

## Supplementary Materials

# Cigarette Smoking, Risky Alcohol Consumption, and Marijuana Smoking among University Students in Germany: Identification of Potential Sociodemographic and Study-Related Risk Groups and Predictors of Consumption

Thilo A. Hoff <sup>1</sup>, Sebastian Heller <sup>1</sup>, Jennifer L. Reichel <sup>1</sup>, Antonia M. Werner <sup>2</sup>, Markus Schäfer <sup>3,†</sup>, Ana Nanette Tibubos <sup>2,4</sup>, Perikles Simon <sup>5</sup>, Manfred E. Beutel <sup>2</sup>, Stephan Letzel <sup>1</sup>, Thomas Rigotti <sup>6,7</sup> and Pavel Dietz <sup>1,\*</sup>

<sup>1</sup> Institute of Occupational, Social and Environmental Medicine, University Medical Centre of the Johannes Gutenberg University, 55131 Mainz, Germany; thilo.hoff@web.de (T.A.H.); seheller@uni-mainz.de (S.H.); jreichel@uni-mainz.de (J.L.R.); letzel@uni-mainz.de (S.L.)

<sup>2</sup> Department of Psychosomatic Medicine and Psychotherapy, University Medical Center of the Johannes Gutenberg University, 55131 Mainz, Germany; antonia.werner@unimedizin-mainz.de (A.M.W.); tibubos@uni-trier.de (A.N.T.); manfred.beutel@unimedizin-mainz.de (M.E.B.)

<sup>3</sup> Department of Communication, Johannes Gutenberg University, 55122 Mainz, Germany; markus.schaefer@uni-mainz.de

<sup>4</sup> Nursing Science, Diagnostics in Healthcare and E-Health, Trier University, 54296 Trier, Germany

<sup>5</sup> Department of Sports Medicine, Rehabilitation and Disease Prevention, Institute of Sport Science, Johannes Gutenberg University, 55122 Mainz, Germany; simonpe@uni-mainz.de

<sup>6</sup> Department of Work, Organizational and Business Psychology, Institute of Psychology, Johannes Gutenberg University, 55122 Mainz, Germany; rigotti@uni-mainz.de

<sup>7</sup> Leibniz Institute of Resilience Research, 55122 Mainz, Germany

\* Correspondence: pdietz@uni-mainz.de; Tel.: +49-6131-17-9213

† Current address: Department of Media and Communication Management, Macromedia University of Applied Sciences, 60488 Frankfurt, Germany.

## Supplementary Table S1. List of all 56 variables used in the present study and their characteristics.

Dimension	Variable (count)	Scale	Reference	Item	"Question for the self-constructed item," answering options
Sociodemographic variables	Gender (1)	Self-constructed items		1	"Your gender": male (1) / female (2) / diverse (3)
	Age (1)	Self-constructed items		1	"Your age in years"
	Relationship status (1)	Self-constructed items		1	"What is your relationship status?" Single (1) / Partnership in one household

				(2) / Partnership with separate living conditions (3)
Employment (1)	Self-constructed items	1		“Are you currently employed?” No (1) / Yes, full-time (2) / Yes, regularly part-time (3) / Yes, marginally or irregularly employed (4)
Financial situation	Self-constructed items	1		“How much money do you have at your disposal on average each month?”
Parental support	Self-constructed items	1		“How do you finance your studies?” Support by parents or relatives: Yes / No
Parents’ educational background	Self-constructed items	1		“Please select the highest educational attainment of your mother or your father (the highest of both)”: List of attainments, also including “other attainment”
Migrant background	Self-constructed items	1		“Were both of your parents born within the current geography of Germany?” Yes (1) / No (2) / Don’t know (3) / No information (4)
Personal migration experience (1)	Self-constructed items	1		“Were you born in the current geography of Germany?” Yes (1) / No (2) / Don’t know (3) / No information (4)
Degree (1)	Self-constructed items	1		“Which degree are you pursuing in your current studies?” Drop-down list of all degrees at the University of Mainz
Field of study (1)	Self-constructed items	1		Grouped variable created for “What is your current study subject or special subject?” Drop-down list of all subjects of the University of Mainz
First year (Semester / study progress) (1)	Self-constructed items	1		“What is the number of your current university semester?”

	First study	Self-constructed items	1	“Have you started or completed another degree program before your current one?” No (1) / Yes, graduate before (2) / Yes, but changed the field of study (3) / Yes, but did not graduate (4)
	Semester hours and semester hours with mandatory attendance (2)	Self-constructed items	2	“How many hours per week are you taking this semester?” and “Of these, how many require your attendance?”
Psychological variables	Somatic symptoms	SSS8	Gierk et al. 8 (2014) [120]	
	Depression symptoms	PHQ-9	Kroenke et al. 9 (2001) [126]	
	General anxiety	GAS-2	Döring & Bortz (1993) [114]	
	Social anxiety	Mini-SPIN	Wiltink et al. 3 (2017) [136]	
	Loneliness	UCLA	Döring & Bortz (1993) [114]	
	Emotional exhaustion	MBI-SS	Gumz et al. 5 (2013) [121]	
Study-related psychosocial variables	Presenteeism		Töpritz et al. 1 (2016) [134]	
	Absenteeism		Töpritz et al. 1 (2016) [134]	
	Perceived employability	Self-constructed items	1	“How do you estimate your chances on the job market?” Very Bad (1) to Very Good (7)

Autonomy	BARI-S	Gusy & 6 Lohmann (2014) [122]
Coping through the use of structural re- sources and social support (2)		Daniels et al. 4 (2008) [112]
Self-endangering be- havior		Krause et al. (2015) [125]
Planning compe- tency		Dettmers & 8 Clauß (2018) [113]
Work complexity		Gusy et al. (2016) [123]
Competition		Fend (1997) 4 [119]
Performance pres- sure		Fend (1997) 5 [119]
Cognitive irritation		Mohr et al. (2005) [127]
Social support by SALSA teachers		Rimann & 3 Udris (1997) [129]
Social support by fel- low students	SALSA	Rimann & 3 Udris (1997) [129]
Competence for self- motivation		Dettmers & 8 Clauß (2018) [113]

	Self-efficacy		Self-Efficacy Scale, adapted from Rigotti et al. (2008) [128]	6	
	Procrastination	GPS-K	Klingsieck & Fries [128]	9	
General psychosocial variables	Self-criticism	DEQ-SC4	Rudich et al. (2008) [130]	4	
	Self-acceptance		Ryff & Keyes (1995); Ryff (1989) [131-132]	3	
	Emotion regulation	ERQ	Abler & Kessler (2011) [115]	4	
	Emotion suppression	ERQ	Abler & Kessler (2011) [115]	4	
	Impulsiveness	ERQ	Abler & Kessler (2011) [115]	4	
Health variables	behavior	Healthy diet	Self-constructed items	1	<p>“A healthy diet consists of eating a large quantity of whole grains, potatoes, fruit, and vegetables several times a day and food low in trans fats as well as a small quantity of red meat and sausages, fast-food (e.g., burger, fries), and sugar-rich food (e.g., lemonade, soft drinks, candy, cake). To what extent have you study to a healthy diet in the last month?” Not</p>

			at all (1) to Very strong (5)
Fruit consumption		European Comission (2013); Fehr et al. (2018) [117-118]	4
Vegetable consumption		European Comission (2013); Fehr et al. (2018) [117-118]	4
Physical activity	IPAQ Short version	Craig et al. (2003); International Physical Activity Questionnaire [116, 135]	
Sedentary behavior	IPAQ Short version	Craig et al. (2003); International Physical Activity Questionnaire [116, 135]	7
Smoking cigarettes		Töpritz et al. (2016) [134]	1
Risky alcohol consumption	AUDIT-C	Bush et al. (1998) [85]	1
Marijuana smoking	Self-constructed items	“Do you smoke marijuana?” <i>never</i> (1) / <i>formerly occasionally</i> (2) / <i>formerly regularly</i> (3) / <i>currently occasionally</i> (4) / <i>currently regularly</i> (5)	

Use of neuroen-  
hancement (2)

Dietz et al. 2  
(2016) [93]

Use of social-media

Adapted from 6  
Stark et al.  
(2017) [133]

**Supplementary Table S2. Association between the dependent variable cigarette smoking and each independent variable (pre-test for regression).**

Variable	<i>p</i> -value
<b>1) Sociodemographic variables</b>	
Gender	<sup>c</sup> <.001
Age, median split	<sup>b</sup> .486
Relationship status	<sup>c</sup> .430
Employment	<sup>c</sup> <.001
Financial situation	<sup>a</sup> <.001
Parental support	<sup>c</sup> .159
Parents' educational background	<sup>c</sup> .278
Migrant background	<sup>c</sup> <.001
Personal migrant experience	<sup>c</sup> .001
Aspired degree	<sup>c</sup> .095
Field of study	<sup>c</sup> <.001
Semester	<sup>a</sup> .921
First study	<sup>c</sup> .001

First year	<sup>c</sup> .516
Semester hours per week	<sup>a</sup> .005
Semester hours per week with mandatory attendance	<sup>a</sup> .001

## 2) Psychological variables

---

Somatic symptoms	<sup>a</sup> <.001
Depression symptoms	<sup>a</sup> <.001
General anxiety	<sup>a</sup> <.001
Social anxiety	<sup>a</sup> .663
Loneliness	<sup>a</sup> .374
Emotional exhaustion	<sup>a</sup> .002

## 3) Study-related psychosocial variables

---

Presenteeism	<sup>a</sup> .428
Absenteeism	<sup>a</sup> .001
Perceived employability	<sup>a</sup> .002
Autonomy	<sup>a</sup> .990
Autonomy exams	<sup>a</sup> .123
Coping via use of structural resources	<sup>a</sup> .188
Coping via use of social resources	<sup>a</sup> .198
Self-endangering behavior	<sup>a</sup> .813
Planning competency	<sup>a</sup> <.001



---

Work complexity	<sup>a</sup> .603
Competition	<sup>a</sup> .421
Performance pressure	<sup>a</sup> .064
Cognitive irritation	<sup>a</sup> .064
Social support from teachers	<sup>a</sup> .294
Social support from fellow students	<sup>a</sup> .401
Competence for self-motivation	<sup>a</sup> <.001
Self-efficacy	<sup>a</sup> .001
Procrastination	<sup>a</sup> <.001

#### 4) General psychosocial variables

---

Self-criticism	<sup>a</sup> .059
Self-acceptance	<sup>a</sup> <.001
Emotion regulation	<sup>a</sup> .209
Emotion suppression	<sup>a</sup> .316
Impulsiveness	<sup>a</sup> <.001

#### 5) Health behavior variables

---

Healthy diet	<sup>b</sup> <.001
Fruit consumption	<sup>a</sup> .010
Vegetable consumption	<sup>a</sup> .377
Physical activity	<sup>b</sup> .347

Sedentary behavior	<sup>a</sup> .101
AUDIT-C score	<sup>a</sup> <.001
Marijuana smoking	<sup>c</sup> <.001
Use of soft neuroenhancement	<sup>c</sup> <.001
Use of pharmacological neuroenhancement	<sup>c</sup> <.001
Use of social media	<sup>a</sup> <.001

<sup>a</sup> ANOVA test.

<sup>b</sup> Pearson's chi-square test.

<sup>c</sup> Cramer's V-test.

**Supplementary Table S3. Association between the dependent variable risky alcohol consumption and each independent variable (pretest for regression).**

Variable	<i>p</i> -value
<b>1) Sociodemographic variables</b>	
Gender	<sup>c</sup> .120
Age, median split	<sup>b</sup> .001
Relationship status	<sup>c</sup> <.001
Employment	<sup>c</sup> <.001
Financial situation	<sup>a</sup> .007
Parental support	<sup>c</sup> <.001
Parents' educational background	<sup>c</sup> .118
Migrant background	<sup>c</sup> <.001

---

Personal migrant experience	<sup>c</sup> .002
Aspired degree	<sup>c</sup> .032
Field of study	<sup>c</sup> .001
Semester	<sup>a</sup> <.001
First study	<sup>c</sup> .001
First year	<sup>c</sup> .030
Semester hours per week	<sup>a</sup> .418
Semester hours per week with mandatory attendance	<sup>a</sup> .206

## 2) Psychological variables

---

Somatic symptoms	<sup>a</sup> .767
Depression symptoms	<sup>a</sup> .339
General anxiety	<sup>a</sup> <.001
Social anxiety	<sup>a</sup> <.001
Loneliness	<sup>a</sup> <.001
Emotional exhaustion	<sup>a</sup> .089

## 3) Study-related psychosocial variables

---

Presenteeism	<sup>a</sup> .020
Absenteeism	<sup>a</sup> .616
Perceived employability	<sup>a</sup> .839
Autonomy	<sup>a</sup> .318

---

Autonomy exams	<sup>a</sup> .608
Coping via use of structural resources	<sup>a</sup> .372
Coping via use of social resources	<sup>a</sup> .949
Self-endangering behavior	<sup>a</sup> .011
Planning competency	<sup>a</sup> .432
Work complexity	<sup>a</sup> .930
Competition	<sup>a</sup> .089
Performance pressure	<sup>a</sup> .010
Cognitive irritation	<sup>a</sup> <.001
Social support by teachers	<sup>a</sup> .590
Social support by fellow students	<sup>a</sup> <.001
Competence for self-motivation	<sup>a</sup> .447
Self-efficacy	<sup>a</sup> .149
Procrastination	<sup>a</sup> <.001

#### 4) General psychosocial variables

---

Self-criticism	<sup>a</sup> .239
Self-acceptance	<sup>a</sup> <.001
Emotion regulation	<sup>a</sup> .762
Emotion suppression	<sup>a</sup> <.001
Impulsiveness	<sup>a</sup> <.001

### 5) Health behavior variables

Healthy diet	<sup>b</sup> .004
Fruit consumption	<sup>a</sup> <.001
Vegetable consumption	<sup>a</sup> .326
Physical activity	<sup>b</sup> <.001
Sedentary behavior	<sup>a</sup> .006
Cigarette smoking	<sup>c</sup> <.001
Marijuana smoking	<sup>c</sup> <.001
Use of soft neuroenhancement	<sup>c</sup> <.001
Use of pharmacological neuroenhancement	<sup>c</sup> <.001
Use of social media	<sup>a</sup> <.001

<sup>a</sup> ANOVA test.

<sup>b</sup> Pearson's chi-square test.

<sup>c</sup> Cramer's V-test.

**Supplemental Table S4. Association between the dependent variable marijuana smoking and each independent variable (pretest for regression)**

<i>Variable</i>	<i>p-value</i>
<b>1) Sociodemographic variables</b>	
Gender	<sup>c</sup> <.001
Age, median split	<sup>b</sup> .034
Relationship status	<sup>c</sup> .014
Employment	<sup>c</sup> .012
Finances	<sup>a</sup> .193
Parental support	<sup>c</sup> .028
Parents' education	<sup>c</sup> .189
Parents' migration	<sup>c</sup> .479
Own migration	<sup>c</sup> .727

Aspired degree	<sup>c</sup> <.001
Field of study	<sup>c</sup> <.001
Semester	<sup>a</sup> .028
First study	<sup>c</sup> <.001
First year	<sup>c</sup> .725
Semester hours per week	<sup>a</sup> <.001
Semester hours per week in attendance	<sup>a</sup> .007

## 2) Psychological variables

Physical complaints	<sup>a</sup> .380
Depression symptoms	<sup>a</sup> <.001
Anxiety symptoms	<sup>a</sup> .355
Social anxiety	<sup>a</sup> .535
Loneliness	<sup>a</sup> .235
Emotional exhaustion	<sup>a</sup> .851

## 3) Study-related psychosocial variables

Presenteeism	<sup>a</sup> .070
Absenteeism	<sup>a</sup> .279
Perceived employability	<sup>a</sup> .659
Autonomy	<sup>a</sup> .231
Autonomy exams	<sup>a</sup> .650
Coping via use of structural resources	<sup>a</sup> .297
Coping via use of social resources	<sup>a</sup> .239
Self-endangering behavior	<sup>a</sup> <.001
Planning competency	<sup>a</sup> <.001
Work complexity	<sup>a</sup> .249
Competition	<sup>a</sup> .335
Performance pressure	<sup>a</sup> <.001
Cognitive irritation	<sup>a</sup> .201
Social support from teachers	<sup>a</sup> .423
Social support from fellow students	<sup>a</sup> .906
Competence for self-motivation	<sup>a</sup> <.001
Self-efficacy	<sup>a</sup> .401
Procrastination	<sup>a</sup> <.001

## 4) General psychosocial variables

Self-criticism	<sup>a</sup> .541
Self-acceptance	<sup>a</sup> .279
Emotion regulation	<sup>a</sup> .365
Emotion suppression	<sup>a</sup> .867
Impulsiveness	<sup>a</sup> .002

## 5) Health behavior variables

Healthy diet	<sup>b</sup> .249
Fruit consumption	<sup>a</sup> .990

Vegetable consumption	<sup>a</sup> .241
Physical activity	<sup>b</sup> <.001
Sedentary behavior	<sup>a</sup> .091
AUDIT-C score	<sup>a</sup> <.001
Cigarette smoking	<sup>c</sup> <.001
Use of soft neuroenhancement	<sup>c</sup> <.001
Use of pharmacological Neuroenhancement	<sup>c</sup> <.001
Use of social media	<sup>a</sup> .011

a ANOVA test.

b Pearson's chi-square test.

c Cramer's V-test.

**Supplemental Table S5. Answering rate for each independent variable (included group, N = 3991)**

Variable	Answering	Percentage
<b>1) Sociodemographic variables</b>		
Gender	3991	100.0%
Age	3987	99.9%
Relationship status	3987	99.9%
Employment	3991	100.0%
Financial situation	3911	98.0%
Parental support	3968	99.4%
Parents' educational background	3989	99.9%
Migrant background	3990	100.0%
Personal migration experience	3990	100.0%
Aspired degree	3991	100.0%
Field of study	3982	99.8%
Semester	3975	99.6%
First study	3989	99.9%
First year	3884	97.3%
Semester hours per week	3867	96.9%
Semester hours per week with mandatory attendance	3873	97.0%
<b>2) Psychological variables</b>		
Physical complaints	3988	99.9%
Depression symptoms	3987	99.9%
Anxiety symptoms	3990	100.0%
Social anxiety	3617	90.6%

Loneliness	3991	100.0%
Emotional exhaustion	3909	97.9%
<b>3) Study-related psychosocial variables</b>		
Presenteeism	3897	97.6%
Absenteeism	3898	97.7%
Perceived employability	3892	97.5%
Autonomy	3949	98.9%
Autonomy exams	3943	98.8%
Coping via use of structural resources	3937	98.6%
Coping via use of social resources	3941	98.7%
Self-endangering behavior	3935	98.6%
Planning competency	3935	98.6%
Work complexity	3922	98.3%
Competition	3921	98.2%
Performance pressure	3920	98.2%
Cognitive irritation	3909	97.9%
Social support by teachers	3892	97.5%
Social support by fellow students	3900	97.7%
Competence for self-motivation	3891	97.5%
Self-efficacy	3890	97.5%
Procrastination	3932	98.5%
<b>4) General psychosocial variables</b>		
Self-criticism	3881	97.2%
Self-acceptance	3880	97.2%
Emotion regulation	3879	97.2%
Emotion suppression	3880	97.2%
Impulsiveness	3874	97.1%
<b>5) Health behavior variables</b>		
Healthy diet	3991	100.0%
Fruit consumption	3649	91.4%
Vegetable consumption	3806	95.4%
Physical activity	3899	97.7%
Sedentary behavior	3899	97.7%
Use of soft neuroenhancement	3984	99.8%
Use of pharmacological neuroenhancement	3984	99.8%
Use of social media	3987	99.9%
Average	3923	98.3%

Supplemental Table S6. Answering rate for each independent variable (non-included group, N = 360)



Variable	<i>answering</i>	per- cent
<b>1) Sociodemographic variables</b>		
Gender	359	99.7%
Age	360	100.0%
Relationship status	360	100.0%
Employment	95	26.4%
Financial situation	0	0.0%
Parental support	0	0.0%
Parents' educational background	360	100.0%
Migrant background	360	100.0%
Personal migration experience	360	100.0%
Aspired degree	360	100.0%
Field of study	360	100.0%
Semester	358	99.4%
First study	360	100.0%
First year	342	95.0%
Semester hours per week	0	0.0%
Semester hours per week with mandatory attendance	0	0.0%
<b>2) Psychological variables</b>		
Physical complaints	340	94.4%
Depression symptoms	320	88.9%
Anxiety symptoms	297	82.5%
Social anxiety	267	74.2%
Loneliness	297	82.5%
Emotional exhaustion	0	0.0%
<b>3) Study-related psychosocial variables</b>		
Presenteeism	0	0.0%
Absenteeism	0	0.0%
Perceived employability	0	0.0%
Autonomy	0	0.0%
Autonomy exams	0	0.0%
Coping via use of structural resources	0	0.0%
Coping via use of social resources	0	0.0%
Self-endangering behavior	0	0.0%
Planning competency	0	0.0%
Work complexity	0	0.0%
Competition	0	0.0%
Performance pressure	0	0.0%
Cognitive irritation	0	0.0%
Social support by teachers	0	0.0%
Social support by fellow students	0	0.0%

Competence for self-motivation	0	0.0%
Self-efficacy	0	0.0%
Procrastination	0	0.0%
<b>4) General psychosocial variables</b>		
Self-criticism	0	0.0%
Self-acceptance	0	0.0%
Emotion regulation	0	0.0%
Emotion suppression	0	0.0%
Impulsiveness	0	0.0%
<b>5) Health behavior variables</b>		
Healthy diet	153	42.5%
Fruit consumption	124	34.4%
Vegetable consumption	100	27.8%
Physical activity	29	8.1%
Sedentary behavior	29	8.1%
Use of soft neuroenhancement	0	0.0%
Use of pharmacological neuroenhancement	0	0.0%
Use of social media	224	62.2%
Average	117	32.6%