the students.

4.5 Statistical Analysis

To process primary data, we used the statistical software package IBM SPSS Statistics and PS IMAGO PRO.

First, the scales were checked for internal consistency using Cronbach's alpha coefficient. Next, the data were checked for normality of distribution using the Kolmogorov-Smirnov test and the asymmetry and kurtosis indicator analysis. All data showed normal distribution. Next, socio-demographic data were analyzed using descriptive statistics (displayed as means, standard deviations, and percentages).

We then performed a hierarchical cluster analysis (Ward's method, quadratic Euclidean metric) to classify the respondents. The classification was based on standardized scores for the eight subscales of the full DOPO-3 version. After classification, we selected a model consisting of four combinations of characteristics of loneliness experience (categorized as positive loneliness, rejection of loneliness, pseudo-positive loneliness, and neurotic loneliness). Finally, an analysis was conducted using Student's t-test to compare the characteristics of satisfaction with social life, difficulties experienced in distance learning, and academic adaptation in students experiencing different types of loneliness. Additionally, the effect size was considered.

5. Results

By performing cluster analysis, we identified four types of loneliness. Each type of loneliness involved the following proportion of students — 1: 27%, 2: 22%, 3: 26%, and 4: 25%.

The four types of loneliness experienced by the students during the pandemic were — type 1: compensatory positive loneliness, type 2: non-acceptance of loneliness, type 3: positive acceptance of loneliness, and type 4: neurotic loneliness.

The differences among the different types of loneliness are presented in Table 1. Dependence on communication was found in the positive and neurotic loneliness groups, and it was significantly higher in the positive loneliness group than in the neurotic loneliness group. Positive loneliness was found in students with pseudo-positive and positive loneliness, and it was significantly higher in the positive loneliness group than in the pseudo-positive loneliness group. General loneliness was higher in the neurotic loneliness group. We found significant differences in general loneliness scores, dependence on communication, and positive loneliness for pairwise comparisons between all combinations of groups (Table 1).

Table 1 The mean scores of the dependent variables for each type (cluster) of loneliness and the significance of differences between them (the scores are presented as standardized z-variables).

Parameters	Mean according to types				Significance of differences, p						η
	M1	M2	M3	M4	1–2	1–3	1–4	2–3	2–4	3–4	
General loneliness	0.13	-0.90	-0.66	1.31	0.01	0.01	0.01	0.01	0.01	0.01	0.63
Communication dependence	0.14	0.69	-1.20	0.51	0.01	0.01	0.01	0.01	0.01	0.01	0.42
Positive loneliness	0.38	-0.72	0.49	-0.34	0.01	0.11	0.01	0.01	0.01	0.01	0.45
Positive affect	-0.03	0.22	0.10	-0.35	0.05	0.32	0.01	0.41	0.01	0.01	0.04
Negative affect	0.05	-0.32	-0.22	0.52	0.01	0.03	0.01	0.46	0.01	0.01	0.10
Education	0.01	-0.27	-0.08	0.34	0.02	0.48	0.01	0.16	0.01	0.01	0.04
Relations with fellow students	0.03	-0.33	-0.24	0.44	0.01	0.016	0.01	0.46	0.01	0.01	0.08
Relations with faculty administration	-0.03	-0.37	-0.13	0.47	0.01	0.34	0.01	0.05	0.01	0.01	0.06
Relations with instructors	-0.06	-0.32	-0.09	0.41	0.03	0.83	0.01	0.06	0.01	0.01	0.05
Interrelations with subjects of one's professional activity	0.04	-0.19	-0.25	0.37	0.07	0.01	0.1	0.60	0.01	0.01	0.06
Content of academic activity as a whole	-0.10	-0.20	0.01	0.29	0.48	0.36	0.01	0.15	0.01	0.04	0.03

Note. M1-pseudo-positive loneliness; M2-rejection of loneliness; M3-positive loneliness; M4-neurotic loneliness.

The differences between loneliness experience types according to the parameters of affective environment and satisfaction with various aspects of life are shown in Table 1. Positive affect was experienced similarly by individuals with pseudo-positive loneliness and positive loneliness and by those who rejected loneliness and experienced positive loneliness. The negative affective environment did not differ significantly between individuals who rejected loneliness and those who experienced positive loneliness.

We found differences between individuals who rejected loneliness and those who experienced neurotic loneliness, according to all satisfaction parameters (see Table 2). Many differences were found in the scores of satisfaction in social life between individuals who experienced pseudo-positive and neurotic loneliness and between those who experienced positive and neurotic loneliness. Respondents who experienced different types of loneliness were satisfied with their social standing, social environment, the sphere of services, domestic services, and medical services in a similar manner (see Table 2). Social satisfaction was similar among students who experienced pseudo-positive and positive loneliness (see Table 1), while differences between these groups of students were found only regarding satisfaction associated with faculty administration. Similar satisfaction scores were observed among students who experienced loneliness types 1 and 3; the differences mostly concerned interpersonal relations, lifestyle, and leisure (see Table 2).

Table 2 Estimation of the changes in academic activity and health during distance learning.

Estimation	M1	M2	M3	M4	1–2	1–3	1–4	2–3	2–4	3–4	η
Possibility of health deterioration risk in the near future (R)	0.06	0.36	-0.10	-0.37	**0.02**	0.23	**0.00**	**0.00**	**0.00**	**0.04**	0.05
Influence of distance learning on motivation of academic activity (R)	-0.02	-0.07	0.18	-0.12	0.73	0.11	0.49	**0.05**	0.72	**0.03**	0.02
Influence of distance learning on academic achievements (R)	-0.06	0.04	0.19	-0.15	0.46	**0.05**	0.52	0.21	0.18	**0.01**	0.03
Influence of distance learning on psychological well-being (R)	-0.07	0.03	0.17	-0.14	0.44	**0.04**	0.63	0.24	0.25	**0.02**	0.02
Influence of distance learning on physical and somatic well-being (R)	-0.08	0.01	0.17	-0.14	0.50	**0.05**	0.66	0.21	0.28	**0.02**	0.02
Negative influence of distance learning on the sphere of communication (R)	-0.16	0.05	0.29	-0.23	0.10	**0.00**	0.60	**0.05**	0.05	**0.00**	0.03
Negative influence of distance learning on the effectiveness of knowledge acquisition (R)	-0.07	-0.10	0.24	-0.11	0.85	**0.02**	0.78	**0.01**	0.94	**0.01**	0.02
More time put into solving academic problems in the course of distance learning (R)	0.76	0.66	0.39	0.56	0.36	**0.00**	0.06	**0.02**	0.39	0.10	0.01

More effort put into solving academic problems in the course of distance learning (R)	0.71	0.51	**0.38**	0.57	0.08	**0.00**	0.21	0.21	0.59	0.06	0.01
Difficulties in the organization of academic process in the course of distance learning (R)	0.46	0.39	**0.28**	0.52	0.48	**0.04**	0.61	0.21	0.23	**0.01**	0.03
Level of comfort in the course of distance learning	-0.04	0.03	0.23	-0.25	0.60	**0.02**	0.13	0.11	0.06	**0.00**	0.03

Note. Questions marked with an R are reverse questions.

In general, the scores for satisfaction with the social environment, the sphere of services, domestic services, and the sphere of medical services showed lesser differences among individuals who experienced various types of loneliness than the scores for other criteria (see Table 2). Students who experienced different types of loneliness showed significant differences in their level of satisfaction regarding their relationship with fellow students, faculty administration, academic subjects, friends, close acquaintances, household conditions, leisure, and lifestyle (see Table 1).

The anxiety level related to the risk of contracting COVID-19 and vaccination was high among all students, regardless of the type of loneliness (Table 2). Difficulties in organizing academic activity in the distance learning format were experienced by most students, except for those who experienced type 3 loneliness. These students also made a lesser effort to solve academic problems during distance learning than other students (see Table 2). Moreover, there were significant differences among students experiencing different types of loneliness regarding academic activity and health during distance learning. The most significant differences were observed in students experiencing different types of loneliness regarding the probability of the risk of health deterioration; representatives of type 2 loneliness (non-acceptance of loneliness) rated this risk lower, while representatives of type 4 loneliness (neurotic loneliness) rated this risk higher.

The academic adaptation in students experiencing pseudo-positive loneliness and positive loneliness had similar scores that reflected the mean values of this trait (Table 3). Representatives of other types of loneliness adapted to the university environment in different ways; students who experienced neurotic loneliness were very different from those who rejected loneliness and those who experienced positive loneliness. Smaller differences were observed in the cognitive component of academic adaptation, while in the motivational, emotional, communicative, and regulatory components, the differences were more noticeable (see Table 3). All components of academic adaptation were well-manifested in students who rejected loneliness (Table 3), and low scores for all components of adaptation were observed in students who experienced neurotic loneliness.

Table 3 The components of academic adaptation scores for each type (cluster) of loneliness.

Component	1	2	3	4	1 and 2	1 and 3	1 and 4	2 and 3	2 and 4	3and 4	η
Motivational	0.08	0.29	-0.03	-0.31	0.07	0.37	0.00	0.02	0.00	0.05	0.02
Emotional	0.08	0.33	-0.03	-0.38	0.04	0.40	0.00	0.01	0.00	0.01	0.03
Communicative	-0.09	0.38	0.13	-0.37	0.00	0.07	0.03	0.04	0.00	0.00	0.04
Cognitive	-0.09	0.22	0.09	-0.24	0.01	0.17	0.24	0.34	0.00	0.02	0.01
Regulatory	0.02	0.34	0.02	-0.35	0.01	0.96	0.00	0.02	0.00	0.01	0.02
Psycho-physiological	-0.15	0.41	0.18	-0.48	0.00	0.01	0.00	0.09	0.00	0.00	0.10

M1-pseudo-positive loneliness; M2-rejection of loneliness; M3-positive loneliness; M4-neurotic loneliness.

6. Discussion

Through an empirical study, we confirmed all three hypotheses. Satisfaction in social life and academic adaptation of students while performing distance learning during the COVID-19 pandemic varied due to the differences in their attitudes toward loneliness. Therefore, the results are discussed in the order in which they were obtained.

Based on cluster analysis, we identified four types of loneliness. Type 1 loneliness (27.3% females and 28.8% males) involved relatively high scores for positive loneliness and average scores for general loneliness and dependence on communication. We interpreted it as **'compensatory positive loneliness' (pseudo-positive loneliness)**. Individuals with this type of loneliness found something positive in loneliness. Type 2 loneliness (20.9% females and 28.8% males) was characterized by **non-acceptance of loneliness** with high scores for dependence on communication and low scores for general and positive loneliness. Type 3 loneliness (25.8% females and 26% males) involved the **positive perception of loneliness** with low scores for dependence on communication and relatively low scores for general loneliness. Individuals in this group did not show an association between tension and loneliness. Type 4 loneliness (26% females and 16.4% males) was characterized by high scores for general loneliness and dependence on communication but low scores for positive loneliness. These individuals had high levels of personal tension caused by forced loneliness and its non-acceptance. We defined this personality type as **'neurotic loneliness'**.

These results partly correlated with those obtained by Osin and Leontev [14]. Thus, loneliness types 2, 3, and 4 were defined in the above-mentioned study, while loneliness type 1, which denoted positive loneliness in our study, was combined with the median level of dependence on socialization and general loneliness, while in a previous study, it was combined with a high level of general loneliness.

Next, we introduced the parameters of positive and negative affect and social frustration, as well as the attitude of the students toward distance learning during the third wave of COVID-19 in Russia as dependent variables. Between the pandemic waves, students attended offline classes. Students attended classes in the distance learning format with certain limitations aimed at

participation in public events both at the university and in the city. This interest was not accidental because previously, it was shown that the level of subjective loneliness experienced was higher at a higher level of involvement in virtual communication and lower involvement in real communication [36].

We found differentiation of affect for all loneliness types (except for 2 and 3). There was a sharp contrast between high scores for positive affect and low scores for negative affect in representatives of the two types – non-acceptance of loneliness and positive perception of loneliness. Parity between positive and negative affect was found in individuals experiencing neurotic loneliness. Such a ratio might indicate mood instability, with abrupt transitions from positive to negative affect. In representatives of pseudo-positive loneliness, relatively high positive affect scores were combined with relatively low negative affect scores. The results were consistent with those of the study that indicated the positive role of loneliness in development [37] and the regaining of mental strength in young people. Depending on the circumstances, forced, voluntary, or purposeful loneliness can cause positive emotional experiences (calmness, peace, sense of unity with oneself, relaxation, and comfort) and negative experiences (sadness, feeling of uselessness, and discomfort) [38]. The relationship between emotional well-being and positive loneliness and negative association with general loneliness was established in a study conducted by Gasanova [39]. Additionally, some studies have established a negative relationship between loneliness and well-being (including optimism, relaxation, etc.) [40]. These observations supported the view that different loneliness types have different potential for emotional distress.

Our results showed that there were certain differences of level scores for satisfaction/dissatisfaction with social life among groups experiencing different types of loneliness. Thus, the highest scores of social frustration were found in students with neurotic loneliness. These students were significantly different from those who experienced other types of loneliness. This indicated a strong imbalance in the social life of such people; they might be dissatisfied not only with interpersonal relationships but also with household conditions, financial situation, academic conditions, the content of educational activities, and life in general.

Compensatory acceptance of loneliness was characterized by higher social frustration scores than non-acceptance of loneliness and positive acceptance of loneliness. Individuals with compensatory positive loneliness were more frustrated about their relationships with classmates ($t = 2.43$, $p < 0.02$), relationships with the subjects of their professional activity, relationships with friends, their position in society, lifestyle, and leisure-related activities. These results might be interpreted based on the ideas of the students regarding the impact of internal stress on personal relationships associated with certain conflicts: general loneliness and non-acceptance of loneliness were constrained by attributing a relatively high level of positive characteristics to loneliness. This was a situation of internal “justification” of the loneliness of an individual, but not its acceptance. These results were consistent with those of previous studies, according to which loneliness can affect personal subjective well-being [41]. In this study, we found that not all loneliness types, but only neurotic or compensatory positive loneliness, might be a factor for dissatisfaction with relationships, as well as general dissatisfaction with life.

Social frustration in people who rejected loneliness or positively accepted loneliness had the lowest scores and similar mean values. Individuals experiencing these two types of loneliness were satisfied with various aspects of social life through different mechanisms; the first was through

inclusion in social life in various ways, and the second was by accepting life without any claims to be included in numerous relationships with others.

Our results showed that representatives of loneliness types 2 and 3, i.e., individuals who rejected loneliness and those who positively accepted loneliness, were more satisfied with life than others. Based on the indicators of satisfaction with relationships, both groups were quite satisfied with their social contacts, which indicated their social and psychological adaptation. These results were consistent with those of a study conducted by Osin and Leontiev [14], who established the relationship of these personality types with life satisfaction, as well as with the results of the studies by other authors [42], who used structural modeling on data from senior adolescents and showed positive associations between positive mental well-being and loneliness associated with friendship, and positive attitude toward loneliness.

These results showed that the probability of the risk of health deterioration in the future is low among individuals who do not accept loneliness. This might be due to an optimistic assessment of the situation, which could develop because of a certain type of character. However, this assessment is least supported among individuals experiencing neurotic loneliness, who assess the risk of health deterioration to be high.

Forced distance learning had the most positive influence on the motivation of academic activity in students with positive acceptance of loneliness. For individuals with this personality type, who perceive loneliness as a natural state, distance learning can provide more opportunities for fulfilling their academic needs. Distance learning had a positive impact on the psychological, physical, and somatic states of these individuals. They were more comfortable with distance learning in general, including its operational indicators (organization of academic activities, time spent on solving academic problems, etc.). Students with a positive acceptance of loneliness can use their time to solve existential and educational problems.

Our results showed that forced distance learning during the pandemic had the most negative impact on the psychological, physical, and somatic states of students with neurotic loneliness and compensatory positive loneliness. Individuals with a positive acceptance of loneliness and those who denied it, however, had a significantly lower score for the impact of distance learning on health. These results partially agreed with those of other studies [31, 36]. In a study, a high level of the subjective experience of loneliness was found at a higher level of involvement in virtual communication and a lower level of involvement in face-to-face communication [36].

Students with positive acceptance of loneliness and non-acceptance of loneliness reported a positive impact on communication conditioned by distance learning. Students with compensatory experience of positive loneliness and neurotic experience of loneliness reported a negative impact on their communication, low level of comfort in the learning process, low learning efficiency, and poor academic performance in general. These results were consistent with those of previous studies, according to which 71% of the students felt lonelier after switching to the distance learning format [43]. However, our study found that not all students experienced stress due to loneliness; only individuals whose general loneliness was combined with dependence on communication and those with pseudo-positive loneliness were affected the most.

Several studies have shown direct relationships between loneliness and depression [44], especially under the constraints associated with the COVID-19 pandemic, when negative emotional states emerged as a significant psychological problem [45-50]. Additionally, fear among

the students related to illness also affected their mental state [51, 52]. Solving this problem requires providing psychological assistance to those who develop severe psychological syndromes.

Our results showed that the highest scores of academic adaptation were for the participants who rejected loneliness. Slightly lower scores were observed in individuals that belonged to the group with positive acceptance of loneliness and compensatory positive acceptance of loneliness (the differences between them were not significant). The lowest scores of academic adaptation were observed in the group of respondents with neurotic loneliness. The results showed that academic adaptation was the highest in individuals who rejected loneliness and the lowest in individuals with neurotic loneliness. This implied that loneliness could be a significant indicator and, possibly, a predictor of academic adaptation (or lack thereof). Earlier, a group of researchers showed that loneliness was negatively associated with the adaptive potential of the participants [32]. However, loneliness was also shown to be a significant predictor of maladjustment [33]. The mechanism of the effect of loneliness on adaptation might be related to a negative change in the behavior of lonely individuals and the perceived behavior of others (with a negative assessment), as found by some researchers [53].

7. Conclusion

Subjective loneliness is of different types and can be characterized by acute emotions and even neuroticism. We studied the characteristics of loneliness during the COVID-19 pandemic when students were forced to study online (away from the university campus). This created objective physical isolation and limited social connections among students. Therefore, the main purpose of the study was to determine which types of loneliness are the most harmful in the current situation and to understand how students who experience different types of loneliness assess the situation.

The results of the study showed several consistent patterns. The loneliness of the students was classified into four main types. Two of these types were relatively favorable, i.e., positive loneliness and rejection of loneliness; the other two types were characterized by a negative experience, i.e., pseudo-positive loneliness and neurotic loneliness.

Loneliness types are characterized by varying degrees of social frustration. Rejection of loneliness and positive loneliness had equally low social frustration scores, compensatory positive loneliness occupied the intermediate position regarding social satisfaction, while neurotic loneliness had the highest social frustration scores. The type of loneliness affected satisfaction in social life; the neurotic type was the socially most frustrating type, while the highest social satisfaction was found in the participants with positive acceptance of loneliness and those who denied loneliness.

The temporary transition from campus to the online mode of education increased loneliness. For different types of loneliness, the subjective evaluation of the changes in health, learning motivation, and finding solutions to problems are different. Assessing the influence of distance learning on the health of individuals and achieving academic success at mastering competencies reveals similarities between loneliness types 1 and 2, as well as loneliness types 1 and 4. The most positive changes that occurred were observed among students with a positive perception of loneliness.

The academic adaptation of the students during distance learning varied significantly depending on the type of loneliness experienced. The highest adaptation scores were of those

students who rejected loneliness. The adaptation scores were lower in students belonging to loneliness types 1 and 3 (i.e., compensatory positive and positive perception of loneliness). Finally, the least adapted students were those who experienced neurotic loneliness.

7.1 Limitations of the Study

The limitations of the study included the lack of statistical measurements before the pandemic, which prevented the comparison of the scores before and during the pandemic. However, the typological design of the study and asking specific questions regarding the change in states partially compensated for the lack of such a comparative analysis. Moreover, the disproportionate sex ratio (significantly more females than males) might be another limitation. This study reflected the current situation in Russian universities.

Author Contributions

Conceptualization, S.R. and G.M.; methodology, S.R. and G.M.; software, S.A.; validation, S.R., G.M., G.E., and S.A.; formal analysis, G.E. and G.M.; investigation, S.R. and G.E.; data curation, G.E., G.M.; writing—original draft preparation, S.R., G.E. and G.M.; writing—review and editing, S.R. and G.E.; visualization, supervision, project administration, and funding acquisition, S.R. All authors have read and agreed to the published version of the manuscript.

Competing Interests

The authors have declared that no competing interests exist.

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