Full research paper

TOO MUCH OF EVERYTHING IS BAD: THE CASE OF CZECH UNIVERSITY STUDENTS' WORK-STUDY BALANCE DURING THE COVID-19 PANDEMIC

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ABSTRACT

Students are an exceptionally vulnerable population in comparison to any other age group. Many students face considerable stress stemming from the combined demands of their studies and, for some, the necessity to work. This situation presents a serious dilemma of how to combine work and study, how to maintain mental well-being. We explored the work-study balance by analyzing a repeated cross-sectional sample of 8,584 Czech university students at two time points (2020 and 2021) during the pandemic outbreak. Employment benefits students' mental health, but students who worked extra hours had more depressive symptoms than those who worked part-time or full-time. In addition, an increasing study load had a negative effect on students in the form of increased depressive symptoms. Both students who were employed before the pandemic but were no longer working during it and students who never had a job had significantly higher depressive symptoms than working students. The expectation of a detrimental high workload-high study load effect was not confirmed.

KEYWORDS

Covid-19, CES-D 8, role enrichment, role overload, study, university students, work

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Highlights

- *The Czech Republic has one of the highest numbers of working students, yet research on the effect of combining work and study is lacking to date.*
- *This article uses unique Czech data, with over 9,000 Czech students participating in two data collections.*
- *Employment benefited the students' mental health during the Covid-19 pandemic.*
- *High study load had a negative impact on students' mental health during the Covid-19 pandemic.*

INTRODUCTION

University students are vulnerable in terms of mental health: many suffer from several depressive symptoms (Mikolajczyk et al., 2008; Rückert, 2015), which have gradually become more pronounced for about a decade (Lipson et al., 2022). Moreover, university students have a higher prevalence of mental health problems in comparison to the general population (Dahlin et al., 2005; Kumar, 2016; Kurre et al., 2011; Verger et al., 2010). This may be because transitioning from school to the university level raises many personal and academic challenges (Rickinson, 1998). These emerging adults are in a unique phase of life when they are still dependent on their parents to some extent but are slowly becoming more detached, leaving adolescence behind but not yet reaching full adulthood (Arnett, 2007). As the cost of university and everyday living rises, students must ensure they can make ends meet. Some Czech students are supported by their parents or partners. However, they still have to work long hours to finance their education, which might hurt their academic achievement and overall education (Fischer and Vltavská, 2016). Two-thirds of students report they could not study without working simultaneously (King and Bannon, 2002). Research shows that 92% of Czech students in 2019 had a paid job, and 74% combined work and study during their courses, making the Czech Republic a country with one of the highest numbers of working students (Hauschildt et al., 2019). Almost two-thirds of the students working more than 20 hours a week claim they work to be able to cover their living costs, and 29% declare strong agreement with the statement they need to work to afford to study. And yet, despite their work efforts and also given the urgency of their reasons for needing to work, students' earnings are below average in comparison to other countries participating in the EUROSTUDENT survey (Hauschildt et al., 2021).

The Covid-19 outbreak has led to many sudden changes in, among other things, the field of university studies, work, and organization. While there is no systematic evidence of job losses and a deteriorating material situation for university students, the assumption is that the already dire situation of working students before the pandemic has only intensified. The pre-pandemic literature shows that changes in the labor market disproportionately affect younger people, who are often in precarious positions due to having only temporary employment contracts and are, therefore, more vulnerable to job loss than older age groups (MacDonald and Giazitzoglu, 2019). Some early pandemic studies already noted significant concerns about job loss (Birmingham et al., 2021; Nunn et al., 2021). This is disturbing since job loss correlates with increased depressive (Paul and Moser, 2009; Rosenthal et al., 2012) and anxiety levels (Paul and Moser, 2009) and a decrease in overall well-being (Flint et al., 2013; Paul and Moser, 2009). Moreover, the negative effects of employment loss are amplified when the unemployed cannot spend time in meaningful activities, including spending time with other people (Winefield et al., 1992), which was hindered during lockdowns. Higher education suddenly went online. Teachers, as well as students, had to adapt to the pandemic by switching to the online mode of study. While the results of comparing face-to-face and online learning from the pre-pandemic period are ambiguous, some suggest there are no differences (Fortune et al., 2011), while others show higher satisfaction among those taking face-to-face courses (Tratnik et al., 2019). These studies are small-scale and influenced by the context. In that period, students had the privilege of choosing between the study modes based on their needs, but in the pandemic, the online mode was unavoidable. That is also likely why more recent pandemic evidence suggests a strong preference for face-to-face learning over online learning, despite the obvious positives of online study, such as greater time efficiency (Kanojiya, 2020; Lemay et al., 2021). Students also emphasized the disadvantages of the online mode, such as social distancing and social isolation (Kanojiya, 2020; Lemay et al., 2021). Moreover, students' workload for university has significantly increased, or at least they perceive it to have done so (Lemay et al., 2021), likely adding to already elevated mental distress.

According to evidence, handling the commitments of paid work and study can be a source of stress (Jogaratnam and Buchanan, 2004), but so are insufficient financial funds (Monk, 2004; Stanley and Manthorpe, 2002). Long working hours, in particular, can cause work overload and be detrimental to mental health (Ogawa et al., 2018; Wong et al., 2019). However, learning new soft and hard skills at work can benefit students and enrich their role and, subsequently, their well-being (Curtis and Shani, 2002; Nicklin et al., 2019). Moreover, during the Covid-19 pandemic, working undergraduates had better psychological health than non-working students (Barros et al., 2022).

Understanding the relationship between working and studying is crucial as it directly affects the academic success, financial stability, and overall well-being of students who are already at high risk of depressive. This relationship is increasingly important as more students work part-time or even full-time while pursuing their education. Notably, the study and work balance among university students is understudied. The vast majority of the very few studies conducted on a similar topic are small scale analyzing only lower hundreds of students' responses (Barros et al., 2022; Butler, 2007; Curtis and Shani, 2002; Nicklin et al., 2019) and they tend to focus on academic performance (Butler, 2007; Curtis and Shani, 2002; Elling and Elling, 2000; Volkwein, 1989), or they consider only full-time workers (Butler, 2007), not taking into account the impact of job loss**.** In our manuscript, we focus on how work and study are interlinked to bridge all the mentioned empirical gaps: whether they complement each other, benefiting students' mental health or deleterious to students' well-being.

THEORETICAL BACKGROUND: COMBINING WORK AND STUDY

Role Overload

Previous research focusing on working university students usually presumes a conflict of roles induced by role strain and the difficulty of meeting multiple obligations placed on students by the very definition of emerging adulthood (Cook, 2015). According to the studies, devoting limited time and energy to work depletes resources meant for fulfilling school responsibilities and the other way around (Hall, 1972). Empirical evidence shows that long working hours predict poorer academic performance (Derous and Ryan, 2008; Miller et al., 2008; Salamonson and Andrew, 2006; Trockel et al., 2000), overall increased work-school conflict (Butler, 2007) and subsequently also reduced psychological well-being (Salamonson and Andrew, 2006; Trockel et al., 2000). All this may result in poorer study skills (Lammers et al., 2001) and role overload (Hecht, 2001). Academic and extracurricular activities, financial burdens, and separation from family lead to work stress and role overload (Agrawal and Chahar, 2007). Role overload prevalence is high in the college population (Cook, 2015).

Role Enrichment/Enhancement

In contrast to the literature pointing out the conflicts in roles and overwork in one or the other domain, some studies did not reveal a negative correlation between work hours and academic performance (Elling and Elling, 2000; Volkwein, 1989). And when the roles are not draining but fulfilling and complement one another, they might enhance each other (Marks and MacDermid, 1996; Sieber, 1974). This principle, known as enrichment theory, assumes a positive implication (Blom et al., 2007; Carlson et al., 2006; Greenhaus and Powell, 2006). There is strong evidence supporting the idea of work and school enrichment (Butler, 2007; Greenhaus and Powell, 2006), emphasizing that students might learn new skills or enhance existing ones (Lucas and Lammont, 1998; Pickering et al., 2000), experience enhanced esteem and also benefit from gaining an income at work that can subsequently improve their performance at school or provide them with better conditions for learning. Thus, there is an assumption that greater time investment in both study and work potentially benefits mental well-being.

Conflicting or Complementing Concept?

While economic reasons drive students to seek work, work also provides an emotional experience that can benefit overall social development (Lucas and Lammont, 1998) and increase

opportunities for advancement and marketability for future jobs (Hornung et al., 2008). Even though they are often considered separate and conflicting spheres, there is evidence to suggest overlap to the extent that they enhance and complement each other, helping students acquire soft and hard skills depending on the nature of their studies and work (Miller et al., 2011). This multiple-role involvement that may lead to a meaningful sense of self can, in turn, also enhance well-being (Creed et al., 2015; Thoits, 1986). It is, however, likely that role enrichment is only applicable to some extent. The enrichment effect might be negated if the students experience excessive stress and are overloaded at work or in their studies. This would produce strain and stress, leading to role overload and subsequently also to the deterioration of their well-being (Buda and Lenaghan, 2005). There is, however, also isolated evidence to suggest that, under certain circumstances, combining work and school is double-edged, both deteriorating and enriching (Butler, 2007).

Hypotheses

Based on previous empirical and theoretical evidence, we formulate the following hypotheses:

H1: University students working part-time and full-time will exhibit fewer depressive symptoms than non-working students.

H2: University students working excessive hours (more than 40 per week) will manifest more depressive symptoms than students working part-time or full-time.

H3: Too many hours spent studying will be detrimental to university students' mental well-being. The more hours students spend in face-to-face lectures, online classes, and self-study combined, the greater their depressive symptoms.

H4: Students who were employed before the pandemic but were no longer working during it will have a higher depressive score than students working part-time and full-time.

H5: Working students with high levels of study will have more depressive symptoms than non-working students with high levels of study.

Data Measurement and Methods

This article concludes with repeated cross-sectional data mapping of the well-being of Czech university students in the years 2020 and 2021. The first dataset was collected as a part of the Covid-19 International Student Well-being Study (C19 ISWS) at the very beginning of the Covid-19 pandemic (Van de Velde et al., 2021). We collected 6,497 answers from Czech students from April 29 to May 19, 2020. It was a time when little was known about the Covid-19 pandemic. The number of cases in the Czech Republic was low, and the number of people who recovered was higher than the number of active cases. Moreover, the restrictions were easing up at that time. The other data collection was realized at the end of the third wave of Covid-19 in the Czech Republic; we collected 5,595 answers between May 18 and June 30, 2021. This was also a time of gradual loosening of pandemic measures and schools reopening. However, the university facilities were the last to be opened, and this opening coincided with the exam period of most universities. Both surveys were conducted online by the Faculty of Social Sciences of Charles University and the Institute of Sociology of the Czech Academy of Sciences. In both years (2020 and 2021), universities were contacted by email and telephone to ask if they would be willing to send information about the survey to their students with a link to complete the survey. Once they expressed willingness, their management distributed an email within the university containing a link to the questionnaire, which students accessed and completed independently. Both surveys were considered and approved by the Research Ethics Committee of the Faculty of Social Sciences at Charles University.

Sample

The analytical sample consists of 8,575 Czech-speaking university students between 20 and 34 years of age (4,975 respondents in 2020 and 3,600 respondents in 2021). Our data version does not contain respondents outside the "standard university student age" and English-speaking respondents. We implemented the listwise deletion method (case is dropped from the analysis because of a missing value in at least one of the specified variables). The biggest loss of cases is due to missing values in the variable measuring the study load (678 missing values in 2020 and 350 in 2021). On the other hand, there were very few missing values in the variables measuring age, gender, study program, and academic field.

Measurements

The dependent variable, perceived and self-reported **depressive symptomatology**, was measured using the 8-item Center for Epidemiologic Studies Depressive Scale (CES-D 8). Respondents were asked to indicate how much of the time during the past week they: a) felt depressed, b) felt that everything they did was an effort, c) sleep was restless, d) were happy, e) felt lonely, f) enjoyed life, g) felt sad, h) could not get going. The responses were divided into four categories: (1) none or almost none of the time, (2) some of the time, (3) most of the time, (4) all or almost all of the time. The resulting sum score ranged from a low of 8 (low depressive symptomatology) to a high of 32 (high depressive symptomatology). CES-D8 is widely used for measuring symptoms of depressive (Huijts et al., 2013; Von Dem Knesebeck et al., 2011; Missinne and Bracke, 2012) and has been validated (Karim et al., 2015; Klusáček et al., 2022; Van de Velde et al., 2009). The distribution by collection year is shown in Figure 1. While the shape of the histogram is similar in both years of data collection, there is a distinct shift toward higher depressive among students in the spring of 2021.

The independent variables were the **study** and **paid workload**. We measured the study load as the amount of time per week dedicated to online, personal, and face-to-face study combined. The workload was measured by a single question on the amount of time per week dedicated to paid work. Workload measured in hours is widely used in studies testing the effect of high work or study burden on mental health in the general population (Choi et al., 2021; Masui et al., 2014; Toubasi et al., 2023; Weston et al., 2019; Yao and Chen, 2023; Yoon et al., 2018). The main advantage of this approach is comparability between students. Still, this comparability comes at the cost of not capturing the complexity of the study and paid workload (intensity, difficulty, and emotional demands of the tasks).

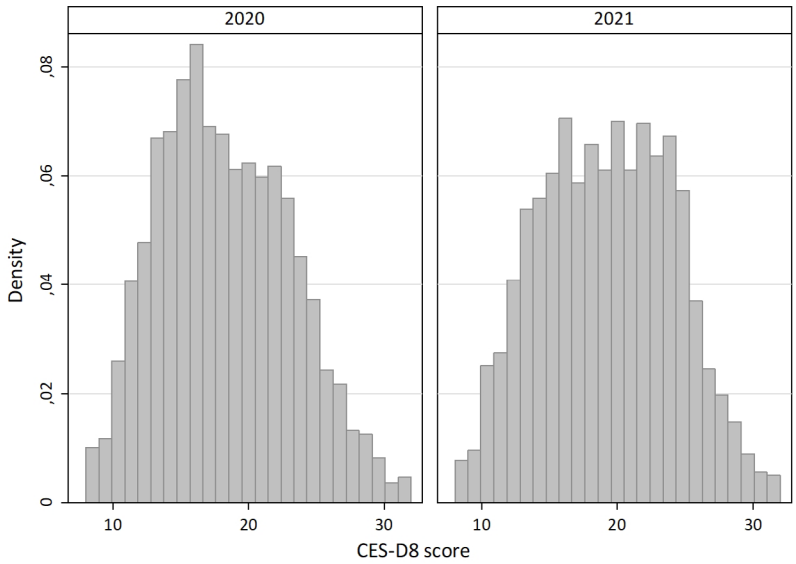

Figure 1: Histogram of CES-D8 by year collection. *N*(2020) = 4,975; *N*(2021) = 3,600

These two variables were recoded into the following categories: 0 hours, 1-10 hours, 11-25 hours, 26-40 hours, and more than 40 hours. To test Hypothesis 4, we further divided the "0 hours" work category into "No job before Covid" (students who declared zero hours worked before the pandemic and during the pandemic as well) and "No longer working during Covid" students who worked at least some hours before the pandemic but declared zero hours worked during the pandemic. To test Hypothesis 5, we further collapsed the paid workload variable into three categories: no paid work (0 hours), part-time work and full-time work (1-40 hours), and overtime working hours (more than 40 hours). Studies on testing the effect of high work or study burden on mental health usually use categorized work or study hours variables (Choi et al., 2021; Weston et al., 2019; Yoon et al., 2018).

Table 1 shows descriptive statistics for independent variables by year of collection. Very few students reported zero hours of study load, while a share of students with paid jobs stood at 58% in 2020. A year later, the percentage of students who reported no workload at all dropped to about 43%. Online study, which included lectures and seminars delivered through the Internet, was not so prevalent in 2020, but the hours spent on online learning increased in 2021. A similar trend appears for face-to-face lectures and seminars, which were not widely prevalent in 2020 due to lockdowns. Therefore, these limited universities' ability to function as they gradually adapted to the new situation. However, in 2021, face-to-face lectures were slightly more frequent, especially in applied study fields that require internship experience.

Workload	2020		2021	
(hours)	*N*	%	*N*	%
No job before covid (0)	1,385	27.8	1,007	28.0
No longer working during covid (0)	1,507	30.3	550	15.3
1–10	681	13.7	702	19.5
11–25	750	15.1	770	21.4
26–40	520	10.5	432	12.0
>40	132	2.7	139	3.9
Total	4,975	100.0	3,600	100.0
Study load	**2020**		**2021**	
(hours)	*N*	%	*N*	%
0	134	2.7	207	5.8
1–10	1,224	24.6	557	15.4
11–25	1,879	37.8	1,162	32.3
26–40	1,027	20.6	885	24.6
>40	711	14.3	789	22.0
Total	4,975	100.0	3,600	100.0

Table 1: Descriptive statistics for independent variables by year of collection

The analyses include several control variables to account for factors that may influence students' mental health outcomes. **Age** (continuous, 20–34 years) and **gender** (male, female) were included as key demographic factors, as previous research has shown that younger adults (Velten et al., 2018) and women are generally more vulnerable to mental health issues, particularly

during periods of heightened stress (Kartalova-O'Doherty and Tedstone Doherty, 2010). **Study programs** (bachelor, master, doctoral) and **academic fields** (professions and applied sciences, humanities, social sciences, natural sciences, IT, medicine) were controlled for, as different levels of study and disciplines vary in terms of academic pressure, workload, and career expectations, creating an academic stress pressure all of which can impact stress and mental well-being (Deng et al., 2022). We also included **having a confidence**, measured by whether the respondent has someone to discuss personal matters with. Social support is a well-established protective factor against psychological distress, buffering against stress and mitigating depressive symptoms (Li et al., 2023). Women were predominant in our analytical sample (74% in 2020 and 68% in 2021). In both years, most students consisted of bachelor students (approximately 59% in 2020 and 52% in 2021). The representation of individual fields of study is similar for 2020 and 2021, except for medical students, whose numbers were 10% higher in 2021. The percentage of respondents with no confidence was around 7% in 2020 and 9% in 2021.

	2020		2021	
	N	%	*N*	%
Gender				
Male	1,310	26.3	1,162	32.3
Female	3,665	73.7	2,438	67.7
Degree				
Bachelor	2,915	58.6	1,858	51.6
Master	1,855	37.3	1,524	42.4
PhD	205	4.1	218	6.0
Academic field				
Professions	2,100	42.2	1,343	37.3
Humanities	719	14.5	468	13.0
Soc. Sci.	490	9.9	335	9.3
Nat. Sci.	980	19.7	628	17.4
IT	372	7.5	234	6.5
Medicine	314	6.3	592	16.5
Confidant				
Has a confidant	4,615	92.8	3,289	91.4
No confidant	360	7.2	311	8.6
	M	SD	*M*	SD
Age	22.8	2.5	23.6	2.9

Table 2: Descriptive statistics for control variables by year of collection

Analytical Procedures

We used linear multiple regression to examine the relationship between workload, study, and depressive symptoms. Multicollinearity was assessed using variance inflation factors (VIF), and all VIF values were below the commonly accepted threshold of 10, indicating no serious multicollinearity problems (see Appendix A). The Breusch-Pagan test was utilized to determine if heteroskedasticity is present. The results indicated that heteroskedasticity is not present (the p-value of Chi-Square test statistics is more than.05). This means that we can assume that the error terms have constant variance.

We also graphically inspected residual values. This way, we can identify issues such as heteroscedasticity, nonlinearity, outliers, or systematic patterns in data. None of the diagnostic plots suggested that such an issue occurred. One of the diagnostic plots (the histogram of the residuals) is in the supplemental materials (see Appendix B). All analyses were conducted using STATA, and results were checked for consistency through sensitivity checks, including alternative model specifications and the inclusion/exclusion of control variables.

RESULTS

Work and study load among students and their effect on mental health in students

Table 3 presents results from multiple linear regression with depressive symptoms as the dependent variable. The models were structured to systematically examine the effects of workload and study load while accounting for potential differences across the two data collection periods. Model 1 includes workload and study load without interactions with the year of data collection. This baseline model establishes their overall associations with depressive symptoms, independent of temporal variation. Model 2 introduces an interaction between workload and the year of data collection to assess whether the impact of workload on depressive symptoms differs between the two-time points. Model 3 similarly tests the interaction between study load and the year of data collection, allowing us to evaluate whether study load effects differ between 2020 and 2021. The regression models with more details (such as confidence intervals) can be found in Appendix C.

The trends are different for workload and study load. We used a moderate workload (11-25 hours) as a reference category.

The findings suggest that there are notable differences between working students who have a weekly workload between 1-10 hours ($\beta = 0.264$; not statistically significant), 11-25 hours, and 26-40 hours ($\beta = 0.017$; not statistically significant) per week, and non-working students ($\beta = 0.611;\ p < .001$). Working students tend to have a lower number of depressive symptoms than those who report no working hours. There was a positive and significant effect of students working excessive hours ($\beta = 1.021; p < .01$). We also visualized the relationship between work and depressive symptoms using predicted values according to hours of paid workload from multiple linear regression (Figure 2). The relationship between variables has a notable U-shape in both surveyed years (2020 and 2021). Clearly, it shows that students with no working hours or students working overtime suffer from more depressive symptoms than students working part-time and full-time.

As for the study load, the students who claimed to have a moderate study load (11-25 hours) were used as a reference category. The overall resulting coefficients suggest that the more hours of study university students had, the worse their mental state. There seems to be a breaking point between categories 26-40 and >40. Students who reported not having to study ($\beta = -0.540$; not statistically significant) or that their study took only a negligible amount of time during the week ($\beta = -0.371;\ p < .05$) had a lower depressive score in comparison to the reference category, students devoting 26-40 hours to their study ($\beta = 0.553;\ p < .001$) and students studying more than 40 hours per week ($\beta = 1.844;\ p < .001$) had a higher depressive score in comparison to the reference category. Figure 2 portrays the relationship between study and depressive symptoms in time: in 2021, the relationship is linear, while in 2020, a generally upward trend is observed with some variation in the lowest study load category. This inconsistency is because very few students had a zero-study load in 2020.

As for the control variables, there is a notable effect of gender: women tend to suffer from significantly more depressive symptoms than men ($\beta = 0.610$; $p < .01$). Students in Humanities, in particular, exhibit higher depressive than profession-oriented students ($\beta = 0.979$; $p < .001$). Also, the most mentally overwhelmed students were PhD candidates ($\beta = -1.228$; $p < .001$). Respondents with a confidant had a much lower depressive score ($\beta = -4{,}120$; $p < .001$). The differences in depressive symptoms scores between 2020 and 2021 are especially notable in Figure 2, and the coefficient has significant effect sizes indicating more serious mental health results in 2021 ($\beta = 0.896;\ p < .001$).

	(1)	(2)	(3)
	CES-D8	CES-D8	CES-D8
Female (ref. male)	0.610***	0.616***	0.608**
Age	0.002	0.003	-0.001
Academic field (ref. Professions)			
Humanities	0.979***	0.983***	0.975***
Soc. Sci.	0.236	0.240	0.239
Nat. Sci.	0.168	0.166	0.152
IT	0.267	0.249	0.269
Medicine	-0.021	-0.039	-0.033
Degree (ref. Bachelor)			
Master	-0.473***	-0.480***	-0.476***
PhD	-1.228***	-1.233***	-1.234***
Has a confidant (ref. No confidant)	-4.120***	-4.118***	-4.119
Study load (ref. 11-25)			
0	-0.540	-0.556+	0.307
1-10	-0.371*	-0.381**	-0.293
26-40	0.553***	0.550***	0.635**
>40	1.844***	1.833***	1.928***
Workload (ref. 11-25)			
0	0.611***	0.390+	0.625***
1-10	0.264	0.004	0.278
26-40	0.017	-0,082	0.011
>40	1.021**	0.934*	1.014*
2021 (ref. 2020)	0.896***	0.547**	1.085***
Workload # Year			
0 # 2021		0.481	
1-10 # 2021		0.513	
26-40 # 2021		0.176	
>40 # 2021		0.175	
Study load # Year			
0 # 2021			-1.453*
1-10 # 2021			-0.198
26-40 # 2021			-0.211
>40 # 2021			-0.215
Constant	20.870***	21.022***	20.842***
Observations	8,575	8,575	8,575
R2	0.095	0.095	0.095

*Note: Unstandardized regression coefficients, + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001*

Table 3: Multiple linear regression, dependent variable depressive symptoms, with the overall category of non-working students

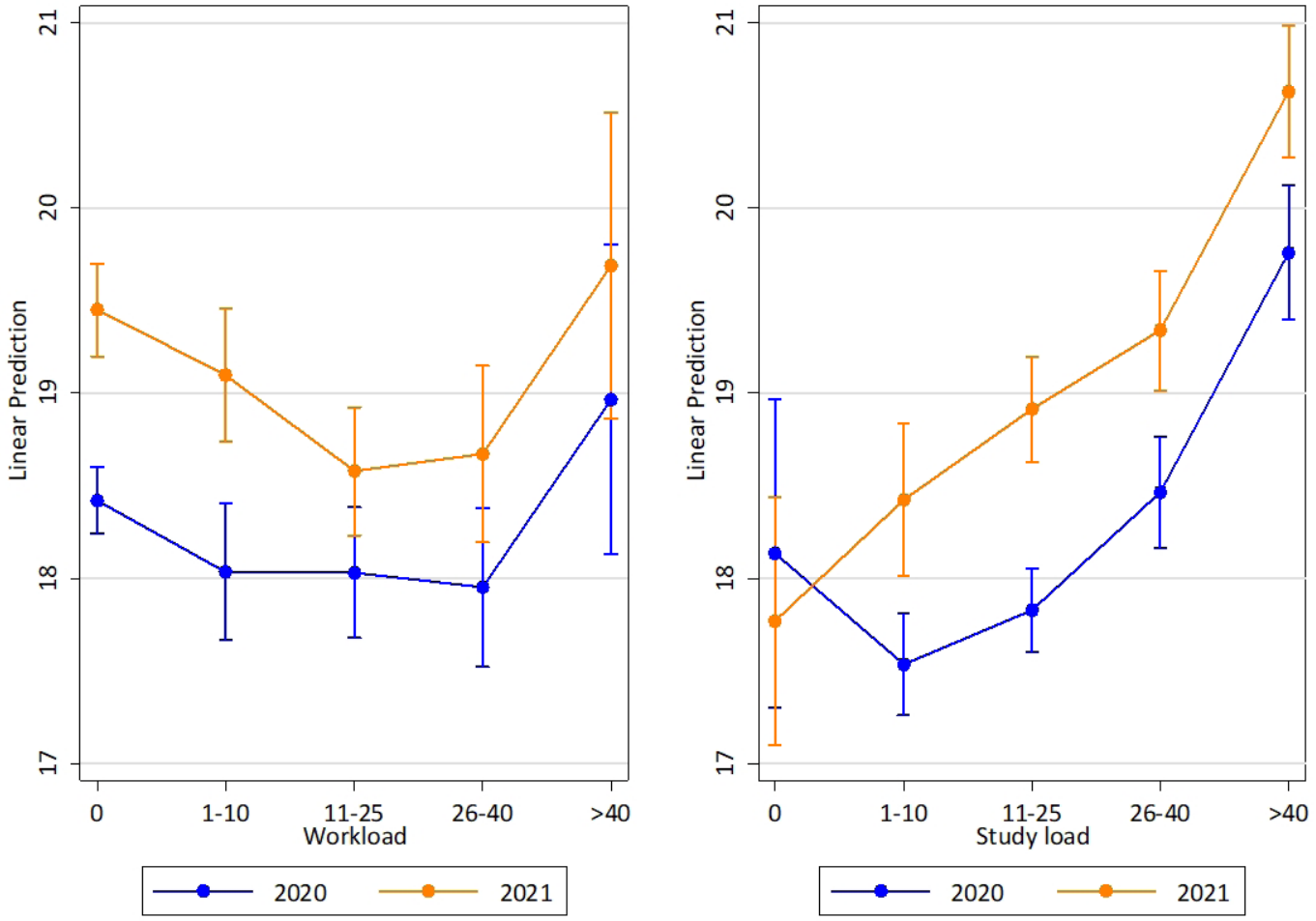

Figure 2: Multilevel linear regression, predicted values for depressive symptoms, *N* = 8,575

Job loss during the Covid-19 pandemic and its effect on mental health in students

Previous results suggest that students without jobs suffered from more depressive symptoms than working students (except for those working excessive working hours). We wanted to take a closer look and split the category of non-working students into those employed before the Covid-19 outbreak but no longer working during the pandemic and those who did not have a job before or after the pandemic (Table 4 and Figure 3). The difference between this table and the previous table (Table 3) lies in the use of a different variable for the workload – the variable in Table 4 distinguishes between students who declared zero hours worked before the pandemic and during the pandemic as well ("No job before covid-19") and students who worked at least some hours before the pandemic but declared zero hours worked during the pandemic ("No longer working during covid"). The regression models with more details (such as confidence intervals) can be found in Appendix D. The results show that both students who stopped working during the Covid-19 pandemic ($\beta = 0.804$; $p < .001$) and students who never had a job ($\beta = 0.442$; $p < .01$) had significantly higher depressive symptoms than working students. The results regarding study load, year of data collection, and control variables remained almost the same as in the previous models (Table 3).

	(1)	(2)
	CES-D8	CES-D8
Female (ref. male)	0.595***	0.601***
Age	-0.002	-0.002
Academic field (ref. Professions)		
Humanities	0.976***	0.967***
Soc. Sci.	0.237	0.234
Nat. Sci.	0.188	0.183
IT	0.293	0.270
Medicine	0.016	0.009
Degree (ref. Bachelor stud.)		
Master stud.	-0.474***	-0.483***
PhD stud.	-1.211***	-1.217***
Has a confidant (ref. No confidant)	-4.120***	-4.115***
Study load (ref. 11-25)		
0	-0.529+	-0.541+
1-10	-0.372*	-0.379**
26-40	0.555***	0.552***
>40	1.849***	1.827***
Workload (ref. 11-25)		
No job before covid	0.442**	0.300
No longer working during covid	0.804***	0.464*
1-10	0.261	0.004
26-40	0.023	-0.080
>40	1.103**	0.935*
2021 (ref. 2020)	0.923***	0.548*
Workload # Year		
No job before covid # 2021		0.265
No longer working during covid # 2021		0.935**
1-10 # 2021		0.509
26-40 # 2021		0.183
>40 # 2021		0.184
Constant	20.942***	20.145***
Observations	8,575	8,575
R2	0.096	0.096

*Note: Unstandardized regression coefficients, + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001*

Table 4: Multiple linear regression, dependent variable depressive symptoms, non-working students split into "No job before covid-19" and "No longer working during covid"

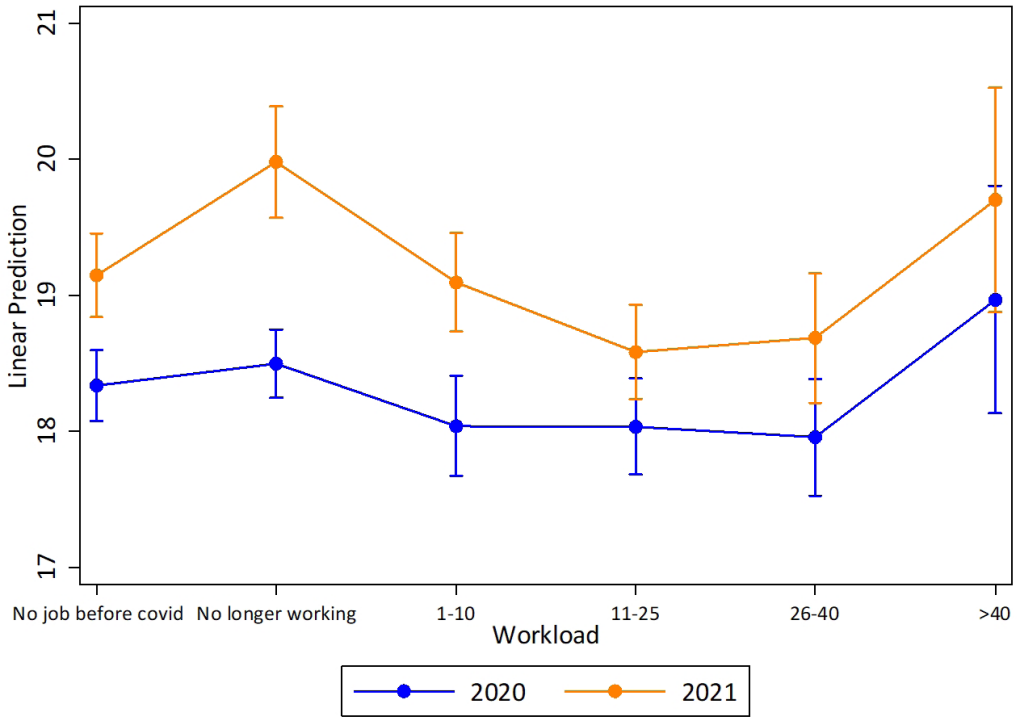

Figure 3: Multiple linear regression, predicted values for depressive symptoms, N = 8,575

Working students with substantial study loads

Moreover, since the expectations included an assumption that students with an excessive study load would have worse mental health than students without work but with the same excessive study load, we also constructed a model considering interactions between study load and workload (Figure 4 and Table with regression coefficients in Appendix E). Our findings, however, suggest that working students, even those working overtime with high study loads, had similar levels of depressive symptoms as non-working students with high study loads.

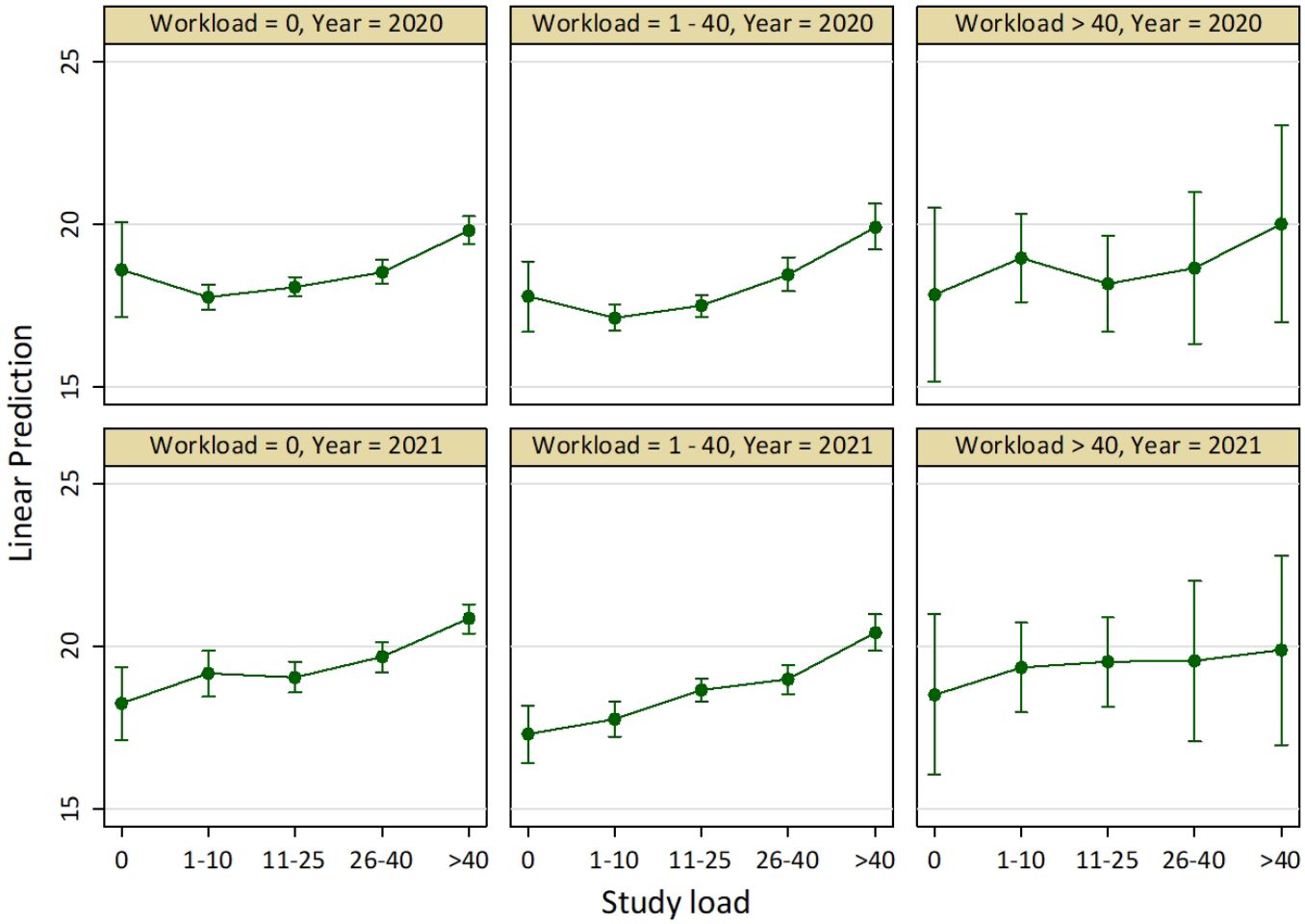

Figure 4: Multilevel linear regression, predicted values for depressive symptoms, N = 8,575

DISCUSSION

Based on the previous literature and theoretical background on role overload and role enrichment, we predicted that working university students would exhibit fewer depressive symptoms than students without any working commitments (H1), students working excessive hours would declare more depressive symptoms than students working up to 40 hours per week (H2), heavy study load would prove harmful to the mental well-being of the students (H3), students experiencing job loss would manifest worse mental health (H4), and students with excessive study and workload would suffer from significantly higher depressive symptoms than a student with a high level of study but without any kind of paid work (H5). Our hypothesis regarding differing degrees of mental distress for non-working students and those working up to a regular 40-hour week (H1) was confirmed in our study and is also in concordance with the previous literature, which clearly states that working students benefit from lower depressive symptomatology (Barros et al., 2022; Curtis and Shani, 2002; Nicklin et al., 2019). This is no surprise because work experience provides students not only with money to elevate their financial security and decrease stress levels (Monk, 2004; Stanley and Manthorpe, 2002) and important skills (Curtis and Shani, 2002; Nicklin et al., 2019) but also affords social contact, which was so very precious during the lockdowns in 2020 and 2021. Also, this finding is in concordance with the assumption that employment is benefiting students. In line with our expectation (H2) and the existing evidence (Ogawa et al., 2018; Wong et al., 2019), the results indicate that students working more than 40 hours per week have significantly worse mental health than other working students. When focusing on Figure 2, signs suggest that the coefficient is high and exceeds the other working groups. Because the literature shows an increase in study load among students during the pandemic (Lemay et al., 2021), and there is evidence suggesting that combining work and study can be stressful

(Jogaratnam and Buchanan, 2004) and, therefore, also harmful to overall well-being, we anticipated a heavy study load to be detrimental to students' mental well-being (H3). This expectation was met. The association between study load and mental distress was positive and linear for 2020 and 2021. We were also interested in the effect of job loss and its relationship with depressive symptomatology (H4). In line with previous literature (Flint et al., 2013; Paul and Moser, 2009), we found a significant association between job loss (students who were no longer working during the pandemic) and worse mental health. Students who lost their jobs exhibited significantly higher depressive symptoms than students working part-time and full-time. Our findings also do not support the expectation we formulated based on the theory of role overload that working students with substantial study loads would suffer from higher mental distress compared to non-working students with a substantial study load (H5). This may also be attributed to selection bias. While it is possible the share of students with such extensive working hours is negligible, it is also likely that this limit stems from our data sample and that we did not succeed in recruiting enough diverse student groups. Another possible explanation might be an influence of some other factor that was not captured by our questionnaire.

Limitations

Despite our study's advantages, such as the focus on the understudied university student population in the special circumstances of the Covid-19 pandemic during two time periods and considering potentially complementary theoretical backgrounds, it is not without limitations. Although the sample size is more than satisfactory, we were limited by the mode of collection (online survey) and the selection of universities that participated. This might have also caused selection bias, which has been mentioned several times. Moreover, the sample does not meet the criteria for representativeness: about two-thirds are women, and more than forty percent of the academic fields of study are professions. This limits the generalization of the conclusions. The data analyzed have cross-sectional characteristics, yet a panel survey would have been ideal for our purposes. Also, the study design did not allow us to establish the causal links between our dependent and independent variables. The explanation is two-fold: students without a job could be more prone to depressive than students with a job, or the students were too depressed to work. Furthermore, we used only one psychological instrument in our analysis; introducing more instruments that would measure, for example, anxiety or positive affect could bring more insight into the relationship between our dependent and independent variables. Similarly, due to the limited scope of the questionnaire, we were able to measure role enrichment and role overload, each by a single variable expressing the time invested in it. Even though that is not ideal, and this drawback should be addressed in future studies, we believe that our study offers interesting and valuable findings despite that. In both surveys, there were different universities with different characteristics. For example, our 2021 sample contained more medical students and fewer students studying in professional academic fields than the 2020 sample. Even though the data collection happened around the same time, each survey had specific circumstances. The year 2020 captured the beginning of the pandemic, and this year was more uncertain, with only a few Covid-19 cases. In 2021, significantly more people were infected, yet the restrictions were easing up at that time. The students were mainly in the exam period or transitioning towards the exam period, which might also be an exceptionally stressful situation that contributed to overall poor mental health among students. Therefore, the results relating to tentative comparisons between the years must be considered cautiously.

CONCLUSION

The study aimed to explore the relationship between hours worked, hours dedicated to the study and subjectively reported depressive among Czech University students during two-time points during the COVID-19 period. Our findings suggest that students who work during the term experience enrichment, at least in the sense of lowered mental health distress, compared to students without a job. When interpreting the results on study load, in general, more hours spent studying tend to result in a more pronounced negative effect on depressive symptomatology. Excessive hours worked seem to have a significant effect on depressive symptomatology in students. Students who had lost their jobs and students who had never worked had similar levels of depressive symptomatology (higher than working students). Role overload expectations applied to students with heavy work and study loads also do not seem to apply to Czech students during the pandemic. Today's students are the future. They will soon become the working population and have to bear the burden of contributing to the pension system and providing for an aging population. But because they are often already forced by the circumstances to work while studying and are becoming overloaded, their already severely compromised mental health suffers even more. Despite the clearly stated limitations, this study contributes to understanding the complex relationship between work, study, and mental health among university students. While the combination of study and work can be beneficial to some extent, too much of everything is harmful. Our results have important implications for developing strategies to support students in managing their work-study balance to maintain their mental health. They also inform the development of educational policies and student support services, which can help create a more equitable and supportive environment for all students. Future research should ideally include a multi-country comparison of the general student population in a normal situation and distinguish among different types of jobs.

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DATA AVAILABILITY STATEMENT

A detailed description of the C19 ISWS data collection (2020) is available in the Scandinavian Journal of Public Health (Van de Velde et al., 2021), and the cross-sectional multicountry dataset including the Czech Republic is freely accessible on Zenodo (Buffel & Velde, 2022) . The Czech dataset from 2021 is publicly available at the Czech Social Science Data Archive: Soukup, Petr; Kudrnáčová, Michaela; Klusáček, Jan, 2023, "University students during COVID-19 pandemic (Vysokoškolští studenti během pandemie)", https://doi.org/10.14473/CSDA/NCKCXO, CSDA, V1. The ČSDA research infrastructure project is supported by the Ministry of Education, Youth and Sports within the framework of grant LM2018135.

REFERENCES

Agrawal, R.K. and Chahar, S.S. (2007) 'Examining role stress among technical students in India', *Social Psychology of Education*, Vol. 10, No. 1, pp. 77–91. https://doi.org/10.1007/s11218-006-9010-y

Arnett, J.J. (2007) 'Emerging Adulthood: What Is It, and What Is It Good For?', *Child Development Perspectives*, Vol. 1, No. 2, pp. 68–73. https://doi.org/10.1111/j.1750-8606.2007.00016.x

Barros, C., Sacau-Fontenla, A. and Fonte, C. (2022) 'Anxiety, depression and stress among university students: the mediator role of work in time of COVID-19', in Arezes, P.M., Baptista, J.S., Carneiro, P., Castelo Branco, J., Costa, N., Duarte, J., Guedes, J.C., Silva, L.C., Sousa, P. and Viana, S.I. (ed.) *Occupational and environmental safety and health III*., Cham: Springer International Publishing.

Birmingham, W.C., Wadsworth, L.L., Lassetter, J.H., Graff, T.C., Lauren, E. and Hung, M. (2021) 'COVID-19 lockdown: Impact on college students' lives', *Journal of American College Health*, Vol. 71, No. 3, pp. 1–15. https://doi.org/10.1080/07448481.2021.1909041

Blom, M., Georgiades, A., László, K.D., Alinaghizadeh, H., Janszky, I. and Ahnve, S. (2007) 'Work and marital status in relation to depressive symptoms and social support among women with coronary artery disease', *Journal of Women's Health*, Vol. 16, No. 9, pp. 1305–1316. https://doi.org/10.1089/jwh.2006.0191

Buda, R. and Lenaghan, J.A. (2005) 'Engagement in multiple roles: an investigation of the student-work relationship', *Journal of Behavioral and Applied Management*, Vol. 6, No. 3, pp. 211–224. https://doi.org/10.21818/001c.14554

Butler, A.B. (2007) 'Job characteristics and college performance and attitudes: A model of work-school conflict and facilitation', *Journal of Applied Psychology*, Vol. 92, No. 2, pp. 500–510. https://doi.org/10.1037/0021-9010.92.2.500

Carlson, D.S., Kacmar, K.M., Holliday, J. and Grzywacz, J.G. (2006) 'Measuring the positive side of the work – family interface: Development and validation of a work – family enrichment scale', Vol. 68, pp. 131–164. https://doi.org/10.1016/j.jvb.2005.02.002

Choi, E., Choi, K.W., Jeong, H.G., Lee, M.S., Ko, Y.H., Han, C., Ham, B.J., Chang, J. and Han, K.M. (2021) 'Long working hours and depressive symptoms: moderation by gender, income, and job status', *Journal of Affective Disorders*, Vol. 286, pp. 99–107. https://doi.org/10.1016/j.jad.2021.03.001

Cook, H. (2015). Role overload and prescription stimulant use among college students. Butler Journal of Undergraduate Research, Vol. 1, No. 1, pp. 22–36. Retrieved from: https://digitalcommons.butler.edu/cgi/viewcontent.cgi?article=1000&context=bjur

Creed, P.A., French, J. and Hood, M. (2015) 'Working while studying at university: The relationship between work benefits and demands and engagement and well-being', *Journal of Vocational Behavior*, Vol. 86, pp. 48–57. https://doi.org/10.1016/j.jvb.2014.11.002

Curtis, S. and Shani, N. (2002) 'The effect of taking paid employment during term-time on students' academic studies', *Journal of Further and Higher Education*, Vol. 26, No. 2, pp. 129–138. https://doi.org/10.1080/03098770220129406

Dahlin, M., Joneborg, N. and Runeson, B. (2005) 'Stress and depression among medical students: A cross-sectional study', *Medical Education*, Vol. 39, No. 6, pp. 594–604. https://doi.org/10.1111/j.1365-2929.2005.02176.x

Deng, Y., Cherian, J., Khan, N.U.N., Kumari, K., Sial, M.S., Comite, U., Gavurova, B., Wang, S. and Wu, J. (2022) 'Family and academic stress and their impact on students' depression level and academic performance', *Frontiers in Psychiatry*, Vol. 13, pp. 1–13. https://doi.org/10.3389/fpsyt.2022.869337

Derous, E. and Ryan, A.M. (2008) 'When earning is beneficial for learning: The relation of employment and leisure activities to academic outcomes', *Journal of Vocational Behavior*, Vol. 73, No. 1, pp. 118–131. https://doi.org/10.1016/j.jvb.2008.02.003

Elling, S.R. and Elling, T.W. (2000) 'The Influence of Work on College Student Development', *NASPA Journal*, Vol. 37, No. 2, pp. 454–470. https://doi.org/10.2202/1949-6605.1108

Fischer, J. and Vltavská, K. (2016) *EUROSTUDENT VI: Základní výsledky šetření postojů a životních podmínek studentů vysokých škol v České republice*. Praha: Ministry of Education, Youth and Sports. Available at: https://msmt.gov.cz/uploads/odbor_30/TF/Analyticke_materialy/Eurostudent/E_VI_zaverecna_zprava.pdf (Accessed: 19 March 2025).

Flint, E., Bartley, M., Shelton, N. and Sacker, A. (2013) 'Do labour market status transitions predict changes in psychological well-being?', *Journal of Epidemiology and Community Health*, Vol. 67, No. 9, pp. 796–802. https://doi.org/10.1136/jech-2013-202425

Fortune, M.F., Spielman, M. and Pangelinan, D.T. (2011) 'Students' Perceptions of Online or Face-to-Face Learning and Social Media in Hospitality, Recreation and Tourism', *MERLOT Journal of Online Learning and Teaching*, Vol. 7, No. 1, pp. 1–16. Retrieved from: https://jolt.merlot.org/vol7no1/fortune_0311.pdf

Greenhaus, J.H. and Powell, G.N. (2006) 'When work and family are allies: a theory of work-family enrichment', *Academy of Management Review*, Vol. 31, No. 1, pp. 72–92. https://doi.org/10.5465/AMR.2006.19379625

Hall, D.T. (1972) 'A Model of Coping with Role Conflict: The Role Behavior of College Educated Women', *Administrative Science Quarterly*, Vol. 17, No. 4, pp. 471. https://doi.org/10.2307/2393827

Hauschildt, K., Gwosć, C., Schirmer, H. and Cras, F. (2019) *The social dimension of student life in the European higher education area in 2019*. Hanover: Eurostudent. Available at: https://www.eurostudent.eu/download_files/documents/Eurostudent_brochure_WEB.pdf (Accessed: 19 March 2025).

Hauschildt, K., Gwosć, C., Schirmer, H. and Wartenbergh-Cras, F. (2021) *Social and economic conditions of student life in Europe: EUROSTUDENT VII synopsis of indicators 2018–2021*. Hanover: Eurostudent. Available at: https://www.eurostudent.eu/download_files/documents/EUROSTUDENT_VII_Synopsis_of_Indicators.pdf (Accessed: 19 March 2025).

Hecht, L.M. (2001) 'Role conflict and role overload: Different concepts, different consequences', *Sociological Inquiry*, Vol. 71, No. 1, pp. 111–121. https://doi.org/10.1111/j.1475-682X.2001.tb00930.x

Hornung, S., Rousseau, D.M. and Glaser, J. (2008) 'Creating Flexible Work Arrangements Through Idiosyncratic Deals', *Journal of Applied Psychology*, Vol. 93, No. 3, pp. 655–664. https://doi.org/10.1037/0021-9010.93.3.655

Huijts, T., Kraaykamp, G. and Subramanian, S. V. (2013) 'Childlessness and psychological well-being in context: A multilevel study on 24 European Countries', *European Sociological Review*, Vol. 29, No. 1, pp. 32–47. https://doi.org/10.1093/esr/jcr037

Jogaratnam, G. and Buchanan, P. (2004) 'Balancing the demands of school and work: Stress and employed hospitality students', *International Journal of Contemporary Hospitality Management*, Vol. 16, No. 4, pp. 237–245. https://doi.org/10.1108/09596110410537397

Kanojiya, A.R. (2020) 'The Impact of Online Learning during Covid-19 Pandemic: Students Perspective Maharashtra, India', *International Journal for Research in Applied Science and Engineering Technology*, Vol. 8, No. 11, pp. 686–690. https://doi.org/10.22214/ijraset.2020.32277

Karim, J., Weisz, R., Bibi, Z. and ur Rehman, S. (2015) 'Validation of the Eight-Item Center for Epidemiologic Studies Depression Scale (CES-D) Among Older Adults', *Current Psychology*, Vol. 34, No. 4, pp. 681–692. https://doi.org/10.1007/s12144-014-9281-y

Kartalova-O'Doherty, Y. and Tedstone Doherty, D. (2010) 'Recovering from recurrent mental health problems: Giving up and fighting to get better', *International Journal of Mental Health Nursing*, Vol. 19, No. 1, pp. 3–15. https://doi.org/10.1111/j.1447-0349.2009.00636.x

King, T. and Bannon, E. (2002) *At what cost? The price that working students pay for a college education.* Washington, DC: U.S. Public Interest Research Group. (ERIC Document Reproduction Service No. ED470026).

Klusáček, J., Kudrnáčová, M. and Soukup, P. (2022) 'Validation of Ces-D8 Among Czech University Students During Covid-19 Pandemic', *Ceskoslovenska Psychologie*, Vol. 66, No. 4, pp. 398–415. https://doi.org/10.51561/cspsych.66.4.398

Kumar, H. (2016) 'Psychological Distress and Life Satisfaction among University Students', *Journal of Psychology & Clinical Psychiatry*, Vol. 5, No. 3, pp. 1–6. https://doi.org/10.15406/jpcpy.2016.05.00283

Kurre, J., Scholl, J., Bullinger, M. and Petersen-Ewert, C. (2011) 'Integration and health-related quality of life of undergraduate medical students with migration backgrounds - Results of a survey', *Psycho-Social Medicine*, Vol. 8, pp. 1–8. https://doi.org/10.3205/psm000076

Lammers, W.J., Onweugbuzie, A.J. and Slate, J.R. (2001) 'Academic success as a function of gender, class, age, study habits, and employment of college students', *Research in the Schools*, Vol. 8, No. 2, pp. 71–81.

Lemay, D.J., Bazelais, P. and Doleck, T. (2021) 'Transition to online learning during the COVID-19 pandemic', *Computers in Human Behavior Reports*, Vol. 4, p. 100130. https://doi.org/10.1016/j.chbr.2021.100130

Li, G., Li, Y., Lam, A.I.F., Tang, W., Seedat, S., Barbui, C., Papola, D., Xie, J. and Zhu, T. (2023) 'Understanding the protective effect of social support on depression symptomatology from a longitudinal network perspective', *BMJ Mental Health*, Vol. 26, pp. 1–7. https://doi.org/10.1136/bmjment-2023-300802

Lipson, S.K., Zhou, S., Abelson, S., Heinze, J., Jirsa, M., Morigney, J., Patterson, A., Eisenberg, D., and Auerbach, R.P. (2022) 'Trends in college student mental health and help-seeking by race/ethnicity: Findings from the national healthy minds study, 2013–2021', *Journal of Affective Disorders*, Vol. 306, pp. 138–147. https://doi.org/10.1016/j.jad.2022.03.038

Lucas, R. and Lammont, N. (1998) 'Combining work and study: an empirical study of full-time students', *Journal of Education and Work*, Vol. 11, No. 1, pp. 41–56. https://doi.org/10.1080/1363908980110103

MacDonald, R. and Giazitzoglu, A. (2019) 'Youth, enterprise and precarity: or, what is, and what is wrong with, the "gig economy"?', *Journal of Sociology*, Vol. 55, No. 4, pp. 724–740. https://doi.org/10.1177/1440783319837604

Marks, S.R. and MacDermid, S.M. (1996) 'Multiple Roles and the Self: A Theory of Role Balance', *Journal of Marriage and the Family*, Vol. 58, No. 2, p. 417. https://doi.org/10.2307/353506

Masui, C., Broeckmans, J., Doumen, S., Groenen, A. and Molenberghs, G. (2012) 'Do diligent students perform better? Complex relations between student and course characteristics, study time, and academic performance in higher education', *Studies in Higher Education*, Vol. 39, No. 4, pp. 621–643. https://doi.org/10.1080/03075079.2012.721350

Mikolajczyk, R.T., Maxwell, A.E., El Ansari, W., Naydenova, V., Stock, C., Ilieva, S., Dudziak, U., and Gable, R. (2007) 'Prevalence of depressive symptoms in university students from Germany, Denmark, Poland and Bulgaria', *Social Psychiatry and Psychiatric Epidemiology*, Vol. 43, No. 2, pp. 105–112. https://doi.org/10.1007/s00127-007-0282-0

Miller, K., Danner, F. and Staten, R. (2008) 'Relationship of work hours with selected health behaviors and academic progress among a college student cohort', *Journal of American College Health*, Vol. 56, No. 6, pp. 675–679. https://doi.org/10.3200/JACH.56.6.675-679

Miller, R.L., Rycek, R.F. and Fritson, K. (2011) 'The effects of high impact learning experiences on student engagement', *Procedia Social and Behavioral Sciences*, Vol. 15, pp. 53–59. https://doi.org/10.1016/j.sbspro.2011.03.050

Missinne, S. and Bracke, P. (2012) 'Depressive symptoms among immigrants and ethnic minorities: A population based study in 23 European countries', *Social Psychiatry and Psychiatric Epidemiology*, Vol. 47, No. 1, pp. 97–109. https://doi.org/10.1007/s00127-010-0321-0

Monk, E.M. (2004) 'Student mental health. Part 2: The main study and reflection of significant issues', *Counselling Psychology Quarterly*, Vol. 17, No. 1, pp. 33–43. https://doi.org/10.1080/09515070410001665749

Nicklin, J.M., Meachon, E.J. and McNall, L.A. (2019) 'Balancing Work, School, and Personal Life among Graduate Students: a Positive Psychology Approach', *Applied Research in Quality of Life*, Vol. 14, No. 5, pp. 1265–1286. https://doi.org/10.1007/s11482-018-9650-z

Nunn, C., Germaine, C., Ogden, C., Miah, Y., Marsh, J., Kitching, R., Kathrada, N., and Warren, L. (2021) 'Precarious hope: Situated perspectives on the COVID-19 pandemic from undergraduate students in Manchester, UK', *Journal of Applied Youth Studies*, Vol. 4, No. 5, pp. 429–444. https://doi.org/10.1007/s43151-021-00057-1

Ogawa, R., Seo, E., Maeno, T., Ito, M., Sanuki, M. and Maeno, T. (2018) 'The relationship between long working hours and depression among first-year residents in Japan', *BMC Medical Education*, Vol. 18, No. 1, pp. 1–8. https://doi.org/10.1186/s12909-018-1171-9

Paul, K.I. and Moser, K. (2009) 'Unemployment impairs mental health: Meta-analyses', *Journal of Vocational Behavior*, Vol. 74, No. 3, pp. 264–282. https://doi.org/10.1016/j.jvb.2009.01.001

Watts, C. and Pickering, A. (2000) 'Pay as you learn: student employment and academic progress', *Education + Training*, Vol. 42, No. 3, pp. 129–135. https://doi.org/10.1108/00400910010372670

Rickinson, B. (1998) 'The Relationship between Undergraduate Student Counselling and Successful Degree Completion', *Studies in Higher Education*, Vol. 23, No. 1, pp. 95–102. https://doi.org/10.1080/03075079812331380522

Rosenthal, L., Carroll-Scott, A., Earnshaw, V.A., Santilli, A. and Ickovics, J.R. (2012) 'The importance of full-time work for urban adults' mental and physical health', *Social Science and Medicine*, Vol. 75, No. 9, pp. 1692–1696. https://doi.org/10.1016/j.socscimed.2012.07.003

Rückert, H.W. (2015) 'Students' mental health and psychological counselling in Europe', *Mental Health and Prevention*, Elsevier, Vol. 3, No. 1–2, pp. 34–40. https://doi.org/10.1016/j.mhp.2015.04.006

Salamonson, Y. and Andrew, S. (2006) 'Academic performance in nursing students: Influence of part-time employment, age and ethnicity', *Journal of Advanced Nursing*, Vol. 55, No. 3, pp. 342–349. https://doi.org/10.1111/j.1365-2648.2006.03863_1.x

Sieber, S.D. (1974) 'Toward a Theory of Role Accumulation', *American Sociological Review*, Vol. 39, No. 4, pp. 567–578. https://doi.org/10.2307/2094422

Stanley, N. and Manthorpe, J. (ed.) (2002) *Students' mental health needs: Problems and responses*. New York: Jessica Kingsley Publishers.

Thoits, P.A. (1986) 'Social support as coping assistance', *Journal of Consulting and Clinical Psychology*, Vol. 54, No. 4, pp. 416–423. https://doi.org/10.1037/0022-006X.54.4.416

Toubasi, A.A., Hasuneh, M.M., Al Karmi, J.S., Haddad, T.A. and Kalbouneh, H.M. (2022) 'Burnout among university students during distance learning period due to the COVID-19 pandemic: A cross sectional study at the University of Jordan', *International Journal of Psychiatry in Medicine*, Vol. 58, No. 3, pp. 263–283. https://doi.org/10.1177/00912174221107780

Tratnik, A., Urh, M. and Jereb, E. (2017) 'Student satisfaction with an online and a face-to-face Business English course in a higher education context', *Innovations in Education and Teaching International*, Routledge, Vol. 56, No. 1, pp. 36–45. https://doi.org/10.1080/14703297.2017.1374875

Trockel, M.T., Barnes, M.D. and Egget, D.L. (2000) 'Health-related variables and academic performance among first-year college students: Implications for sleep and other behaviors', *Journal of the American College Health Association*, Vol. 49, No. 3, pp. 125–131. https://doi.org/10.1080/07448480009596294

Van de Velde, S., Buffel, V., Bracke, P., Van Hal, G., Somogyi, N.M., Willems, B. and Wouters, E. (2021) 'The COVID-19 International Student Well-being Study', *Scandinavian Journal of Public Health*, Vol. 49, No. 1, pp. 114–122. https://doi.org/10.1177/1403494820981186

Van de Velde, S., Levecque, K. and Bracke, P. (2009) 'Measurement equivalence of the CES-D 8 in the general population in Belgium: A gender perspective', *Archives of Public Health*, Vol. 67, No. 1, pp. 15–29. https://doi.org/10.1186/0778-7367-67-1-15

Velten, J., Bieda, A., Scholten, S., Wannemüller, A. and Margraf, J. (2018) 'Lifestyle choices and mental health: A longitudinal survey with German and Chinese students', *BMC Public Health*, Vol. 18, No. 1, pp. 1–15. https://doi.org/10.1186/s12889-018-5526-2

Verger, P., Guagliardo, V., Gilbert, F., Rouillon, F. and Kovess-Masfety, V. (2010) 'Psychiatric disorders in students in six French universities: 12-month prevalence, comorbidity, impairment and help-seeking', *Social Psychiatry and Psychiatric Epidemiology*, Vol. 45, No. 2, pp. 189–199. https://doi.org/10.1007/s00127-009-0055-z

Volkwein, J.F. (1989) 'Changes in Quality among Public Universities', *The Journal of Higher Education*, Vol. 60, No. 2, pp. 136–151. https://doi.org/10.1080/00221546.1989.11775019

von Dem Knesebeck, O., Pattyn, E. and Bracke, P. (2011) 'Education and depressive symptoms in 22 European countries', *International Journal of Public Health*, Vol. 56, No. 1, pp. 107–110. https://doi.org/10.1007/s00038-010-0202-z

Weston, G., Zilanawala, A., Webb, E., Carvalho, L.A. and McMunn, A. (2019) 'Long work hours, weekend working and depressive symptoms in men and women: Findings from a UK population-based study', *Journal of Epidemiology and Community Health*, Vol. 73, No. 5, pp. 465–474. https://doi.org/10.1136/jech-2018-211309

Winefield, A.H., Tiggemann, M. and Winefield, H.R. (1992) 'Spare time use and psychological well-being in employed and unemployed young people', *Journal of Occupational and Organizational Psychology*, Vol. 65, No. 4, pp. 307–313. https://doi.org/10.1111/j.2044-8325.1992.tb00507.x

Wong, K., Chan, A.H.S. and Ngan, S.C. (2019) 'The effect of long working hours and overtime on occupational health: A meta-analysis of evidence from 1998 to 2018', *International Journal of Environmental Research and Public Health*, Vol. 16, No. 12, pp. 13–19. https://doi.org/10.3390/ijerph16122102

Yao, H. and Chen, S. (2023) 'Associations of Time Spent on Study and Sleep with Anxiety and Depressive Symptoms in Junior High School Students: Report from the Large-Scale Monitoring of Basic Education Data in China', *International Journal of Mental Health Promotion*, Vol. 25, No. 9, pp. 1053–1065. https://doi.org/10.32604/ijmhp.2023.028844

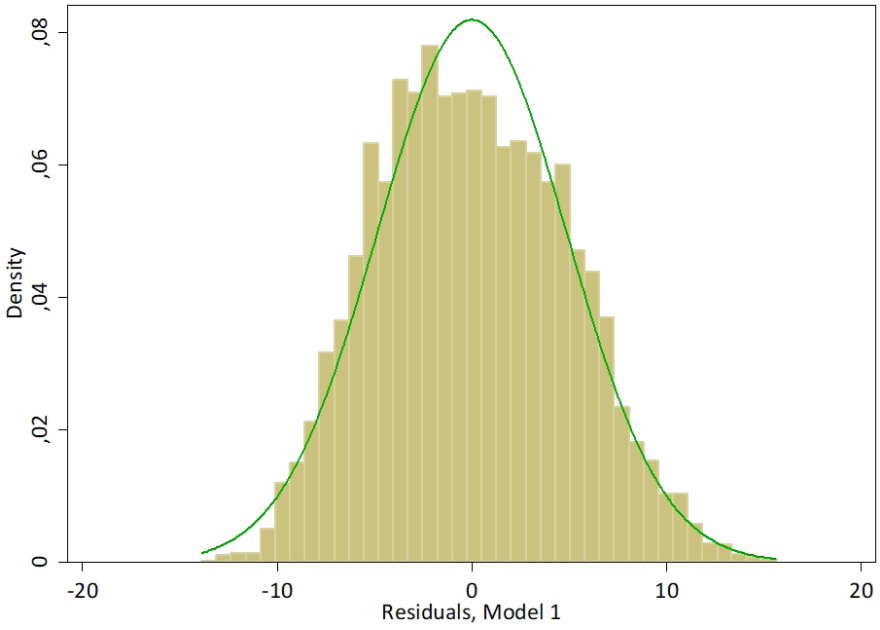
Yoon, Y., Ryu, J., Kim, H., Kang, C. won and Jung-Choi, K. (2018) 'Working hours and depressive symptoms: The role of job stress factors', *Annals of Occupational and Environmental Medicine*, Annals of Occupational and Environmental Medicine, Vol. 30, No. 1, pp. 1–9. https://doi.org/10.1186/s40557-018-0257-5

APPENDIX

APPENDIX A. VIF VALUES FOR BASELINE MODEL IN TABLE 3

	VIF
Female (ref. male)	1.09
Age	1.62
Academic field (ref. Professions)	
Humanities	1.21
Soc. Sci.	1.13
Nat. Sci.	1.25
IT	1.16
Medicine	1.30
Degree (ref. Bachelor)	
Master	1.39
PhD	1.39
Study load (ref. 11-25)	
0	1.10
1-10	1.29
26-40	1.29
>40	1.33
Workload (ref. 11-25)	
0	2.01
1-10	1.62
26-40	1.52
>40	1.18
2021 (ref. 2020)	1.11

APPENDIX B. HISTOGRAM OF THE RESIDUALS, MODEL 1 IN TABLE 3



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APPENDIX C. MULTIPLE LINEAR REGRESSION, DEPENDENT VARIABLE DEPRESSIVE SYMPTOMS, WITH THE OVERALL CATEGORY OF NON-WORKING STUDENTS

	(1)	95% Conf. Interval		(2)	95% Conf. Interval		(3)	95% Conf. Interval	
	CES-D8			CES-D8			CES-D8		
Female (ref. male)	0.610***	0.372	0.848	0.616***	0.378	0.854	0.608**	0.370	0.846
Age	0.002	-0.046	0.050	0.003	-0.045	0.051	-0.001	-0.048	0.048
Academic field (ref. Professions)									
Humanities	0.979***	0.649	1.308	0.983***	0.654	1.312	0.975***	0.646	1.304
Soc. Sci.	0.236	-0.136	0.608	0.240	-0.132	0.612	0.239	-0.133	0.611
Nat. Sci.	0.168	-0.128	0.463	0.166	-0.129	0.462	0.152	-0.143	0.448
IT	0.267	-0.168	0.701	0.249	-0.186	0.684	0.269	-0.165	0.704
Medicine	-0.021	-0.405	0.361	-0.039	-0.423	0.345	-0.033	-0.417	0.352
Degree (ref. Bachelor)									
Master	-0.473***	-0.722	-0.225	-0.480***	-0.729	-0.231	-0.476***	-0.725	-0.227
PhD	-1.228***	-1.790	-0.665	-1.233***	-1.796	-0.671	-1.234***	-1.798	-0.672
Has a confidant (ref. No confidant)	-4.120***	-4.508	-3.732	-4.118***	-4.506	-3.730	-4.119	-4.507	-3.731
Study load (ref. 11-25)									
0	-0.540	-1.094	0.014	-0.556*	-1.111	-0.002	0.307	-0.557	1.171
1-10	-0.371*	-0.660	-0.083	-0.381**	-0.669	-0.092	-0.293	-0.646	0.061
26-40	0.553***	0.272	0.835	0.550***	0.268	0.831	0.635**	0.263	1.006
>40	1.844***	1.531	2.158	1.833***	1.518	2.147	1.928***	1.504	2.353
Workload (ref. 11-25)									
0	0.611***	0.318	0.904	0.390+	-0.008	0.787	0.625***	0.332	0.919
1-10	0.264	-0.094	0.621	0.004	-0.504	0.512	0.278	-0.079	0.636
26-40	0.017	-0.388	0.422	-0,082	-0.632	0.469	0.011	-0.393	0.416
>40	1.021**	0.381	1.661	0.934*	0.028	1.840	1.014*	0.374	1.655
2021 (ref. 2020)	0.896***	0.676	1.117	0.547**	0.053	1.041	1.085***	0.722	1.449
Workload # Year									
0 # 2021				0.481	-0.096	1.059			
1-10 # 2021				0.513	-0.198	1.225			
26-40 # 2021				0.176	-0.618	0.970			
>40 # 2021				0.175	-1.089	1.439			
Study load # Year									
0 # 2021							-1.453*	-2.577	-0.330
1-10 # 2021							-0.198	-0.805	0.408
26-40 # 2021							-0.211	-0.778	0.355
>40 # 2021							-0.215	-0.829	0.399
Constant	20.870***	19.703	22.038	21.022***	19.831	22.215	20.842***	19.671	22.012
Observations	8,575			8,575			8,575		
R^2	0.095			0.095			0.095		
AIC	51527.20			51531.76			51528.67		
BIC	51668.33			51701.12			51698.03		

*Note: Unstandardized regression coefficients, + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001*

APPENDIX D. MULTIPLE LINEAR REGRESSION, DEPENDENT VARIABLE DEPRESSIVE SYMPTOMS, NON-WORKING STUDENTS SPLIT INTO "NO JOB BEFORE COVID-19" AND "NO LONGER WORKING DURING COVID"

	(1)	95% Conf. Interval		(2)	95% Conf. Interval	
	CES-D8			CES-D8		
Female (ref. male)	0.595***	0.357	0.833	0.601***	0.362	0.839
Age	-0.002	-0.050	0.046	-0.002	-0.050	0.046
Academic field (ref. Professions)						
Humanities	0.976***	0.647	1.305	0.967***	0.638	1.297
Soc. Sci.	0.237	-0.135	0.609	0.234	-0.138	0.606
Nat. Sci.	0.188	-0.108	0.483	0.183	-0.113	0.479
IT	0.293	-0.142	0.727	0.270	-0.165	0.705
Medicine	0.016	-0.368	0.401	0.009	-0.376	0.394
Degree (ref. Bachelor stud.)						
Master stud.	-0.474***	-0.723	-0.225	-0.483***	-0.732	-0.234
PhD stud.	-1.211***	-1.773	-0.648	-1.217***	-1.780	-0.655
Has a confidant (ref. No confidant)	-4.120***	-4.508	-3.732	-4.115***	-4.503	-3.727
Study load (ref. 11-25)						
0	-0.529+	-1.083	0.025	-0.541+	-1.095	0.013
1-10	-0.372*	-0.660	-0.083	-0.379**	-0.667	-0.090
26-40	0.555***	0.274	0.837	0.552***	0.271	0.834
>40	1.849***	1.536	2.163	1.827***	1.513	2.142
Workload (ref. 11-25)						
No job before covid	0.442**	0.119	0.765	0.300	-0.139	0.740
No longer working during covid	0.804***	0.472	1.136	0.464*	0.032	0.895
1-10	0.261	-0.096	0.618	0.004	-0.504	0.512
26-40	0.023	-0.382	0.427	-0.080	-0.630	0.471
>40	1.103**	0.386	1.665	0.935*	0.029	1.841
2021 (ref. 2020)	0.923***	0.702	1.145	0.548*	0.054	1.041
Workload # Year						
No job before covid # 2021				0.265	-0.367	0.898
No longer working during covid # 2021				0.935**	0.250	1.620
1-10 # 2021				0.509	-0.202	1.220
26-40 # 2021				0.183	-0.610	0.977
>40 # 2021				0.184	-1.080	1.447
Constant	20.942***	19.773	22.110	20.145***	19.951	22.338
Observations	8,575			8,575		
R^2	0.096			0.096		
AIC	51523.30			51524.73		
BIC	51671.49			51708.20		

*Note: Unstandardized regression coefficients, + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001*

APPENDIX E. MULTIPLE LINEAR REGRESSION, DEPENDENT VARIABLE DEPRESSIVE SYMPTOMS

	CES-D8	95% Conf. Interval	
Gender			
Female (ref. male)	0.614***	0.375	0.852
Age	-0.005	-0.051	0.044
Academic field (ref. Professions)			
Humanities	0.992***	0.664	1.320
Soc. Sci.	0.241	-0.131	0.613
Nat. Sci.	0.176	-0.120	0.472
IT	0.265	-0.170	0.700
Medicine	-0.019	-0.404	0.366
Degree (ref. Bachelor stud.)			
Master stud.	-0.473***	-0.723	-0.224
PhD stud.	-1.210***	-1.774	-0.645
Has a confidant (ref. No confidant)	-4.120***	-4.509	-3.731
Study load (ref. 11-25)			
0	0.537	-0.954	2.028
1-10	-0.311	-0.800	0.178
26-40	0.470+	-0.002	0.941
>40	1.744***	1.228	2.261
Workload # Year (0 # 2020)			
1 - 40 # 2020	-0.572*	-1.028	-0.116
>40 # 2020	0.098	-1.409	1.605
0 # 2021	0.972**	0.416	1.527
1 - 40 # 2021	0.578*	0.103	1.053
>40 # 2021	1.441*	0.039	2.843
Study load # Workload # Year			
0 # 1 - 40 # 2020	-0.260	-2.133	1.614
0 # >40 # 2020	-0.963	-4.246	2.519
0 # 0 # 2021	-1.349	-3.272	0.573
0 # 1 - 40 # 2021	-1.900*	-3.666	-0.134
0 # >40 # 2021	-1.547	-4.736	1.642
1-10 # 1 - 40 # 2020	-0.060	-0.779	0.658
1-10 # >40 # 2020	1.094	-0.967	3.155
1-10 # 0 # 2021	0.424	-0.556	1.403
1-10 # 1 - 40 # 2021	-0.575	-1.382	0.232
1-10 # >40 # 2021	0.133	-1.862	2.129
26-40 # 1 - 40 # 2020	0.495	-0.288	1.277
26-40 # >40 # 2020	0.014	-2.775	2.804
26-40 # 0 # 2021	0.149	-0.671	0.968
26-40 # 1 - 40 # 2021	-0.146	-0.887	0.595
26-40 # >40 # 2021	-0.445	-3.300	2.411
>40 # 1 - 40 # 2020	0.679	-0.252	1.609
>40 # >40 # 2020	0.102	-3.304	3.509
>40 # 0 # 2021	0.054	-0.769	0.877
>40 # 1 - 40 # 2021	0.026	-0.820	0.871
>40 # >40 # 2021	-1.392	-4.621	1.837
Constant	21.562***	20.428	22.696
Observations	8,575		
R^2	0.095		

*Note: Unstandardized regression coefficients, + p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001*