

Stress Management and Academic Performance during COVID-19

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Abstract

To understand how college students managed stress related to the COVID-19 pandemic, we surveyed more than 300 students at a large public university in central Europe. We use an instrument designed to recover stress management techniques, as well as personality traits and habits associated with stress and stress management. We identify 16 stress management techniques used during the COVID-19 pandemic; meditation or breathing exercises were most commonly reported. Academically outstanding students, compared with average or struggling students, are more likely to use physical activity, journaling/to-do lists, and less likely to come in contact with friends and family, to manage stress during the COVID-19 pandemic.

Keywords: COVID-19, pandemic, stress, stress management, academic performance

JEL Classification: I20, I24

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1 Introduction

The COVID-19 pandemic has disrupted almost every sector of our society and higher education was not an exception. The resulting upheaval in higher education systems increased anxiety among college students (Fruehwirth et al., 2021).

Students manage their stress in very different ways (Holden and Brown, 2021). Students with effective coping mechanisms may be more resilient to pandemic-induced stressors and thus suffer less during the pandemic. In this paper, we ask the following policy-relevant questions: Do students have stress management skills to cope with the COVID-19 pandemic? What are those techniques? Lower-performing students may be less likely to use effective stress management techniques and may experience the most harmful effects of the COVID-19 pandemic (Fruehwirth et al., 2021; Sumell et al., 2021). This motivates us to investigate whether low- and high-performers use different stress management techniques.

We designed and administered a survey instrument that captures: (1) student demographics and study and employment attributes; (2) academic performance (outstanding, average, or struggling); (3) measures of stress and capacity for stress regulation; (4) changes in stress levels during the COVID-19 pandemic; (5) stress management techniques used.

2 Survey Design

We asked questions related to anxiety levels and capacity for executive functioning, a quality associated with stress regulation (Williams et al., 2009). We measured executive functioning using questionnaire items related to awareness and control from the Mindful Attention Awareness Scale (MAAS), developed by (Brown and Ryan, 2003). We also asked questions designed to capture the change in anxiety levels during the COVID-19 pandemic. Finally, we directly asked students to describe, in open form, stress management techniques used during the COVID-19 pandemic.

3 Data

We surveyed more than 300 students at a large public university in central Europe. Table 1 presents student characteristic summary statistics. Table 2 shows that academically outstanding students have a lower level of anxiety and higher levels of awareness and control compared with academically average or struggling students. Table 3 shows that one third of respondents report increased worry about themselves or those close to them during the COVID-19 pandemic.

4 Results

We have identified 16 stress management techniques, each reported by 1% to 23% of respondents (Table 4). Figure 1 shows that 24% of respondents used more than one technique to manage stress.¹ Our results show that *Meditation or Breathing Exercises* is the most commonly reported stress management technique followed by *Walking, Jogging, or Physical Exercise* during the COVID-19 pandemic. Many students reported using multiple stress management techniques. Table A3 shows that the most frequently reported combination of stress management techniques is *Meditation or Breathing Exercises* and *Walking, Jogging, or Physical Exercise*. A text mining algorithm reveals that the most frequently mentioned word in students' responses regarding stress management techniques used is "meditation" (Figure 2).

We estimate linear probability models to investigate differences between outstanding and average or struggling students in the propensity to use each stress management technique and the number of techniques used (Table 5). Outstanding students are substantially more likely to use physical activity and journaling/to-do lists and less likely to come in contact with friends and family as a stress management technique during the COVID-19 pandemic compared with average or struggling students. We also find that average or struggling students are 23 percentage points more likely than outstanding students to provide no response. This may be indicative of lack of understanding about what strategies relieve their anxiety and/or the lack of stress coping techniques.

5 Conclusion

Our findings speak to administrators and instructors helping students cope and continue learning under repeated waves of the COVID-19 pandemic. Lower-performing students may be less likely to know of and use effective techniques to manage their stress. The stress management techniques outstanding students practice can widen the array of effective approaches to relieve anxiety during the pandemic. Administrators and instructors should take note of these effective techniques and incorporate methods to disseminate these to all students, especially those average

¹Table A1 (A2) reports correlation coefficients between the number of techniques used and student characteristics (questionnaire items on anxiety, awareness, and control). Table A4 (A5) shows the share of significant chi-square tests of independence between each technique and student characteristics (measures of anxiety, awareness, or control). Table A6 reports chi-square test results between each technique and indices on anxiety, awareness, and control. We find a limited number of significant associations. Table A7 (A8) reports the most significant association between each technique and student characteristics (items on anxiety, awareness, or control).

and low-performing, to ameliorate overall outcomes during the COVID-19 pandemic.

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Table 1: STUDENT CHARACTERISTICS

	All	Academic Performance		
		Outstanding	Average	Struggling
Panel A: Demographics				
Female (1=Yes)	61.0	63.6	62.0	35.3
What is your age? Ans: 20 years or younger	25.5	16.9	27.8	35.3
Ans: between 21 and 25 years	50.0	61.0	47.2	35.3
Ans: 26 years or older	24.5	22.1	25.0	29.4
What is your living situation? Ans: Alone	37.7	40.3	35.6	52.9
Ans: with Family	36.1	24.7	41.2	23.5
Ans: with Roommates	21.3	26.0	19.4	23.5
Ans: Varies	4.8	9.1	3.7	0.0
What is your parents' highest degree? Ans: High School or Lower	37.1	35.1	37.5	41.2
Ans: Professional	26.8	32.5	25.5	17.6
Ans: Bachelors	23.2	19.5	25.0	17.6
Ans: Masters or Higher	12.9	13.0	12.0	23.5
Were you or your parents born in a foreign country? (1=Yes)	32.6	22.1	35.6	41.2
Are you partnered or married? (1=Yes)	45.2	46.8	45.8	29.4
Do you have children? (1=Yes)	4.2	5.2	4.2	0.0
Panel B: Study and Employment				
What is your major? Ans: Economics or Management	51.0	54.5	50.0	47.1
Ans: Law	3.2	2.6	3.2	5.9
Ans: Information Systems	8.4	3.9	9.3	17.6
Ans: Other	37.4	39.0	37.5	29.4
Do you receive financial support? Ans: Yes	25.8	31.2	25.0	11.8
Do you work? Ans: Between 1 and 8 hours per week	44.8	48.1	44.0	41.2
Ans: Between 9 and 15 hours per week	10.6	7.8	11.1	17.6
Ans: 16 hours or more per week	38.1	41.6	38.0	23.5
Ans: No	6.5	2.6	6.9	17.6
<i>N</i>	310	77	216	17

Notes: This table reports mean values of student characteristics overall and by self-reported academic performance.

Table 2: ANXIETY, AWARENESS, AND CONTROL

	Academic Performance			
	All	Outstanding	Average	Struggling
Panel A: Anxiety				
I worry about something happening to me or those close to me.	4.9	4.6	4.9	5.6
If there is something I do not want to think about, I will try many things to get it out of my mind.	4.5	3.9	4.8	4.4
My thoughts keep me from sleeping.	4.2	4.0	4.2	5.1
Little things bother me.	4.4	4.4	4.3	4.8
I have trouble standing still in lines.	3.1	3.1	3.0	4.4
I get sick more than others.	2.1	1.9	2.1	2.2
I tell myself that I should not be feeling the way I am feeling.	4.0	3.9	3.9	4.8
<i>Anxiety Index</i> (Cronbach's alpha: 0.6)	3.9	3.7	3.9	4.5
Panel B: Awareness				
I am aware of what thoughts pass through my mind.	5.8	5.8	5.8	5.9
I notice when my moods begin to change.	5.8	5.5	5.9	6.1
When talking with other people, I am aware of their facial and body expressions.	5.7	5.6	5.7	5.2
When talking with other people, I am aware of the emotions I am experiencing.	5.5	5.5	5.6	5.3
I pay attention to how my emotions affect my thoughts and behavior.	5.1	5.3	5.0	5.1
I am good at finding the words to describe my feelings.	4.6	4.7	4.6	3.8
I sometimes feel I am not in complete awareness of myself. [†]	3.8	3.4	3.9	4.5
<i>Awareness Index</i> (Cronbach's alpha: 0.6)	5.1	5.1	5.1	4.8
Panel C: Control				
I have confidence in myself.	5.4	5.8	5.3	4.2
I accept things that I cannot control.	5.3	5.4	5.3	4.2
I can accept things I cannot change.	5.2	5.5	5.2	4.4
I am able to accept the thoughts and feelings I have.	5.1	5.2	5.1	4.0
I tend to do several things at once rather than focusing on one thing at a time.	5.1	4.9	5.2	5.5
It is easy for me to concentrate on what I am doing.	4.7	5.0	4.6	3.4
It is easy for me to keep track of my thoughts and feelings.	4.7	5.0	4.7	3.7
I get angry easily when I fail. [†]	3.9	4.2	3.8	4.8
<i>Control Index</i> (Cronbach's alpha: 0.7)	4.4	4.6	4.4	3.4
<i>N</i>	310	77	216	17

Notes: This table reports mean values of measures of anxiety, awareness, and control overall and by self-reported academic performance. † marks inversely coded questions. T-tests reveal no statistically significant differences in anxiety, awareness, or control indices between outstanding and average or struggling students. Respondents score each statement on a Likert scale between 1 and 7 with 7 reflecting strong agreement.

Table 3: CHANGE IN ANXIETY DURING THE COVID-19 PANDEMIC

	Academic Performance			
	All	Outstanding	Average	Struggling
Since the COVID-19 pandemic started, I worry [...] about something happening to me or those close to me.				
Less	3.2	3.9	3.2	0.0
About the same	63.2	64.9	63.0	58.8
More	33.5	31.2	33.8	41.2
Chi-square p-value				0.882
Since the COVID-19 pandemic started, my thoughts keep me from sleeping [...].				
Less	5.2	6.5	5.1	0.0
About the same	66.1	74.0	66.2	29.4
More	28.7	19.5	28.7	70.6
Chi-square p-value				0.001
<i>N</i>	310	77	216	17

Notes: This table reports mean values of measures of change in anxiety during the COVID-19 pandemic overall and by self-reported academic performance.

Table 4: STRESS MANAGEMENT TECHNIQUES DURING THE COVID-19 PANDEMIC

	Academic Performance			
	All (1)	Outstanding (2)	Average (3)	Struggling (4)
Panel A: Specific Techniques (1=Yes)				
Meditation or Breathing Exercises	22.6	28.6	21.3	11.8
Walking, Jogging, or Physical Exercise	19.0	27.3	16.7	11.8
Journaling or To-do Lists	8.7	15.6	6.9	0.0
Reflection	6.1	9.1	4.6	11.8
Technology Unplugging	5.2	3.9	5.6	5.9
Listen to Music	4.8	5.2	4.6	5.9
Pauses or Breaks	4.5	6.5	4.2	0.0
Pleasure Reading	4.2	6.5	3.7	0.0
Get out of the House	3.5	6.5	2.8	0.0
Live in the Moment	2.9	2.6	3.2	0.0
Take up Hobbies	2.6	3.9	1.9	5.9
Watch a Program	2.3	2.6	2.3	0.0
Prepare or Consume Food or Drink	1.9	0.0	2.3	5.9
Contact with Friends or Family	1.6	0.0	1.9	5.9
Expression of Hightened Emotions	1.0	1.3	0.9	0.0
Sauna, Hot Bath, or Hot Showers	1.0	3.9	0.0	0.0
Panel B: Number of Techniques Used				
# of Techniques (Zero Included)	1.4	1.5	1.4	1.2
# of Techniques (No Zero Included)	1.6	1.8	1.6	1.4
Explicitly No Technique Used (1=Yes)	9.4	10.4	9.3	5.9
No Response (1=Yes)	34.5	19.5	38.9	47.1
<i>N</i>	310	77	216	17

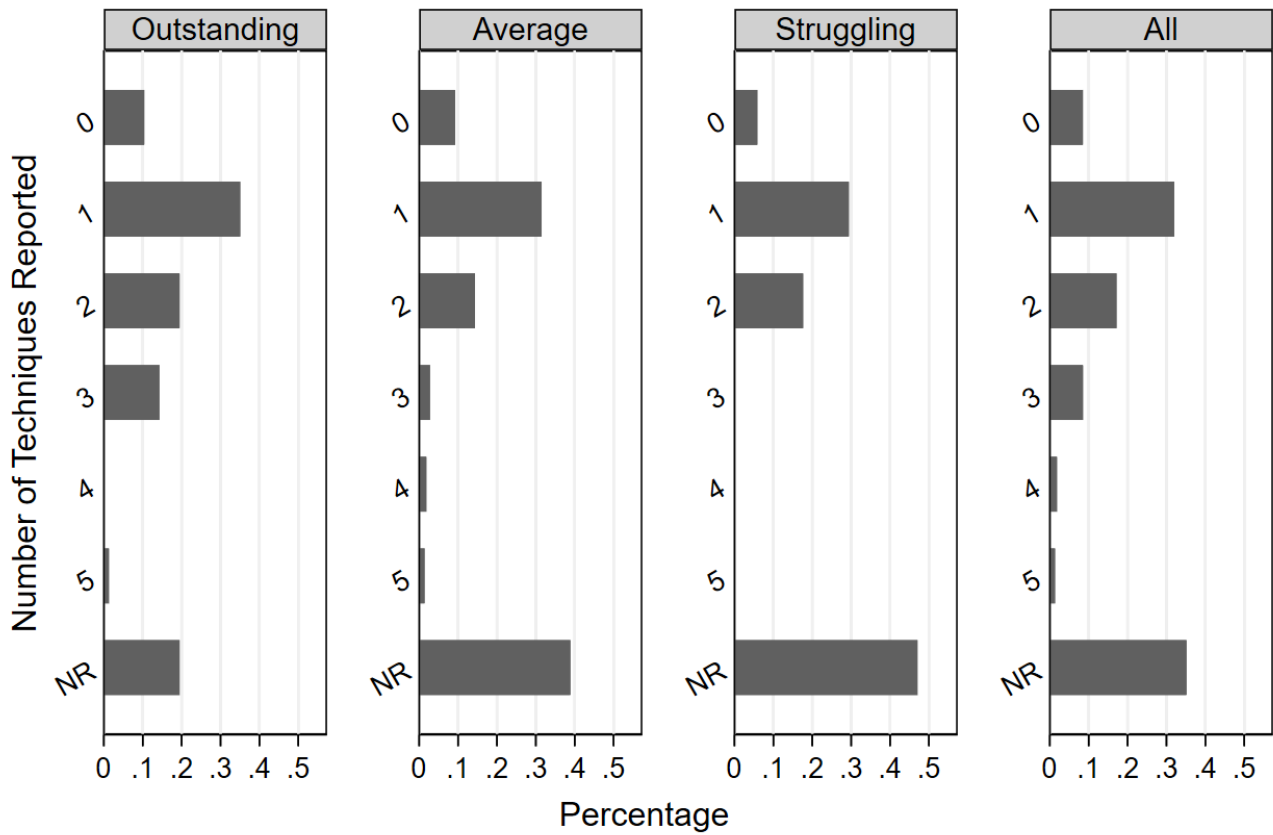
Notes: This table shows the percentage of respondents reporting using each stress management technique during the COVID-19 pandemic overall and by self-reported academic performance.

Table 5: DIFFERENTIAL PROPENSITY TO USE STRESS MANAGEMENT TECHNIQUES DURING THE COVID-19 PANDEMIC BY PERFORMANCE

	Independent Variable: Outstanding Vs. Struggling or Average	
	(1)	(2)
Panel A: Specific Techniques (1=Yes)		
Meditation or Breathing Exercises	0.08	0.07
Walking, Jogging, or Physical Exercise	0.15***	0.18***
Journaling or To-do Lists	0.10**	0.08*
Reflection	0.05	0.04
Technology Unplugging	-0.02	-0.02
Listen to Music	0.00	-0.01
Pauses or Breaks	0.05	0.06*
Pleasure Reading	0.03	0.03
Get out of the House	0.04	0.06*
Live in the Moment	-0.01	0.01
Take up Hobbies	0.01	0.02
Watch a Program	0.00	-0.00
Prepare or Consume Food or Drink	-0.01	-0.02
Contact with Friends or Family	-0.02*	-0.02
Expression of Hightened Emotions	0.01	0.01
Sauna, Hot Bath, or Hot Showers	0.04*	0.05*
Panel B: Number of Techniques Used		
# of Techniques (Zero Included)	0.25	0.22
# of Techniques (No Zero Included)	0.21	0.12
Explicitly No Technique Used (1=Yes)	-0.01	-0.03
No Response (1=Yes)	-0.24***	-0.23***
R-Squared	0.12	0.25
Student Characteristics	✓	✓
<i>Anxiety</i> Measures		✓
Change in <i>Anxiety</i> Measures		✓
<i>Awareness</i> Measures		✓
<i>Control</i> Measures		✓

Notes: This table reports the estimated differences in the propensity to use stress management techniques during the COVID-19 pandemic by students with different self-reported academic performance. Heteroskedasticity-robust standard errors are reported in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Figure 1: STRESS MANAGEMENT DURING THE COVID-19 PANDEMIC BY PERFORMANCE



NR: No Response
 Performance is self-reported.

Notes: This figure shows the distribution of the number of stress management techniques used during the COVID-19 pandemic by academic performance.

Online Appendix

Stress Management and Academic Performance during COVID-19

Appendix A: Additional Tables

Table A1: CORRELATION BETWEEN NUMBER OF STRESS MANAGEMENT TECHNIQUES USED AND STUDENT CHARACTERISTICS

	All	Academic Performance		
		Outstanding	Average	Struggling
Panel A: Demographics				
Female (1=Yes)	0.16**	0.19	0.15*	-0.19
What is your age? Ans: 20 years or younger	0.01	-0.14	0.08	0.32
Ans: between 21 and 25 years	-0.05	0.03	-0.09	-0.61*
Ans: 26 years or older	0.05	0.09	0.03	0.24
What is your living situation? Ans: Alone	-0.07	-0.12	-0.07	0.40
Ans: with Family	0.12	0.16	0.14	-0.61*
Ans: with Roommates	-0.05	-0.02	-0.09	0.13
Ans: Varies	0.02	-0.01	0.02	
What is your parents' highest degree? Ans: High School or Lower	0.11	0.06	0.12	0.66*
Ans: Professional	-0.05	-0.11	-0.02	-0.61*
Ans: Bachelors	0.00	0.05	-0.01	0.24
Ans: Masters or Higher	-0.09	0.01	-0.13	-0.25
Were you or your parents born in a foreign country? (1=Yes)	0.08	0.07	0.12	-0.40
Are you partnered or married? (1=Yes)	0.08	0.08	0.07	0.24
Do you have children? (1=Yes)	0.09	0.10	0.08	
Panel B: Study and Employment				
What is your major? Ans: Economics or Management	0.15**	0.33***	0.05	0.63*
Ans: Law	0.02	-0.01	0.03	
Ans: Information Systems	0.01	-0.01	0.03	-0.12
Ans: Other	-0.17**	-0.33***	-0.08	-0.61*
Do you receive financial support? Ans: Yes	0.03	0.11	-0.02	-0.13
Do you work? Ans: Between 1 and 8 hours per week	-0.02	-0.15	0.05	-0.25
Ans: Between 9 and 15 hours per week	0.16**	0.15	0.17*	
Ans: 16 hours or more per week	-0.01	0.00	-0.04	0.13
Ans: No	-0.10	0.17	-0.17*	0.13
<i>N</i>	310	77	216	17

Notes: This table reports point biserial correlation coefficients between student characteristics and the number of stress management techniques used during the COVID-19 pandemic (zero included). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A2: CORRELATION BETWEEN NUMBER OF STRESS MANAGEMENT TECHNIQUES USED AND PERSONALITY TRAITS

	Academic Performance			
	All	Outstanding	Average	Struggling
Panel A: Anxiety				
I worry about something happening to me or those close to me.	0.11	0.07	0.15*	0.14
If there is something I do not want to think about, I will try many things to ge	0.07	0.20	-0.01	0.62*
My thoughts keep me from sleeping.	-0.05	-0.27**	0.05	0.20
Little things bother me.	0.15**	0.12	0.17*	-0.07
I have trouble standing still in lines.	-0.11	0.03	-0.17**	-0.13
I get sick more than others.	-0.07	-0.18	-0.04	0.57
I tell myself that I should not be feeling the way I am feeling.	0.08	-0.13	0.20**	-0.52
<i>Anxiety Index</i>	0.05	-0.04	0.10	0.27
Panel B: Awareness				
I am aware of what thoughts pass through my mind.	0.03	0.07	0.02	-0.56
I notice when my moods begin to change.	0.10	0.02	0.14	0.00
When talking with other people, I am aware of their facial and body expressions.	0.12*	0.06	0.15*	-0.24
When talking with other people, I am aware of the emotions I am experiencing.	0.12*	0.08	0.14	0.05
I pay attention to how my emotions affect my thoughts and behavior.	0.06	0.20	0.02	-0.29
I am good at finding the words to describe my feelings.	0.09	-0.06	0.12	0.65*
I sometimes feel I am not in complete awareness of myself.†	0.01	-0.06	0.06	0.00
<i>Awareness Index</i>	0.12*	0.10	0.12	0.06
Panel C: Control				
I have confidence in myself.	-0.04	0.02	-0.09	0.09
I accept things that I cannot control.	-0.05	-0.09	-0.03	-0.27
I can accept things I cannot change.	-0.06	0.03	-0.10	-0.19
I am able to accept the thoughts and feelings I have.	-0.01	0.26**	-0.14	-0.05
I tend to do several things at once rather than focusing on one thing at a time.	0.03	0.08	0.00	0.23
It is easy for me to concentrate on what I am doing.	0.09	0.24*	0.02	0.00
It is easy for me to keep track of my thoughts and feelings.	0.07	0.18	0.02	0.03
I get angry easily when I fail.†	0.01	-0.09	0.04	0.15
<i>Control Index</i>	-0.00	0.13	-0.07	-0.19
<i>N</i>	310	77	216	17

Notes: † marks inversely coded questions. This table reports point biserial correlation coefficients between questionnaire items related to stress and capacity for stress regulation and the number stress management techniques used during the COVID-19 pandemic (zero included). * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A3: COMBINATIONS OF STRESS MANAGEMENT TECHNIQUES DURING THE COVID-19 PANDEMIC

	Most Commonly Combined Technique
Meditation or Breathing Exercises	Walking, Jogging, or Physical Exercise (16)
Walking, Jogging, or Physical Exercise	Meditation or Breathing Exercises (16)
Journaling or To-do Lists	Walking, Jogging, or Physical Exercise (9)
Reflection	Meditation or Breathing Exercises (5)
Technology Unplugging	Walking, Jogging, or Physical Exercise (6)
Listen to Music	Meditation or Breathing Exercises (6); Walking, Jogging, or Physical Exercise (6)
Pauses or Breaks	Walking, Jogging, or Physical Exercise (6)
Pleasure Reading	Meditation or Breathing Exercises (4)
Get out of the House	Walking, Jogging, or Physical Exercise (6)
Live in the Moment	Meditation or Breathing Exercises (5)
Take up Hobbies	Pleasure Reading (3)
Watch a Program	Meditation or Breathing Exercises (3)
Prepare or Consume Food or Drink	Walking, Jogging, or Physical Exercise (6)
Contact with Friends or Family	Walking, Jogging, or Physical Exercise (2)
Expression of Hightened Emotions	Get out of the House (1); Meditation or Breathing Exercises (1)
Sauna, Hot Bath, or Hot Showers	Journaling or To-do Lists (1); Meditation or Breathing Exercises (1); Pauses or Breaks (1); Walking, Jogging, or Physical Exercise (1)

Notes: Many students reported using multiple stress management techniques. This table reports the most commonly reported combination for each stress management technique. The most frequently reported combination is *Meditation/Breathing Exercises* and *Walking, Jogging, or Physical Exercise*. Frequency of combination instances are reported in parentheses.

Table A4: TESTS OF INDEPENDENCE BETWEEN STRESS MANAGEMENT TECHNIQUES DURING THE COVID-19 PANDEMIC AND STUDENT CHARACTERISTICS

	Academic Performance			
	All (1)	Outstanding (2)	Average (3)	Struggling (4)
Panel A: Specific Techniques (1=Yes)				
Meditation or Breathing Exercise	2/10	0/10	0/10	0/10
Walking, Jogging, or Physical Exercise	0/10	0/10	0/10	0/10
Journaling or To-do Lists	0/10	0/10	1/10	0/10
Reflection	0/10	1/10	0/10	0/10
Technology Unplugging	1/10	1/10	0/10	0/10
Listen to Music	1/10	2/10	0/10	0/10
Pauses or Breaks	3/10	1/10	3/10	0/10
Pleasure Reading	1/10	0/10	1/10	0/10
Get out of the House	0/10	0/10	0/10	0/10
Live in the Moment	0/10	1/10	0/10	0/10
Take up Hobbies	0/10	1/10	0/10	0/10
Watch a Program	0/10	0/10	0/10	0/10
Prepare or Consume Food or Drink	1/10	0/10	0/10	0/10
Contact with Friends or Family	0/10	0/10	0/10	0/10
Expression of Hightened Emotions	0/10	0/10	0/10	0/10
Sauna, Hot Bath, or Hot Showers	2/10	2/10	0/10	0/10
Panel B: Number of Techniques Used				
# of Techniques (Zero Included)	0/10	1/10	0/10	0/10
# of Techniques (No Zero Included)	0/10	1/10	0/10	0/10
Explicitly No Technique Used (1=Yes)	1/10	0/10	1/10	0/10
No Response (1=Yes)	1/10	0/10	1/10	0/10

Notes: This table summarizes the results of Chi-square tests of independence between student characteristics and stress management technique used during the COVID-19 pandemic. Each entry shows the share of student characteristics from Table 1 for which the null hypothesis of independence with each stress management technique is rejected at a confidence level of 95/

Table A5: TESTS OF INDEPENDENCE BETWEEN STRESS MANAGEMENT TECHNIQUES DURING THE COVID-19 PANDEMIC AND QUESTIONNAIRE ITEMS ON ANXIETY, AWARENESS, AND CONTROL

	Academic Performance			
	All (1)	Outstanding (2)	Average (3)	Struggling (4)
Panel A: Specific Techniques (1=Yes)				
Meditation or Breathing Exercise	5/22	3/22	3/22	1/22
Walking, Jogging, or Physical Exercise	3/22	1/22	1/22	3/22
Journaling or To-do Lists	1/22	1/22	0/22	0/22
Reflection	0/22	1/22	1/22	3/22
Technology Unplugging	0/22	3/22	1/22	1/22
Listen to Music	0/22	0/22	1/22	2/22
Pauses or Breaks	5/22	0/22	8/22	0/22
Pleasure Reading	0/22	0/22	0/22	0/22
Get out of the House	0/22	0/22	2/22	0/22
Live in the Moment	0/22	0/22	0/22	0/22
Take up Hobbies	0/22	3/22	1/22	0/22
Watch a Program	4/22	3/22	4/22	0/22
Prepare or Consume Food or Drink	4/22	0/22	5/22	1/22
Contact with Friends or Family	2/22	0/22	0/22	3/22
Expression of Hightened Emotions	5/22	1/22	6/22	0/22
Sauna, Hot Bath, or Hot Showers	5/22	7/22	0/22	0/22
Panel B: Number of Techniques Used				
# of Techniques (Zero Included)	1/22	1/22	2/22	0/22
# of Techniques (No Zero Included)	1/22	1/22	2/22	0/22
Explicitly No Technique Used (1=Yes)	5/22	0/22	6/22	0/22
No Response (1=Yes)	4/22	5/22	0/22	0/22

Notes: This table summarizes the results of Chi-square tests of independence between items measuring anxiety, awareness or control and stress management technique used during the COVID-19 pandemic. Each entry shows the share of items from Table 2 for which the null hypothesis of independence with each stress management technique is rejected at a confidence level of 95%.

Table A6: TESTS OF INDEPENDENCE BETWEEN STRESS MANAGEMENT TECHNIQUES DURING THE COVID-19 PANDEMIC AND ANXIETY, AWARENESS, AND CONTROL INDICES

	Academic Performance											
	All			Outstanding			Average			Struggling		
	Anxiety	Awareness	Control	Anxiety	Awareness	Control	Anxiety	Awareness	Control	Anxiety	Awareness	Control
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Specific Techniques (1=Yes)												
Meditation or Breathing Exercise	30.49	19.95	45.92	24.57	24.57	24.57	31.94	20.56	20.56	7.37	10.58	17.00
Walking, Jogging, or Physical Exercise	33.58	30.58	34.37	31.96	31.96	31.96	38.61	25.43	25.43	12.18	4.96	17.00
Journaling or To-do Lists	43.30	34.67	41.24	25.44	25.44	25.44	47.87**	30.46	30.46			
Reflection	29.07	17.91	33.32	34.45	34.45	34.45	20.03	16.34	16.34	7.37	12.18	17.00
Technology Unplugging	22.74	31.65	16.82	14.24	14.24	14.24	21.02	24.79	24.79	7.97	17.00**	17.00
Listen to Music	58.14**	25.57	53.20*	24.55	24.55	24.55	70.32***	19.63	19.63	7.97	3.45	7.97
Pauses or Breaks	25.23	44.99**	49.17	15.24	15.24	15.24	27.33	42.04**	42.04**			
Pleasure Reading	18.47	20.36	30.26	44.06**	44.06**	44.06**	15.55	25.57	25.57			
Get out of the House	25.58	29.20	32.48	33.63	33.63	33.63	27.78	28.19	28.19			
Live in the Moment	26.13	20.46	22.80	50.65***	50.65***	50.65***	21.30	21.03	21.03			
Take up Hobbies	29.27	8.94	48.17	28.04	28.04	28.04	19.68	15.00	15.00	7.97	7.97	17.00
Watch a Program	74.38***	43.61**	46.62	15.73	15.73	15.73	71.59***	22.44	22.44			
Prepare or Consume Food or Drink	41.05	12.45	28.54				45.51*	13.02	13.02	7.97	3.45	17.00
Contact with Friends or Family	19.09	12.00	15.57				26.55	14.13	14.13	7.97	3.45	7.97
Expression of Hightened Emotions	16.49	53.49***	50.30	14.59	14.59	14.59	15.54	70.65***	70.65***			
Sauna, Hot Bath, or Hot Showers	33.89	49.14**	43.24	16.91	16.91	16.91						
Panel B: Number of Techniques Used												
# of Techniques (Zero Included)	153.96	91.02	165.57	88.06	88.06	88.06	157.96	87.70	87.70	15.60	9.40	12.60
# of Techniques (No Zero Included)	153.96	91.02	165.57	88.06	88.06	88.06	157.96	87.70	87.70	15.60	9.40	12.60
Explicitly No Technique Used (1=Yes)	32.48	20.49	26.22	18.46	18.46	18.46	32.68	19.46	19.46	17.00	4.96	7.97
No Response (1=Yes)	28.37	36.11	35.27	28.44	28.44	28.44	21.23	21.03	21.03	14.99	7.30	14.99

Notes: This table reports chi-square statistics for tests of independence between each stress management technique and anxiety, awareness, and control indices. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A7: STRONGEST ASSOCIATIONS BETWEEN STRESS MANAGEMENT TECHNIQUES DURING THE COVID-19 PANDEMIC AND STUDENT CHARACTERISTICS

	Top Independent Association	Chi-Square
Panel A: Specific Techniques (1=Yes)		
Meditation or Breathing Exercise	What is your age?	10.37***
Walking, Jogging, or Physical Exercise	Do you work?	5.70***
Journaling or To-do Lists	What is your major?	5.59***
Reflection	What is your parents' highest degree?	4.64***
Technology Unplugging	Female (1=Yes)	4.99***
Listen to Music	What is your major?	8.25***
Pauses or Breaks	What is your major?	9.99***
Pleasure Reading	What is your living situation?	4.43***
Get out of the House	What is your living situation?	4.84***
Live in the Moment	Do you work?	2.20***
Take up Hobbies	What is your parents' highest degree?	5.77***
Watch a Program	What is your major?	1.67***
Prepare or Consume Food or Drink	Do you work?	8.18***
Contact with Friends or Family	Do you work?	5.32***
Expression of Hightened Emotions	Do you work?	5.72***
Sauna, Hot Bath, or Hot Showers	What is your parents' highest degree?	8.31***
Panel B: Number of Techniques Used		
# of Techniques (Zero Included)	What is your parents' highest degree?	15.58***
# of Techniques (No Zero Included)	What is your parents' highest degree?	15.58***
Explicitly No Technique Used (1=Yes)	Do you work?	9.37***
No Response (1=Yes)	Do you work?	12.82***

Notes: This table reports the student characteristic with the highest chi-square statistic across all tests of independence between each stress management technique and the student characteristics of Table 1. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table A8: STRONGEST ASSOCIATIONS BETWEEN STRESS MANAGEMENT TECHNIQUES DURING THE COVID-19 PANDEMIC AND ITEMS ON ANXIETY, AWARENESS, AND CONTROL

	Top Independent Association	Chi-Square
Panel A: Specific Techniques (1=Yes)		
Meditation or Breathing Exercise	I get sick more than others.	20.18***
Walking, Jogging, or Physical Exercise	It is easy for me to concentrate on what I am doing.	19.26***
Journaling or To-do Lists	It is easy for me to concentrate on what I am doing.	13.31***
Reflection	It is easy for me to keep track of my thoughts and feelings.	11.64***
Technology Unplugging	If there is something I do not want to think about, I will try many things to get it out of my mind.	11.47***
Listen to Music	I worry about something happening to me or those close to me.	8.31***
Pauses or Breaks	It is easy for me to concentrate on what I am doing.	55.34***
Pleasure Reading	I worry about something happening to me or those close to me.	11.33***
Get out of the House	Little things bother me.	8.64***
Live in the Moment	I am able to accept the thoughts and feelings I have.	11.45***
Take up Hobbies	I get sick more than others.	10.26***
Watch a Program	When talking with other people, I am aware of the emotions I am experiencing.	37.41***
Prepare or Consume Food or Drink	It is easy for me to concentrate on what I am doing.	32.41***
Contact with Friends or Family	My thoughts keep me from sleeping.	15.58***
Expression of Hightened Emotions	I am able to accept the thoughts and feelings I have.	22.47***
Sauna, Hot Bath, or Hot Showers	I am good at finding the words to describe my feelings.	30.51***
Panel B: Number of Techniques Used		
# of Techniques (Zero Included)	It is easy for me to concentrate on what I am doing.	53.36***
# of Techniques (No Zero Included)	It is easy for me to concentrate on what I am doing.	53.36***
Explicitly No Technique Used (1=Yes)	It is easy for me to keep track of my thoughts and feelings.	18.40***
No Response (1=Yes)	Little things bother me.	15.45***

Notes: This table reports the questionnaire item on anxiety, awareness, or control with the highest chi-square statistic across all tests of independence between each stress management technique and the items of Table 2. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Appendix B: Questionnaire on Stress Management Techniques and Student Performance

B1 General Information

Responses are anonymous and will be used for research purposes.

1. I agree to the consent statement

Yes No

2. What is your gender?

Female Male Non-Binary Other/Prefer not to say

3. What is your age?

4. What is your current living situation?

Alone With family With roommates Inconsistent

5. What is your parents' highest level of education?

Middleschool diploma (MSA) Highschool diploma (Abitur) Professional training (Ausbildung) Bachelor Master PhD

6. Were you or your parents born in a foreign country?

Yes No

7. Are you currently partnered or married?

Yes No

8. Do you have children?

Yes No

9. What is your major study area?

Economics Business Administration Economic Law Computer Sciences Public Management Other

10. Do you receive financial support? (Choose all that apply)
O Yes, from parents or family O Yes, from BaFoeg or some other kind of student loan O Yes, from scholarship or similar funding O No
11. Do you work parallel to your studies? How many hours per week do you work on average?
O I do not work O 1-4 hours O 5-8 hours O 9-12 hours O 12-15 hours O 15+ hours

B2 Academic Performance

12. What kind of student would you describe yourself as?
O Outstanding O Average O Struggling

B3 Anxiety, Control, Awareness

Please read each of the statements below. Think carefully and rate how much each statement reflects your character and behaviour on a scale from 1 to 7. Value 1 means you do not feel a statement represents yourself at all while value 7 means the statement heavily/totally reflects yourself.

13. I worry about something happening to me or those close to me.
14. If there is something I do not want to think about, I will try many things to get it out of my mind.
15. My thoughts keep me from sleeping.
16. Little things bother me.
17. I have trouble standing still in lines.
18. I get sick more than others.
19. I am aware of what thoughts are passing through my mind.
20. I notice when my moods begin to change.
21. When talking with other people, I am aware of their facial and body expressions.
22. When talking with other people, I am aware of the emotions I am experiencing

23. I pay attention to how my emotions affect my thoughts and behavior.
24. I am good at finding the words to describe my feelings.
25. I sometimes feel that I am not in complete awareness of myself.
26. I have confidence in myself.
27. I accept things that I cannot control.
28. I can accept things I cannot change.
29. I am able to accept the thoughts and feelings I have.
30. I tend to do several things at once rather than focusing on one thing at a time.
31. It is easy for me to concentrate on what I am doing.
32. It is easy for me to keep track of my thoughts and feelings.
33. I get angry easily when I fail.

B4 Change in Anxiety during COVID-19

34. Since the COVID-19 pandemic started, I worry [...] about something happening to me or those close to me.
O Less O About the same O More
35. Since the COVID-19 pandemic started, my thoughts keep me from sleeping [...].
O Less O About the same O More

B5 Stress Management Techniques

36. What stress management techniques did you use during the COVID-19 pandemic?