Health-risk behavior among university students

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Introduction

A network of European universities sharing a common interest in conducting the Student Life Cohort Study (SLiCE; www.slice-study.eu) has been created. This network is trying to react to the need for further exploration of factors related to risk behavior of university students. The significance of this research aim is supported by the general effort of the society to promote health behaviors and prevent risk behaviors, especially drug use. Important indicators of successful prevention and health promotion are represented by early prevention and recognition of various protective factors such as significant adults. University students often are in the role of significant adults and serve as role models for many young people. This role of a significant adult contains an important protective potential which makes university students an important target group for Prevention Science.

AIMS OF THE SLiCE

I. to explore health indicators and health-related behavior among university students.

II. to address gender and country similarities and differences regarding health indicators and health-related behavior among university students.

III. to explore how much variation in health indicators, in health-related behavior and in changes over time in these indicators and behaviors, can be explained by the explored sets of individual, intrapersonal, interpersonal and environmental predictors. Furthermore, it is also to address the mediating and moderating mechanisms of these effects.

This publication presents selected results of the SLiCE study regarding:

I. health indicators (emotional well-being and depressive symptoms) and their predictors: gender, social support, self-regulation and personality factors, perceived stress, resilience, as well as the exploration of mediation and moderation effects.

II. life perspective of university students in the context of autonomy and in relation to alcohol use as a frequent risk behavior in this population and well-being as an important generic indicator of wellness.

III. the role of decision-making styles in selected types of risk behavior (alcohol use, smoking, junk food consumption, risk sex behavior and problematic internet use)

IV. the importance of descriptive normative beliefs and their change in different risk behaviors (alcohol use, smoking, drug use, sexual risk behavior and problematic internet use) as well as the exploration of the data from a newly developed online application, which has been created with the aim to change normative beliefs in order to reduce risk behavior of students.

V. prevalence of alcohol consumption, alcohol dependence and alcohol related problems as well as the exploration of relationships between mental health variables, self-regulation and alcohol consumption (total AUDIT score) while focusing on alcohol dependence and alcohol related problems and reduction of alcohol consumption, alcohol dependence and reduction of alcohol related problems.

VI. direct and indirect associations between the factors of body dissatisfaction and general self-determination at the beginning of university studies and disordered eating two years later among university students from Hungary, Lithuania and Slovakia.

Due to the fact that the methods used at different data collection points (T1, T2, T3) in the participating countries within the SLiCE study varied, individual chapters in this volume will focus on different waves and countries in their empirical analyses depending on the addressed topic. In some chapters, additional datasets will be presented which have been collected for the purposes of in-depth analyses relevant to individual research aims. However, before proceeding with the specific topics addressed in this monograph a general information about risk behaviors measured in the SLiCE study as well as their changes over time will be presented.

CHANGES IN RISK BEHAVIOR

In the following part, changes in various types of risk behavior over two to three time points among university students from participating European countries will be presented. Parametric statistical analyses (paired-samples t-test, one-way repeated measures ANOVA) were computed to investigate changes in continuous variables (disordered eating, alcohol use, problematic internet use, junk food, number of sexual partners). With regard to ordinal variables (condom use during the first sexual intercourse with a new partner, smoking cigarettes and

marihuana use) non-parametric statistical analyses (Friedman test) were used to explore changes over time.

Changes in disordered eating at the beginning of university studies and over a one-year period

A paired-sample t-test was conducted to evaluate whether disordered eating changed between the beginning of university studies and the first year of the follow-up measurement among students from Slovakia, Lithuania and Hungary (disordered eating was measured only in three countries and only at two time points). The results showed that there was not a significant difference between the measurement points (t(267)=.34, p=.73). The means and the standard deviations are reported in Table 1.

Table 1 Descriptive statistics of disordered eating at T1 and T2

time period	N	mean	SD
T1	268	.62	.92
T2	268	.60	.82

T1 – at the beginning of studies, T2 – 1st follow up

Changes in alcohol use over a two-year period

A one-way repeated measures ANOVA was conducted to compare the scores on alcohol use over a two-year period (at the beginning of university studies, at the first year and at the second year) among students from Slovakia, Lithuania, Hungary, Czech Republic and Germany. The means and the standard deviations are presented in Table 2. There results showed that there was not a significant effect of time, Wilks' Lambda=.996, F(2.393)=.72, p=.49, multivariate partial eta squared=.004.

Table 2 Descriptive statistics of alcohol use for T1, T2 and T3

time period	N	mean	SD
T1	395	5.15	4.34
T2	395	5.30	4.38
T3	395	5.15	3.95

T1 – at the beginning of studies, T2 – 1st follow up , T3 – 2nd follow up

Changes in problematic internet use over a two-year period

A one-way repeated measures ANOVA was conducted to compare the scores of problematic internet use over a two-year period (at the beginning of university studies, in the first year and in the second year) of students from Slovakia, Lithuania, Hungary, Czech Republic and Germany. The means and the standard deviations are presented in Table 3. There was a significant effect of time, Wilks' Lambda=.96, F(2.467)=10.91, p<.001, with a multivariate partial eta squared =.05 indicating a small to moderate effect size. Pairwise comparisons further showed that there was a significant increase in problematic internet use in the first year (Mean difference=-4.40, p<0.001) and in the second year (Mean difference=-3.80, p<0.001) when compared with the baseline.

Table 3 Descriptive statistics of problematic internet use for T1, T2 and T3

time period	N	mean	SD
T1	469	32.19	25.54
T2	469	36.59	21.06
T3	469	35.99	19.44

Note. T1 – at the beginning of studies, T2 – 1st follow up , T3 – 2nd follow up

Table 4 Descriptive statistics of junk food for T1, T2 and T3

time period	N	mean	SD
T1	485	9.53	2.05
T2	485	9.49	1.98
T3	485	9.39	2.05

Note. T1 – at the beginning of studies, T2 – 1st follow up , T3 – 2nd follow up

Changes in junk food consumption over a two-year period

Another one-way repeated measures ANOVA was conducted to compare the scores on junk food over a two-year period (at the beginning of university studies, in the first year and in the second year) among students from Slovakia, Lithuania, Hungary, Czech

Republic and Germany. The means and the standard deviations are presented in Table 4. There was not a significant effect of time, Wilks' Lambda=.99, F(2.483)=1.35, p=.26, multivariate partial eta squared=.01.

Changes in sexual risk behavior over a two-year period

Finally, a one-way repeated measures ANOVA was conducted to compare the number of sexual partners during the last 12 months over a two-year period (at the beginning of university studies, in the first year and in the second year) among students from Slovakia, Lithuania, Hungary, Czech Republic and Germany. The means and the standard deviations are presented in Table 5. There was not a significant effect of time, Wilks' Lambda=.99, F(2.314)=1.74, p=.18, multivariate partial eta squared=.01.

Table 5 Descriptive statistics of the number of sexual partners for T1, T2 and T3

time period	N	mean	SD
T1	316	1.34	1.57
T2	316	1.38	1.58
T3	316	0.37	9.82

Note. T1 – at the beginning of studies, T2 – 1st follow up , T3 – 2nd follow up

In addition, the results of the Friedman test indicated that there was not a statistically significant difference in condom use during the first sexual intercourse with a new partner across the three points of measurement (at the beginning of university studies, in the first year and in the second year), X^2(2, n=273)=.03, p=.98. The mean ranks and the median values are reported in table 6.

Table 6 Descriptive statistics of condom use during the first intercourse with a new partner for T1, T2 and T3

time period	mean rank	median
T1	2	1
T2	2	1
T3	2	1

Note. T1 – at the beginning of studies, T2 – 1st follow up , T3 – 2nd follow up

Changes in smoking cigarettes over a two-year period

According to the results of the Friedman test, there was not a statistically significant difference in the number of days when smoking cigarettes during the last 30 days between the three time points of measurement (at the beginning of university studies, in the first year and in the second year) among students from Slovakia, Lithuania, Hungary, Czech Republic and Germany, $X^2(2, n=338)=4.02, p=.13$.

The observed differences with regard to the number of cigarettes smoked per day during the last 30 days across the three measurement points (at the beginning of the studies, in the first year and in the second year) were not found to be significant, $X^2(2, n=332)=.04, p=.98$. The mean ranks and the medians are presented in Table 7 and Table 8.

Table 7 Descriptive statistics of the number of days when smoking cigarettes for T1, T2 and T3

time period	mean rank	median
T1	1.97	1
T2	1.98	1
T3	2.05	1

Note. T1 – at the beginning of studies, T2 – 1st follow up , T3 – 2nd follow up

Table 8 Descriptive statistics of the number cigarettes smoked per the day for T1, T2 and T3

time period	mean rank	median
T1	2	1
T2	2	1
T3	2	1

Note. T1 – at the beginning of studies, T2 – 1st follow up , T3 – 2nd follow up

Changes in marihuana use
over a two-year period

Furthermore, the results of the Friedman test indicated that there was not a statistically significant difference in marihuana use during the last 30 days across the three time points (at the beginning of university studies, in the first year and in the second year) among students from Slovakia, Lithuania, Hungary, the Czech Republic and Germany, $X^2(2, n=506)=1.00, p=.61$. The Mean ranks and the medians are presented in Table 9.

Table 9 Descriptive statistics of marihuana use for T1, T2 and T3

time period	mean rank	median
T1	2.00	1
T2	2.01	1
T3	1.99	1

Note. T1 – at the beginning of studies, T2 – 1st follow up , T3 – 2nd follow up

SUMMARY

To sum up, our results show that significant changes over time have been observed only in one type of risk behavior – problematic internet use. Particularly, the results show a significant increase of problematic internet use with the increasing number of years at the university. The lowest level was reported at the beginning of university studies and one year later problematic internet use was found to be significantly higher. It was also found to be significantly higher two years after the beginning of studies when compared to the level of problematic internet use at the beginning of studies. However, the change in problematic internet use between the first year and the second year was not significant. With regard to other types of risk behavior (disordered eating, alcohol use, junk food, sexual risk behavior, smoking cigarettes or marihuana use) changes over time were not found to be significant.

RISK BEHAVIOR
AT T3

In the next part, the relationship between gender, country and risk behaviors at T3 (alcohol use, smoking, marihuana use, sexual risk behavior, problematic internet use, junk food, disordered eating) will be addressed while controlling for the baseline level of risk behavior (at T1). Linear regression and binary logistic regression were used to analyze this relationship. The results are presented with respect to individual risk behaviors.

Alcohol use

The linear regression model explaining alcohol use was significant (χ^2=2858.07; df=6; p < 0.001) and explained 45.1% of the variance in alcohol use. It was found (Table 10) that low alcohol use at T1 was associated with high alcohol use at T3.

Table 10 The association between gender, country and alcohol use

		β	t	p
alcohol use at T1		.66	17.06	<.001
gender		-.04	-1.12	.262
country*	Hungary	-.01	-.09	.931
	Czech	-.01	-.06	.951
	Germany	-.01	-.11	.916
	Lithuania	.05	.92	.360

reference group: Slovakia

Smoking

Smoking cigarettes was measured as two aspects: 1. the number of days of smoking cigarettes (during the last month); 2. the number of cigarettes usually smoked during the last month.

The binary logistic models explaining smoking cigarettes were significant (number of days: χ^2=94.25; df=6; p<0.001; number of cigarettes: χ^2=122.39; df=6; p<0.001), indicating that the models were effective in differentiating between respondents who reported and did not report smoking cigarettes. The models explained from 25.9% to 35.2% of variance in models focused on number of days of smoking and from 32.6% to 44.4% of variance in models focused on the number of cigarettes usually smoked. It was found (Table 11) that reported smoking at T1 and being from Czech Republic were associated with smoking at T3 (both aspects of smoking). Moreover, being male was associated with a higher number of days of smoking at T3.

Table 11 The association between gender, country and smoking cigarettes

	number of days of smoking					95% C.I.		number of cigarettes usually smoked					95% C.I.	
	B	S.E.	df	p	odds ratio			B	S.E.	df	p	odds ratio		
smoking at T1	2.49	.31	1	<.001	12.11	6.60	22.22	2.85	.31	1	<.001	17.32	9.49	31.62
gender	-.74	.31	1	.017	.48	.26	.88	-.62	.34	1	.066	.54	.28	1.04
Hungary*	-.03	.47	1	.957	.98	.39	2.43	-.33	.50	1	.505	.72	.27	1.91
Czech	-.98	.49	1	.044	.50	.19	1.30	-1.16	.51	1	.023	.31	.12	.85
Germany	-.70	.49	1	.155	.50	.19	1.30	-.89	.52	1	.086	.41	.15	1.13
Lithuania	.57	.43	1	.180	1.77	.77	4.8	.01	.45	1	.994	1.00	.42	2.41

reference group: Slovakia

Marihuana use

The binary logistic model explaining marihuana use was significant (χ^2=79.34; df=6; p<0.001), indicating that the model was effective in differentiating between respondents who reported and did not report marihuana use. The model explained between 14.6% and 33% of variance and correctly classified 93.4% of cases. It was found (Table 12) that being male and not reporting marihuana use at T1 was associated with marihuana use at T3.

Table 12 The association between gender, country and marihuana use

		B	S.E.	df	p	odds ratio	95% C.I.	
marihuana use at T1		11.15	.41	1	<.001	22.49	5.15	50.34
gender		-.1.14	.38	1	.003	.32	.15	.67
country*	Hungary	.58	.61	1	.342	1.79	.54	5.97
	Czech	-.26	.63	1	.683	.76	.23	2.64
	Germany	.03	.65	1	.967	1.03	.29	3.66
	Lithuania	.12	.63	1	.847	1.13	.33	1.15

reference group: Slovakia

Sexual risk behavior

Sexual risk behavior (two aspects: 1. the number of sexual partners during the last year; 2. using of condom with a new sexual partner).

The linear model explaining sexual risk behavior (number of sexual partners) was significant (χ^2=823.68; df=6; p=0.039) and explained 3.2% of the variance in sexual risk behavior (the number of sexual partners). It was found (Table 13) that being from Germany was associated with a higher number of sexual partners at T3.

The binary logistic model explaining sexual risk behavior (condom use) was significant (χ^2=83.39; df=6; p<0.001), indicating that the model effectively differentiated between respondents who reported and did not report sexual risk behavior (condom use). The model explained between 27.9% and 40.0% of the

variance in sexual risk behavior status, and correctly classified 82.7% of cases. It was found (Table 13) that not using condom at T1 was associated with the same behavior at T3.

Table 13 The association between gender, country and sexual risk behavior

	the number of sexual partners			using of condom with new sexual partner						
	β	t	p	B	S.E.	df	p	OR	95% C.I.	
sexual risk behavior at T1	.03	.56	.575	2.70	.35	1	<.001	14.95	7.47	29.92
gender	.02	.44	.663	-.32	.42	1	.439	.73	.32	1.64
Hungary*	.07	.98	.328	-.21	.65	1	.745	.81	.23	2.91
Czech	.07	1.15	.251	.74	.55	1	.185	2.08	.70	6.17
Germany	-.13	-2.15	.032	.40	.60	1	.501	1.50	.46	4.82
Lithuania	.68	.97	.333	-.16	.67	1	.815	.86	.23	3.16

reference group: Slovakia

Problematic internet use

The linear model explaining problematic internet use was significant (x^2=77204.79; df=6; p<0.001) and explained 41.8% of the variance in problematic internet use. It was found (Table 14) that lower problematic internet use at T1, being from Lithuania, Hungary, Czech and Germany were associated with more problematic internet use at T3.

Table 14. The association between gender, country and problematic internet use

		B	t	p
problematic internet use at T1		.58	15.03	<.001
gender		.01	0.34	.736
country*	Hungary	.23	4.65	<.001
	Czech	.12	2.88	.004
	Germany	.16	4.74	<.001
	Lithuania	.15	3.18	.002

reference group: Slovakia

Junk food consumption

The linear model explaining junk food consumption was significant (χ^2=576.78; df=6; p<0.001) and explained 27.0% of the variance in junk food consumption. It was found (Table 15) that eating more junk food at T1 was associated with eating more junk food at T3.

Table 15 The association between gender, country and junk food consumption

		β	T	p
junk food consumption at T1		.51	12.89	<.001
gender		.03	.68	.499
country*	Hungary	-.08	-1.48	.139
	Czech	-.01	-.03	.980
	Germany	.01	.01	.996
	Lithuania	-.03	-.57	.572

reference group: Slovakia

Disordered eating

The linear model explaining disordered eating was significant (χ^2=46.79; df=4; p<0.001) and explained 23.6% of the variance in disordered eating. It was found (Table 16) that a higher level of disordered eating at T1 was associated with a higher level of disordered eating at T3.

Table 16 The association between gender, country and disordered eating

		β	t	p
disordered eating at T1		.46	8.39	<.001
gender		.05	.83	.408
country*	Hungary	.02	.26	.796
	Lithuania	.09	1.66	.098

reference group: Slovakia; disordered eating was measured only in three countries in comparison to other risk behavior

SUMMARY   In summary, all risk behaviors at T3, with the exception of the problematic internet use, were found to be associated with a lower level or non-reporting the same risk behavior at T1. Moreover, (1) being male was associated only with reported marihuana use at T3; (2) being from Germany was associated with a higher number of sexual partners at T3 and higher engagement in problematic internet use at T3; and (3) being from Hungary, the Czech Republic and Lithuania was associated with a higher engagement in problematic internet use.

More information about the SLiCE study is available in the published article of the authors Janovská, Orosová and Jurystová (2014).

1st part

Psychological aspects of health-risk behavior among Slovak university students

Selected psychological factors
and health indicators of health-risk behavior

INTRODUCTION

Transition to university is one of the most important life changes of university students in young adulthood (Carr et al., 2013). A high prevalence of stress, stress related symptoms such as depression and anxiety on one side and well-being and prevalence of positive emotions on the other have been shown to be a powerful source of growth and change (Pluut, Curşeu, & Ilies, 2014; Bayram & Bilgel, 2008). Moreover, they have been found to serve as predictors of individuals' views about life and life skills (Cohn et al., 2009). Thus a regular data based evaluation of university students' psychological health might be very important (Beiter et al., 2015).

Emotional well-being and depression are explored in this study as the two main health indicators among university students (Fleming et al., 2014). Emotional well-being and depression are phenomena which can be approached from two viewpoints. Firstly, they can be approached as two separate psychological constructs. For example, Kern et al. (2014) has suggested that well-being is a multidimensional construct covering both the positive and the negative aspects of mental health continuum. According to this view, emotional well-being and positive emotions represent a separate dimension of psychological well-being and depression and anxiety represent another dimension consisting of ill-being factors (Kern et al., 2014). Wood and Joseph (2010) have discovered, within a longitudinal design of their study that positive well-being is a significant predictor of depression. Simply, they have found that the absence of positive well-being forms a substantial risk factor for depression which provides support for the second main approach conceptualizing these constructs of opposite poles on the same continuum. For example, the results of the study of Krieger el al. (2014) indicated that there was a curvilinear association between emotional well-being and depression and these authors concluded that emotional well-being and depression might be perceived as opposite poles of the same specific continuum, at least when considering the intensity of depression from absent to moderate level. This study has adopted the concept of two separate

constructs resulting in two individual measures for each. One measure will be used for addressing well-being and the other will address depressive symptoms as two relatively separate health indicators of university students.

Firstly, a literature review was performed and health predictors significantly related to health indicators have been identified. After this initial step a list of identified important predictors was outlined. These predictors included gender, resilience, perceived stress, social support, self-regulation, extraversion, emotional stability and personality variables.

Gender differences in well-being and in mental health problems have been identified in several studies (Santos et al., 2014; Ren, 2009). For example, with regard to academic success, mental health problems and negative experiences of female students have been found to be significant predictors of academic difficulties (Douglass & Islam, 2009) and in male students a positive social interaction has been seen to predict fewer academic difficulties (Douglass & Islam, 2009). These findings provide support for a further investigation of how gender difference actually contribute to students' psychological health.

Resilience has been addressed in various research samples but studies specifically aimed at the population of university students are still scarce (González-Torres & Artuch-Garde, 2014). "In psychology, the term resilience refers to a complex and dynamic multidimensional construct, which derives from the interaction of neurobiological, social and personal factors and indicates the ability to adaptively cope with stress and adversity, preserving a normal physical and psychological functioning." (Elisei et al., 2013, p.263). Resilience has been defined in psychological literature within different conceptualizations as a trait or a capacity as well as a process (Fletcher & Sarkar, 2013; Lee, Cheung, & Kwong, 2012). Resilience as a trait or a capacity may be viewed as person's ability to overcome hardship, to remain psychologically healthy when facing a variety of different stressors (Moore, Lampley, & Moore, 2010; Robinson, Larson, & Cahill, 2014; Connor & Davidson, 2003). Resilience as a process can be understood as an answer to the question how people 'bounce back' and deal with various challenges that appear during their lifespan. Within this conceptualization it is seen as a process of negotiating, managing and adapting to significant sources of stress or trauma (Windle, Bennett, & Noyes, 2011).

Unidimensionality and multidimensionality or heterogeneity of characteristics, assets and resources of resilience (some resilience scales focus only on certain characteristics) constitute an important particularity of this research topic (Robinson, Larson, & Cahill, 2014; Windle, Bennett, & Noyes, 2011). However, adversity and the ability to adapt, are the two core concepts of the most definitions of resilience despite the variety of its operationalizations in psychological research (Fletcher & Sarkar, 2013). Associations between resilience and a number of health conditions have been identified (Kimhi, 2014). For example, a positive relationship has been found between resilience and well-being as well as with positive emotionality (Robinson, Larson, & Cahill, 2014; Pidgeon & Keye, 2014; Jaafar et al., 2014; Gayton & Lovell, 2012; Burns, Anstey, & Windsor, 2011). On the other hand, an inverse relationship between resilience and depressive symptoms has been also shown in many studies (Robinson, Larson, & Cahill, 2014; Petros, Opacka-Juffry, & Huber, 2013; Catalano et al., 2011).

While strong evidence supports the fact that depressed individuals tend to interpret all information in a negative manner, resilience has been found to facilitate positive interpretation and seems to be the basis for a protective "background" of well-being, particularly under conditions of stress (Kleim, Thörn, & Ehlert, 2014). In addition, it has also been found that the relationship between stress and depression as well as physical complaints (Mosley et al., 1994) is partially mediated by the stress management self-efficacy (Sawatzky et al., 2012). But most importantly, resilience seems to possess the characteristic of a "buffer" with regard to stress on depressive symptoms (Catalano et al., 2011). „Resilient individuals may be less susceptible to depression and other stress-related conditions over time when faced with stress." (Kleim, Thörn, & Ehlert, 2014, p.1).

Positive association between social support and well-being as well as school well-being has been shown is several studies (Coffey et al., 2014; Sun et al., 2014; Kong, Zhao, & You, 2013; Petros, Opacka-Juffry, & Huber, 2013). For example, Reifman, Dunkel-Schetter (1990) found that low stress and high social support were associated with a higher level of well-being. However, with respect to the stress-buffering hypothesis Glozah (2013) has reported that his findings are consistent with this hypothesis that perceived support protects individuals from life stress.

The influence of life stress, ego-resilience and social support on university students' psychological well-being has been also explored. This research has found that (i) life stress has a negative influence on ego-resilience, social support and psychological well-being; ego-resilience and social support has a positive influence on psychological well-being and (ii) life stress has a direct negative effect on psychological well-being and ego-resilience; social support has an indirect effect on the relationship between life stress and psychological well-being of university students (Lee, 2012). It has also been found that resilience has a stronger effect on psychological well-being than social support (Kim & Kim, 2013). Another study has found that hope and ego-resilience seem to have a dual mediating effect on the relationship between academic stress and psychological well-being (Hui & Lee, 2013). The role of resilience and social support with regard to maintaining certain level of psychological well-being under stressful conditions among students has also been explored and discussed (Ishige & Muto, 2005).

Self-regulation has been one of the most investigated skills, given its close relation with resilience, well-being, and health-related behavior (Dias & del Castillo, 2014; Ríos & Pérez, 2012; Hofer, Busch, & Kärtner, 2011). It has been found that perceived personal control over one's life is associated with a higher late – life well-being (Gerstorf et al., 2014). Sanders and Mazzucchelli (2013) have presented their research findings in which they found evidence for the relationship between self-regulation capacity in early childhood and social competence, as well as with well-being in adolescence and adulthood. Park, Edmondson, and Lee (2012) have further found support for the association between self-regulation and depression, anxiety, and stress over the course of the first year of university study.

Previous research has also found support for the associations between certain factors of the Big Five and health indicators explored in this study. In particular, agreeableness and openness have been found to be negatively related to depressive symptoms while neuroticism has been found to be related to depressive symptoms positively (Shi et al., 2015b). Extraversion has been found to be positively related to well-being (Lönnqvist & Deters, 2016) and statistically significant associations have been further found between extraversion, agreeableness, conscientiousness, emotional stability, openness to experience and general mental health (Yee et al., 2015). A cross-national comparative study has

also revealed that neuroticism is positively associated with depression, and low well-being (Vazsonyi et al., 2015). Furthermore, extraversion has been negatively associated with poor well-being, but has not been consistently associated with depression (Vazsonyi et al., 2015). This study has also shown that agreeableness is negatively associated with low well-being, neuroticisms is the strongest and the most consistent predictor of depression and low well-being across cultural contexts while extraversion is consistently associated solely with low well-being (Vazsonyi et al., 2015).

However, to our knowledge up to now there is no study that would test comprehensive models with the set of introduced psychological variables which can directly or indirectly contribute to the variance in each of the explored health indicators. This theoretical background has provided background and emphasized the importance of the investigation of psychological mechanisms connected to resilience and social support which represent the underlying mechanisms between perceived stress, the strongest hypothesized predictor and mental health, and health indicators among university students.

AIM

This study had the two following main aims. The first aim was to explore how much of the variance in health indicators (emotional well-being and depressive symptoms) can be explained by the chosen set of predictors (gender, social support, self-regulation, personality factors, perceived stress, and resilience. Secondly, this study aimed to explore the mediation effects of resilience in the relationship between perceived stress and health indicators (emotional well-being, depressive symptoms) among university students. Mediation analyses were carried out after controlling for gender, social support, self-regulation and personality factors. In addition, moderated mediation was also addressed in order to examine whether social support as the moderator had a significant effect in high and low condition (Edwards & Lambert, 2007).

SAMPLE

237 students from four universities in Eastern Slovakia (PJ Safarik University, the University of Veterinary Medicine, the Technical University and Presov University) took part in this study (79.4% females, age 18–35, mean age 19.94, SD = 1.54). The collection of these data was a part of the SLiCE (Student Life Cohort in Europe) research project. The SLiCE study has developed from the previous collaborative research activities within the Cross-

National Student Health Survey which was conducted in May 2008 (El Ansari et al., 2007). The data used in this study were taken from the second round of SLiCE data collection. Selected universities provided e-mail addresses of all first year students and they were asked to participate in the first round of the study. From 4062 students 814 provided data by completing an online questionnaire (response rate = 20.03%) and 237 participated also in the second round (response rate = 29.12% from the first round, 5.83% from all asked students). In total, 237 respondents provided data on all studied variables (perceived stress, resilience, social support, self-regulation, well-being, and depression). The questionnaire was approved by the university Review Board.

MEASURES

Two measures were used as *indicators of mental health*. The WHO-5 Well-being Index (WHO-5, World Health Organization, 1998) was used to address psychological well-being. This measure focuses especially on the aspects of emotional well-being and covers positive mood, vitality and general interests. In this measure, participants were asked to answer each item on a 6-point Likert scale from not present (0, at no time) to constantly present (5, all of the time). A higher score indicated better quality of life. Depressive symptoms were measured by using a modified version of the Beck Depression Inventory (M-BDI) (Schmitt et al., 2003). In this measure students were asked to describe how often they had experienced each of the 20 listed depressive feelings during the past few days on a 5-point scale (from 1= "never" to 5= "almost always"). The M-BDI score was obtained by summing up the answers of individual questions. A higher score indicated a higher level of depressive symptoms.

Perceived stress was assessed by a short (4-item) version of the Perceived Stress Scale (Cohen et al., 1983). These four questions detected perceived stress with answers ranging from never (1) to very often (4) A higher score meant higher perceived stress. Finally, a total score was calculated as the sum of the items (two of them were rescaled).

Trait resilience was measured by using the Connor-Davidson-Resilience Scale (CD-RISC, Connor & Davidson, 2003), a widely used self-report measure to index the ability to cope with stress and adversity. The authors of this instrument based their work largely on the constructs of hardiness, protective factors against psychopathology, and traits associated with adaptive responses to stress. Then they formulated characteristics of resilient people

who: think of a change as a challenge, have the ability to adapt to a change, are in control, are committed, engage the support of others, have a secure attachment to others, pursue personal or collective goals, are self-efficacious, are able to tolerate stress and pain, are optimism and have faith and are also characterized by having sense of humor and patience (Connor & Davidson, 2003). In this questionnaire the respondents were asked to rate 10 items on a scale from 1 ("not true at all") to 5 ("true nearly all the time") and scores were calculated as a sum score with higher scores reflecting higher resilience. The rating of this scale was based on how the subjects felt over the past month.

Perceived social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS, Zimet et al., 1988). The MSPSS is a 12-item, multi-dimensional tool measuring how one perceives his/her social support system, including individual sources of social support (i.e. family, friends, and significant other). Each item was rated using a 7-point scale with possible answers varying between "definitely no" to "definitely yes". A higher score indicated a higher level of social support.

In order to assess *self-regulation skills*, the Short Self-Regulation Questionnaire was used (Carey, Neal, & Collins, 2004). 31 items are scored on a 1–5 scale (strongly disagree–strongly agree) and summed to create the total score. A higher score indicated a higher level of self-regulation skills.

The Ten-item Personality Inventory (TIPI) was used to measure additional *personality variables*. The TIPI is a brief 10-item scale consisting of two descriptors designed to measure two poles of the Big Five Personality model (Gosling, Rentfrow, & Swann, 2003). Two of the five personality factors (extraversion, neuroticism/emotional stability) were included om the analyses of this study. Each item was preceded by the statement: "I see myself as...". Individual statements were scored on a 7-point Likert scale ranging from strongly disagree to strongly agree. The scores of opposite poles (e.g. extroversion and reverse scored introversion) were combined to represent a cumulative score for each component of the Big Five Model.

STATISTICAL ANALYSES

Three-step hierarchical multiple regression models were built to assess the effectiveness of the set of predictors in predicting health indicators (Model 1: emotional well-being and Model 2: depressive symptoms). Prior to and after the analyses, all required checks were conducted to ensure there was no violation

of the assumptions of normality, linearity, multicolinearity and homoscedasticity (Field, 2013; Pallant, 2007). Gender, self-regulation, social support, extraversion and emotional stability were entered at the Step 1, perceived stress and resilience were entered in the regression models in the Step 2 and in the Step 3. The same step-order procedure was used for both regression models.

Based on Baron and Kenny's technique of mediation analysis (1986), the following conditions were (after controlling for the influence of gender, perceived social support, self-regulation skills, extraversion, and emotional stability): (1) the independent variable (perceived stress) was significantly related to the dependent variables (well-being, depression symptoms); (2) the independent variable (perceived stress) was significantly related to the mediator (resilience); (3) the mediator (resilience) was significantly related to the dependent variables (well-being, depressive symptoms), with the effect of the independent variable (stress) on the dependent variable (well-being, depression symptoms) shrinking (partial mediator) or becoming statistically insignificant (full mediator) upon the addition of the mediator (resilience) to the model. After the analysis standardized estimate (β), F, R^2, and R^2-changes (R^2) were provided for each step. The analyses were out in SPSS 20.

Then, Sobel test was performed to calculate the mediation effect (Field, 2013). In order to test moderated mediation, collected data were divided into „lower" and higher" datasets according to values of social support as a moderator variable (using Visual Binning to identify suitable cut-off point to break the continuous variable social support into two approximately equal group: <=73.0 and 74.00+), and separate mediation analyses were conducted to examine whether social support as a moderator would have a significant effect in either lower and higher conditions.

RESULTS

Table 17 presents the descriptive statistics for the explored psychological variables of this study. The underlying factor structure of the Connor-Davidson-Resilience Scale has been explored on the sample of Slovak university students using the technique of principal component analysis (PCA). This PCA has confirmed one-factor structure of the Connor-Davidson-Resilience Scale in this study.

Table 17 Descriptive statistic of the studied variables

	possible range	actual range	mean	SD	Cronbach α*
well-being	0-25	0-25	13.48	4.92	0.86
depressive symptoms	20-100	20-100	44.72	15.36	0.93
perceived stress	4-20	4-20	10.46	3.30	0.78
resilience	10-50	10-50	37.63	7.39	0.89
social support	12-84	12-84	69.73	14.41	0.95
self-regulation	31-155	38-117	97.10	7.65	0.63
extraversion	2-14	6-14	9.18	2.27	0.72
emotional stability	2-14	6-14	9.18	2.44	0.48

* Spearman-Brown coefficient for extraversion and emotional stability

The three-steps hierarchical multiple regression was used to assess the effectiveness of the set of predictors (gender, social support, self-regulation, extraversion, emotional stability, perceived stress, and resilience) in predicting the levels of emotional well-being (Table 18) and depressive symptoms (Table 19).

The results of hierarchical regression for emotional well-being (EWB) are presented in Table 18. Gender, social support, self-regulation, and personality factors were entered in the Step 1, explaining 18.9% of the variance in the EWB. Perceived stress was entered in the Step 2, explaining 35% of the variance in the EWB. After entering the Resilience scale in the Step 3 the total variance explained by the model as a whole was 38% of variance in the EWB. Self-regulation, social support, extraversion, and emotional stability were in positive association with the EWB only in the Step 1 of multiple regression but these associations disappeared in the Step 2 and in the Step 3 after adjusting for perceived stress and resilience with the exception of extraversion. In the final model, only three measures were statistically significant with the perceived stress scale with the highest beta coefficient, and with resilience having a higher beta than extraversion (Table 18). These results revealed that stress was negatively associated with the EWB (Steps 2, 3). Resilience as well as extraversion were positively associated with the EWB (Step 3). R^2 change value for Step 2 was 0.16 and was statistically significant (p<0.001), and R^2 change value for the Step 3 was 0.03 and was statistically

significant (p<0.01). In addition, resilience played a partial mediating role in the association between stress and the EWB as an absolute value of its standardized regression coefficient (ᚖ) which reduced from -0.449 to -0.383 (Sobel test=3.799, ps<0.001).

The results of hierarchical regression for depressive symptoms (M-BDI) are presented in Table 19. Gender, social support, self-regulation, and personality factors were entered in the Step 1, explaining 29% of the variance in the M-BDI. Perceived stress was entered in the Step 2, explaining 47% of the variance in the M-BDI. After entering the Resilience scale in the Step 3 the total variance explained by the model as a whole was 51% of the variance in the M-BDI. In the final model, gender and extraversion did not contribute to the final multiple regression for the M-BDI on a statistically significant level. The results revealed that social support, emotional stability, and resilience were negatively associated with the M-BDI and perceived stress was positively associated with the M-BDI (Steps 2, 3), with the perceived stress scale having the highest beta coefficients (Table 19). The results revealed that the negative association between extraversion and the M-BDI (Step 1) disappeared after adjusting for perceived stress, and resilience stress (Steps 2, 3). R^2 change value for the Step 2 was 0.18 and was statistically significant (p<0.001), and R^2 change value for the Step 3 was 0.04 and was statistically significant (p<0.001). In addition, resilience played a partial mediating role in the association between stress and the M-BDI as absolute value of its standardized regression coefficient (ᚖ) reduced from 0.477 to 0.395 (Sobel test = -4.008, ps<0.001).

Table 18 Hierarchical regression for emotional well-being

		B	Std. Error	Beta	t	P
Step 1	gender	-0.171	0.857	-0.014	-0.199	0.842
	self-regulation	0.084	0.042	0.131	1.985	0.049
	social support	0.051	0.024	0.149	2.109	0.036
	extraversion	0.384	0.106	0.256	3.637	<0.001
	emotional stability	0.321	0.118	0.182	2.713	0.007
Step 2	gender	-0.071	0.769	-0.006	-0.092	0.927
	self-regulation	0.065	0.038	0.101	1.715	0.088
	social support	0.029	0.022	0.084	1.312	0.191

	extraversion	0.303	0.095	0.202	3.178	0.002
	emotional stability	0.050	0.113	0.028	0.443	0.659
	stress	-0.670	0.097	-0.449	-6.923	<0.001
Step 3	gender	0.021	0.757	0.002	0.027	0.978
	self-regulation	0.039	0.039	0.061	1.021	0.308
	social support	0.02	0.022	0.058	0.911	0.364
	extraversion	0.206	0.100	0.137	2.054	0.041
	emotional stability	0.004	0.113	0.002	0.031	0.975
	stress	-0.573	0.101	-0.383	-5.644	<0.001
	resilience	0.138	0.050	0.208	2.786	0.006

Table 19 Hierarchical regression for depressive symptoms

		B	std. error	Beta	t	p
step 1	gender	-0.049	2.554	-0.001	-0.019	0.985
	self-regulation	-0.03	0.126	-0.015	-0.235	0.815
	social support	-0.292	0.072	-0.273	-4.047	<0.001
	extraversion	-0.632	0.314	-0.135	-2.01	0.046
	emotional stability	-1.976	0.353	-0.359	-5.602	<0.001
step 2	gender	-0.382	2.208	-0.01	-0.173	0.863
	self-regulation	0.033	0.109	0.016	0.298	0.766
	social support	-0.218	0.063	-0.204	-3.461	0.001
	extraversion	-0.365	0.274	-0.078	-1.332	0.184
	emotional stability	-1.077	0.325	-0.196	-3.315	0.001
	stress	2.222	0.278	0.477	8.000	<0.001
step 3	gender	-0.741	2.13	-0.019	-0.348	0.728
	self-regulation	0.134	0.109	0.067	1.239	0.217
	social support	-0.183	0.061	-0.171	-2.98	0.003
	extraversion	0.019	0.282	0.004	0.068	0.946
	emotional stability	-0.894	0.317	-0.163	-2.822	0.005
	stress	1.838	0.285	0.395	6.441	<0.001
	resilience	-0.544	0.14	-0.262	-3.892	<0.001

Moderated mediation analysis confirmed that resilience served as a mediator of the relationship between perceived stress and the M-BDI after controlling for gender, self-regulation, extraversion, and emotional stability only among students with a lower level of social support (Sobel test=-2.457, ps<0.01).

DISCUSSION

This study aimed to investigate the level of direct and indirect contributions of psychological factors, including gender, to the variance in each of the explored health indicators. The investigation of psychological mechanisms was concerned mainly with the role of resilience and social support in the relationship between perceived stress, as the strongest hypothesized predictor of mental health, and mental health indicators on a sample of university students. The structure of regression models was based on the current knowledge regarding the prospective moderating role of gender and mediating role of social support (Kim & Kim, 2013; Lee, 2012) and self-regulation (Gerstorf et al., 2014) in the relationship between stress and explored mental health indicators. The aim of this study was to test the mediating role of resilience in the relationship between stress and explored mental health indicators while controlling for other predictors of mental health recognized in the current research. This kind of analysis allowed to explore whether the contribution and the mediating role of resilience skills in the final regression models for the EWB and the M-BDI are comparable and whether gender, perceived social support, and self-regulation skill contribute to the significance of the final regression model calculated for the EWB and the M-BDI separately.

The results of this study has shown that are no significant differences in the EWB with regard to the control variables of individual and interpersonal measures (gender, social support and self-regulation). However, this finding is not consistent with previous research which has shown that perceived social support is a very important factor which helps to improve the overall well-being of individuals (Talwar, Kumaraswamy, & Ar, 2013; Reifman & Dunkel-Schetter, 1990) and that there is a positive relationship between the measures of social support and psychological well-being among young adults, for both men and women (Ho & Chik, 2010). It is important to mention that in the conducted analysis social support was found to be in positive association with the EWB in the Step 1 and in the Step 2 of the regression model but this association disappeared in the Step 3 after adjusting for resilience. The three steps multiple regression

of this study has not found support for the association between self-regulation and well-being which makes this study not fully consistent with the results of previous research. Furthermore, self-regulation as one of measured character strengths has been previously found to be positively associated with life satisfaction and hope (Frank, 2014) and Tavakoli, and Bagheri (2015) have further found a negative relationship between difficulties in emotional regulation and psychological well-being. Simon (2015) has reported that a significant amount of variance in level of psychological well-being can be explained by self-regulation capacity.

In this study, extraversion and emotional stability were found to be in a positive association with the EWB only in the Step 1 of multiple regression but this association disappeared in the Step 2 and Step 3 after adjusting for perceived stress and resilience. Perceived stress was the strongest predictor of the low EWB and resilience was a stronger predictor of the high EWB when compared to extraversion. The results of this study support the findings regarding the crucial role of personality characteristics together with stressful situation in predicting people's subjective well-being (Macan, Bobić, & Cvijetić, 2015).

The partial mediation effect of resilience in the relationship between perceived stress and the EWB has been supported by this study. This finding extents existing research-based knowledge regarding the positive association between resilience and well-being (Kimhi, 2014) as well as regarding the mediating role of resilience in the relationship between perceived stress and life satisfaction (Shi et al., 2015a) which has been achieved by the testing of a comprehensive model to predict the EWB as well as by testing the mediation role of resilience in the relationship between stress and the EWB.

The results from current study suggest that among the explored individual and interpersonal measures (gender, social support and self-regulation, extraversion, emotional stability, perceived stress, resilience) the M-BDI was significantly different with the exception of gender, self-regulation, and extraversion. Contrary to these results previous studies have found the association between gender, self-regulation, and depression. Regarding gender differences, the results of this study are not consistent with the previous findings. In particular, Macan, Bobić, Cvijetić (2015) and Yildirim (2007), and Patten et al. (2006) have reported

that depression symptoms are more prevalent among females.

The results of this study have not supported the previous findings regarding the association between self-regulation and depressive symptoms. Schleider, Abel, and Weisz (2015) have reported their results from a literature review which allow to suggest that youths who feel that they have little control over their thoughts, feelings or environment are at an increased risk of developing anxiety and depression. Park et al. (2012) has further observed that self-regulation competence is significantly related to positive adjustment (e.g., lower depression, anxiety, and stress) among university students. The comprehensive model created for depressive symptoms of this study has confirmed a significant contribution of self-regulation skills.

The findings of Macan, Bobić, Cvijetić (2015) support the previous results regarding the dominant role of the stable dimension "neuroticism- -emotional stability" over the "extraversion-introversion" trait in the prediction of self-reported indicators of well-being and depression symptoms. Our study has confirmed the assumption that emotional stability is the significant predictor of depressive symptoms among university students which means that a lower level of emotional stability contributes to the presence of depressive symptoms.

The results of this study showed that social support was in negative association with the M-BDI in every of the three steps of multiple regression. Similar results have been found in previous studies. Park and Jang (2013) have found that depression increases with stress and decreases with social support, and moderating effect of emotional support is significant when provided by friends but not by parents. Yildirim (2007) has found that depressed students tend to report lower levels of support from family, friends, and teachers.

The partial mediation effect of resilience in the relationship between perceived stress and the M-BDI was found in this study after controlling for gender, social support, self-regulation, and personality factors. Next, moderated mediation was also found where resilience served as a mediator of the relationship between perceived stress and the M-BDI after controlling for gender, self-regulation, extraversion, and emotional stability but only among students with a lower level of social support.

This result is important with regard to the development of strategies of prevention of university students' stress which is related to unhealthy behaviors (Feld & Shusterman, 2015), to the development of strategies that promote resilience to reduce the risk for university students' developing mental health problems, such as depressive symptoms or depression (McGillivray & Pidgeon, 2015; Elisei et al., 2013). The results of this study are consistent with the finding indicated in a reciprocal model of the relation between stressors and depressive symptoms, with the "buffering effect" of resilience on perceived stress with regard to depression, (Calvete, Orue, & Hankin, 2015; Catalano et al., 2011).

Finally, the findings regarding the mediating role of resilience in the relationship between perceived stress and health indicators support previous research which has indicated that resilience is significantly related to positive cognitions about the self, the world, and the future and that individuals with a higher level of resilience report significantly higher levels of life satisfaction and lower levels of depression (Mak, Ng, & Wong, 2011).

FUTURE RESEARCH

The present study represents a step on an important route of inquiry of predictors and psychological mechanism underlying health indicators among university student population. A limitation of this study is that the sample of this research was only of a moderate in size. Therefore, it is important to replicate these results in a larger student sample, and in a longitudinal design to be more confident about the generalizability of the findings. Future investigation of the effectiveness of resilience-based interventions among university students might contribute to a better understanding of mediating and moderating mechanisms by which interventions achieve effects.

LIMITATIONS

There are also limitations of this study which need to be addressed. Firstly, with respect to the measures used, and secondly with respect to the sample. Firstly, self-reported measures were used, the respondents were asked for information directly and the question regarding the potential validity problems could be relevant. The WHO Emotional Well-being Index (WHO-5, World Health Organization, 1998) was used in this research for the measurement of well-being as one of the health indicators. This instrument has also been used in previous studies not only for measuring emotional well-being but also as a measure of depressive symptoms or together for emotional well-being and depressive feelings by other authors (Milanés

et al., 2013; Roy et al., 2012; Lucas-Carrasco, 2012). Secondly, in this study an online data collection was used, which has resulted in a low response rate and a significantly higher portion of female students in the final sample. Thus, any generalizations from the findings for all students should be done cautiously. Future research should address these limitations.

IMPLICATIONS FOR PRACTICE

Despite these limitations, these findings indicate that resilience may be the key variable for promoting well-being and reducing the risk of developing mental health problems. Focusing on strengthening resilience in interventions may be beneficial for university students (Hricova et al., 2013).

CONCLUSIONS

This study has helped to improve the understanding of how much variation in the health indicators can be explained by the explored predictors. The analysis has shown that the comprehensive regression models had satisfying power with regard to explaining the variance in health indicators (38%) and the variance in emotional well-being (51%) and the variance in depressive symptoms. Multiple regression as the main method of the analyses allowed to explore the association between perceived stress and health indicators while controlling for the influence of gender, social support, self-regulation, extraversion, emotional stability and resilience. This study has provided evidence for the association between extraversion, perceived stress, resilience and emotional well-being as well as for the association between social support, emotional stability, perceived stress, resilience and depressive symptoms. The hypothesized strongest predictive power attributed to perceived stress was found to be true for both health indicators. Moreover, the mediating role of resilience in the relationships between perceived stress and health indicators was also found. The moderated mediation analysis of this study further supported resilience's role as a mediator of the relationship between perceived stress and the M-BDI after controlling for gender, self-regulation, extraversion, and emotional stability but only among the students with a lower level of social support.

Life perspective and alcohol use among university students in the context of autonomy and well-being

INTRODUCTION University students constitute a very unique population in many respects. In the context of this publication as well as this chapter, the main focus is on health-related behaviors and especially risk behaviors such as substance use which seems to be highly prevalent in this group (Arnett, 2000; Ham & Hope, 2003). However, the psychological context which we are about to enter takes us to what has been called the "emerging adulthood" (Arnett, 2000). A period when ideals and life goals are the most vibrant topic and one's position and role in a society is pondered and questioned (Arnett, 2000). This has been the major inspiration for writing this chapter which will try to explore the role of autonomy as the fundamental concept of the Self-determination theory connecting self with the social world and life goals. This will be considered the most important means of how to approach one's life perspective in this life stage. These concepts will be studied mainly in relation to alcohol use as a common risk behavior in the population of university students as well as in relation to various indicators of students' well-being.

Life perspective

Psychological relevance and importance of life perspective or life prospects is based on the idea that even though there are many possible levels of analysis of human behavior the most psychologically meaningful is to address it in terms of organized and internally regulated, goal-driven and purposeful endeavor. This approach has been always present and often stood somewhat in opposition to the mainstream of psychological research (Ryan & Deci, 2006). Within this framework the key role is attributed to self-regulatory processes which are organized and maintained around the pursued goals. Unarguably, self-regulation processes include both conscious and unconscious processes which have a considerable (and according to some theorists crucial) effect on the determination of behavior (Muraven, Gagne, & Rosman, 2008). In spite of this fact, it is still psychologically most sound to pay

a very close attention to explicit goals which can be reported and reflected upon by individuals and rely on them as the best indicators of what is a person trying to achieve in life and what is his or her life perspective. This way, life perspective can be understood as potential which is materialized through pursued goals (Emmons, 1991; Vallerand, Blais, Lacouture, & Deci, 1987).

Within the existing research, life perspective can be understood through various concepts that are differently operationalized, although share many similarities. Individual concepts were specifically defined as personal projects (Little, 1983), life tasks (Cantor, Norem, Niedenthal, Langston, & Brower, 1987), life goals and personal strivings (Emmons, 1991) or current concerns (Cox & Klinger, 2002). In a broader sense, life perspective has been also understood as a concept closely linked to the construct of meaning of life in terms of certain mission in life (Palfai, 2006). Even though, the research on life goals, life perspective, has been present in psychological research from very early on, it is still seen as an area needing to be addressed further (McAdams & Olson, 2010).

The first mentioned term is personal projects and has been developed by Brian Little. Little (1983) assumes that personal projects or a personal project consists of a series of coordinated actions or action units which are aimed at achieving specific objectives. Within his concept the focus is centered on the process of achieving one's goals and this is identified by several phases: inception, planning, action and termination. This approach defines personal projects as detailed plans consisting of partial steps that eventually lead to achievement of the desired goal.

Next, the concept of life tasks formulated by the author Nancy Cantor et al. (1987) has been defined as cognitive-motivational structures consisting of certain specific life tasks which become the organizing factor of daily activities. The role of life tasks is often associated with the challenges understood as a result of the requirements of developmental tasks. Research this area, indeed, focused mainly on the issue of developmental tasks of young adulthood and dealt primarily with the task of intimacy.

The third conceptualization was introduced by Cox and Klinger (2002) who defined the concept of current concerns as a way to address goal-directed behavior. Current concerns are defined as a motivational state which starts at the beginning of a goal

pursuit and ends when the goal is achieved or surrendered. Within this concept, the motivational focus remains on the goal although it may not always be a conscious process. It is more a kind of mind set that affects thoughts, reflections and feelings.

A similar but perhaps somewhat psychologically richer and more detailed concept was introduced by Robert Emmons (1991) who emphasizes the meaning and function of life goals. This concept can be described as life goals that a person is trying to achieve. While in the Klinger' s model the emphasis is put on motivational state, Emmons puts greater emphasis on the structure of goals and takes into account the relationships between them and this way addresses the complex issue of coherence between goals.

While the presented concepts differ in their approach to studying goal-directed behavior they contain a common unifying element. Each of these approaches is aimed at personal individual goals, goals which are individuals trying to achieve and this process is crucial for organizing their behavior and has an impact on other potentially competing goals or behavior as well as their subjective experience. All of these approaches contain what has been called the Personal Action Unit or PAC, which represents the dynamic aspect of behavior (agentic) (Little, 1983; McGregor & Little, 1998). However, in addition to studying the process of goal achievement it might be also important to focus on qualitative aspects of the self-regulatory processes and in particular the "whys". As suggested by the Self-determination theory (SDT) different types of motivation with respect to the level of internalization tell a good deal about what achieving certain goals or even the process of trying does, how it affects well-being, health related behavior, selection of goals and so forth. Within the SDT is this qualitative aspect of motivation defined in terms of autonomy which corresponds with the level of internalization and regulation by the self. However, since the term autonomy has been used with different connotations a short overview is provided in the following section.

Different conceptualizations of autonomy

Firstly, it must be said that the empirical findings on autonomy and its relationship with different variables is often accompanied with inconsistent and contradictory findings. This stems mainly from the fact that the concept of autonomy is not only differently operationalized and measured by different researchers, but it is

even used for the purposes of representing constructs which are often unrelated or even contradictory. This might be the main reason for the existing confusion and accumulation of contradictory results which are very difficult to interpret. The origin of the different understandings of the concept of autonomy is therefore very important to identify and acknowledge that different theoretical standpoints exist. In order to explain these contradictions, it is important to consolidate and clarify the terminology in order to provide an overview of the different theoretical context within which is autonomy being used (Anderson, Dowds, Pelletz, Edwards, & Peeters-Asdourian, 1995; Deci, Vallerand, Pelletier, & Ryan, 1991; Dworkin, 1988; Hmel & Pincus, 2002)

Several authors have attempted to review the existing conceptualizations of autonomy. One of such important review studies by Hmel and Pincus (2002) outlined theoretical approaches to autonomy and addressed its measurement as well as provided an overview of empirical findings regarding autonomy. The goal of their review study was precisely to explain the differences and contradictory findings which have been found with regard to this construct in psychology focusing especially in the context of social-psychological research.

According Hmel and Pincus (2002) the existing conceptualizations of autonomy can be divided into three basic groups. The first group defines autonomy in the sense of vulnerability. For example, this conceptualization is used in Beck's theory of depression. Autonomy in terms of vulnerability is considered to be a personality disposition which increases the risk of a reactive depression. Autonomy in this case is seen as a trait-like characteristic which plays a crucial role in emphasizing the value of individualism. This autonomy (or self-reliance) trait is as a consequence responsible for attributing excessive amount importance of value of one's own independence from others. The emphasis is on self-sufficiency praising one's own intrinsic strength and capability. However, when the self-sufficiency is threatened then the individual may show a disproportionate reaction which results in the onset of depressive symptoms. Overall, this view of autonomy is focused on the potential risk connected to autonomy and therefore inevitably produces associations with various ill-being factors (Hmel & Pincus, 2002).

The second view of autonomy represents the most common definition and operationalization of this concept in psychological research. This understanding of autonomy defines it as individuation-separation and emphasizes such attributes as independence, separation or defined as "not leading nor being led by others" (Murray, 1938, p.82). This understanding of the autonomy concept was refined by Henry Murray who included it among the basic psychogenic needs and defined within the need "to resist influence or coercion. To defy an authority or seek freedom in a new place. To strive for independence." (Murray, 1938). This need manifests itself and can be perceived as certain resistance in a situation in which an individual is prevented from proceeding or if he/she is somehow restricted. Again, this understanding of autonomy produces associations with negative outcomes because this kind of behavior is prone to have an antisocial tendency especially when accompanied with dominance and aggression (Murray, 1938). Autonomy measured as based on the theory of Murray has been found to be associated with various negative outcomes, especially related to teamwork and those which require accommodating to social norms (Murray, 1938).

The third view of autonomy focuses on the role of the self in terms of its involvement in behavior (regulation of behavior) of an individual and thus on the extent to which a particular behavioral act is self-determined as opposed to controlled and regulated by external factors without the endorsement of the self (Ryan & Deci, 2006). The main dimension within this understanding lies in integration which results in active engagement in the processes that take place between individual's self and his or her social environment. Therefore, this definition of autonomy is based on the perspective of engagement and integration of the socially imposed values, goals or norms rather than separating from them or defying them for the sake of individualism. Such understanding of autonomy has been mainly endorsed by and refined within the Self-determination theory (SDT).

This is also based on the fact that SDT holds an organismic view of human nature as a background philosophical perspective meaning that an individual, unless actively prevented, naturally heads towards personal growth and psychological integration. The other end of the pole is represented by the self's passivity understood in terms of heteronomy, a kind of fragmented and

inconsistent set of behavioral acts which result from the fact that behavior is mainly determined by controlling factors from the environment. Thus heteronomy and not independence is in this context considered to be the counterpart of autonomy (Deci et al., 1991).

The three mentioned theoretical perspectives constitute three different frameworks as well as operationalizations of autonomy which are used in the field of psychological research dealing with autonomy. In the present work, we will focus on autonomy as defined and operationalized within the Self-determination theory, which emphasizes autonomy with regard to the engagement or endorsement of self in the regulation of one's behavior resulting in authenticity and inner identification with the values that are gradually integrated.

Two approaches to operationalization of autonomy will be used in this study. The first approach will focus on relatively stable interpersonal differences in autonomous functioning. While the concept of autonomy is mostly understood within the dynamic between an individual and social environment it can be assumed that a relatively stable individual difference develop (Weinstein, Przybylski, & Ryan, 2012). These differences are very general in nature and provide similarly a very general idea about the basic relationship between autonomy and explored variables.

The second approach is more specific and focuses on self-determination of life goals and will be addressed in more detail. Within this approach the key issue is addressing life perspective in terms of life goals with regard to the autonomous quality of self-regulation. Several studies have examined the relationship between autonomy (self-determination) of life goals and psychological well-being using a methodological approach of Robert Emmons (1991) specifically modified for this purpose (Sheldon, Ryan, Deci, & Kasser, 2004; Sheldon & Cooper, 2008; Sheldon & Schuller, 2011). As a result, a specific construct of perceived locus of causality continuum or PLOC has been developed to address this concept more conceptually. Particularly the degree of autonomy (self-determination) with respect to life goals has been shown to be very important for the role a particular goal plays in one's life (Sheldon et al., 2004). This will be addressed in more detail in the next section.

Life perspective within the PLOC approach leading to well-being and health

Specific concept which is based on self-determination theory and especially on the SDT mini-theory of Organismic integration approach is called the PLOC (Perceived Locus of Causality Continuum). Organismic integration approach defines four types of self-regulation: extrinsic, introjected, identified and integrated. The first two types of self-regulation or levels of self-determination, are considered to be relatively largely determined by the external and environmental factors, and the other two are considered to be relatively internalized and determined primarily by the self (Deci & Ryan, 2008). The actual level of autonomous regulation of life goals may be expressed by using the so-called index of relative autonomy, which will be used in our work. Autonomous regulation of life goals have been shown to be associated with indicators of well-being cross-culturally (Kasser & Ryan, 1993; Sheldon et al., 2004). Recently, there has been a particularly strong emphasis on the area eudaimonic indicators such as for example within the SDT vitality (Ryan & Frederick-Recascino, 1997).

The PLOC was originally called self-determination of life goals, but in order to differentiate it and avoid overlap with other constructs it was later renamed. Like the aforementioned approaches to the study of life perspective it focuses on an individual and his/her key life goals that he/she tries to achieve in life. This corresponds with a long-term personology tradition of employing idiographic approach, which allows to penetrate deeper into the personality of the individual and examine the specific goals individually.

The approach PLOC is focused on the exploration of autonomous functioning of an individual. The theory of organismic integration serves as the main explanatory theory for distinguishing the degrees of autonomous functioning as part of the continuum of internalization represented by a continuum ranging from controlled to autonomous regulation. The main objective is thus to explore the extent to which person's goals are determined by relatively external non-autonomous factors which are represented by various external factors and introjected reasons opposed to relatively autonomous goals which are mainly determined by the self.

External factors can be represented by rewards and punishments

(their absence means the disappearance of a particular goal pursuit) and introjected reasons are represented for example by ideas and reasons originating in significant others from person's environment such as parents (in the context of our research, for example the importance of university studies, etc.). On the other hand, autonomous goals (or autonomously regulated) are characterized by deeper levels of internalization producing identified goals in which an individual fully realizes the value of a goal. Finally, there is the level of integrated goals, where the goals are fully integrated as a part of person's self that defines it. The SDT is based on the organismic assumption and expects a natural tendency towards achieving deeper internalization of social values and their integration in deeper levels of self-regulation so that they become a natural part of a self and allow experiencing autonomy (self-determination, a sense of authorship of one's actions). On the other hand, inconsistency and fragmentation is characteristic for the weaker levels of internalization.

As already mentioned, the first two types of regulation are relatively non-autonomous or in other words based on external controls and the latter two types of regulation are autonomous or in other words based on the determination by the self. However, given that the degree of self-determination, or autonomy is theoretically understood to be in principle a continuum a single indicator can be calculated to create and overall index of autonomous functioning, which is the key element within the PLOC approach (Sheldon & Kasser, 1995).

The presented model examining life goals with an emphasis on their autonomous regulation has been studied in relation to several variables, involving mostly various indicators of well-being including experiencing positive and negative emotions, vitality, but also factors related to the healthy functioning of personality and global evaluations of physical and mental health (Sheldon & Kasser, 1995). The period of university study can be understood as a certain moratorium in which life goals are being formed and a considerable experimentation with risk behavior takes place (Arnett, 2000). The goal of this work is therefore an analysis which will explore the associations between life perspective in terms of autonomous functioning in general as well as with regard to one's main life goals with risky behavior typical for this period of life.

Autonomy in the context of health-related behaviors and alcohol use

Recently, the SDT theory and especially its key concept of autonomy has been applied in the research of health-related behaviors. The main focus has been on exploration of behavioral change of various risk behaviors. The main reason for this is that despite technical progress in medicine human behavior still remains the largest source of variance in health status (Ryan, Patrick, Deci, & Williams, 2008). Behavioral risk factors such as smoking, excessive use of alcohol, drug abuse, risky sexual behavior and similar risk behaviors are potentially controllable by individuals through the process of self-regulatory processes. This is highly relevant not only for behavior change but can be applied just as well in prevention which justifies the exploration of autonomy as a protective factor.

Moreover, from the perspective of prevention it is absolutely crucial that majority of risk behaviors take place in individual's natural environment. They are triggered and maintained by various social controls and "trapped" in the net of various degrees and forms of regulatory processes. Therefore, when addressing risky behavior, whether in a research study or in intervention, it is important to realize that it depends to a large extent on the level of internalization and autonomous self-regulation of healthy forms of behavior of individuals (Ryan et al., 2008). In line with this, research studies have compiled evidence that for example the existence of alternative goals and their pursuit might be crucial for essential "alteration" of one's original environment. This way the pursuit of one's goals and life prospects may bring about a change in one's behavior or serve as a preventive factor (E. M. Cox, Williams, Hedberg, & Deci, 1997; Shamloo & Cox, 2010). This has been especially emphasized by the motivational approach which is introduced below and will be used in the presented studies (W. M. Cox & Klinger, 1988).

Alcohol use among university students from a motivational perspective

Excessive alcohol use is a common problem among university students. Among other risk behaviors it is probably socially and culturally most accepted if not directly socially required activity. Yet, like other risk behaviors it is connected with many negative consequences which concern not only deterioration of health the

long term but also performance, subjective well-being both in short term and long term (Ham & Hope, 2003). At a first glance, it might seem difficult to link risk behavior such as alcohol use and a rather broad concept of life perspective but exactly the opposite might be actually true. Since life goals, their achievement and emphasis on self-regulation has been repeatedly shown to be related to various forms of risk behavior and especially substance use (E. M. Cox et al., 1997). Self-regulation has been particularly shown to be linked to substance use in general. It has been theorized and empirically shown that self-regulation facilitates goal oriented behavior and allows individuals to postpone instant gratification in order to achieve long term goals (Neal, & Carey, 2005). Psychological models which try to explain behavior of substance use emphasize the role of the social environment and the role of alternative goals that contribute to well-being particularly in instances when substance use plays an important role in eliciting positive emotions as a replacement of pursuing real life goals (W. M. Cox & Klinger, 1988). From this perspective it is very important to focus on motivational processes involved in substance use and given the focus of our study in alcohol use.

Motivation to alcohol use is the ultimate and the most proximal factor through which other distal factors related to drinking are mediated (Cooper, Agocha, & Sheldon, 2000). In addition, different motivations to drink have been shown to be connected to different drinking patterns and different outcomes as well. One of the most elaborated theoretical models is the model of Cox and Klinger, who point out that the use of psychoactive substances should be seen in the context of competing incentives present in life (Cox & Klinger, 1988). The mentioned authors claim that the motivation to use psychoactive substances is indeed determined by many factors (from biological through social, psychological to cultural). In their model, it is emphasized that the final decision to take or not to take a psychoactive substance (or to drink) is based on the decision of an individual. This decision is largely related to the incentive value of the substance over other the value of a potential pursuit of a goal. The actual decision regarding the use of psychoactive substances is not explicitly rational nor necessarily conscious and often dominated by automatic processes. Indeed, it can be understood as a complex mixture of rational and emotional components and complex mechanisms consisting of all levels of motivational determinants. However, what is especially important in this model is that the

decision to use alcohol (or other substance) or not does not happen in isolation from other domains and in particular not in isolation from one's life goals. As pointed out by several research findings, if an individual finds satisfaction and fulfillment in other areas of life, it is likely that the psychoactive substance will be used to regulate affect (Cox & Klinger, 2002; Man, Stuchlikova, & Klinger, 1998).

In order to define and establish different motivations of alcohol use two underlying dimensions were identified. The first dimension represented positive versus negative valence or in other words positive or negative reinforcement and the second dimension represented internal versus external source. Within these two dimension and their combinations four different motivations to drink have been identified Kun. Thus the theory suggests that can drink in order to enhance their positive emotions or decrease their negative emotions. The second dimension refers to the source, meaning whether it is internal and source lies in internal manipulation or is socially determined. Internally generated positive reinforcement represents mood enhancement, internally generated negative reinforcement represents coping motive, externally generated positive reinforcement represents social motive and finally internally generated negative reinforcement representing conformity (Cooper et al., 2000).

To sum up, the presented research findings regarding life perspective operationalized through life goals and addressed from the prism of goal-oriented behavior in the context of university students is very important because it reflects the specifics, tasks of the developmental period and has been shown to be related to different risk behaviors and indicators well-being (Arnett 2000). Indeed, this is an area of research in which various theorists found a direct link between substance use and particularly alcohol use in the context of life goals, self-regulatory processes related to the achievement of its emphasis on incentives, as the final and the most proximal factors resulting in behavior associated with the use alcohol (Cox, & Klinger, 1988; Hustad et al. 2009; Cooper, Agocha, & Sheldon, 2000). Excessive alcohol use, which is typical for the studied group and this developmental period, presents a potential risk in terms of health, but also the life prospects (Palfau & Weafer, 2006). Based on the SDT, another important dimension in the field of research on life goals was introduced, the concept of autonomy which

represents a rather more qualitative than quantitative aspect of life goals (Sheldon et al. 2004; Sheldon, & Kasser, 1995). It has been theorized that autonomy plays an important role in the context of self-regulatory processes, however, it has not been extensively researched. For the purposes of our studies presented below we used the concept of individual differences in autonomy and autonomy within the approach PLOC, which is described in more detail above and is based on the Organismic integration theory which refers to four types of regulation distinguishing four levels of self-determination, which can be applied to the field of life goals.

AIM

Based on the review, in the context of health-related behavior and in line with theoretical background of SDT it can be expected that autonomy will be negatively related to alcohol use and motivation to drink and, as the previous research has shown, positively related to indicators of well-being. This will be addressed in two separate samples. The first study sample was taken from a larger international project and will be used to explore the relationship between individual differences in autonomous functioning and aspects of alcohol use as well as indicators of well-being. The second study sample was collected to look a bit deeper and explore the degree of autonomous regulation of life goals and aspects of alcohol use as well as indicators of well-being. In addition, a moderating role of autonomous regulation life goals with regard to self –regulation will be also addressed as it is reasonable to assume that the degree to which the goals are regulated autonomously will strengthen or weaken (moderate) the relationship between the goal-oriented behavior and well-being as well as the goal-oriented behavior and alcohol use.

HYPOTHESES

H1: Individual differences in autonomy will be negatively related to alcohol use and motivations to alcohol use (study sample 1).

H2: Individual differences in autonomy will be positively related to indicators of well-being (study sample 1).

H3: Autonomous regulation (self-determination) of life goals will be positively correlated to the well-being and negatively related to alcohol use and motivation for alcohol use (study sample 2).

H4: Autonomous regulation of (self-determination) life goals will play the role of a moderator in the relationship between goal-directed behavior in relation to vitality as an indicator of well-

being and alcohol use (study sample 2).

The sample 1 used in this study is from a larger longitudinal international project SLiCE (Student Life Cohort in Europe) which has been developed on the basis of the Cross – National Student Health Survey (Ansari et al., 2007). First year university students were approached in each participating country and asked to participate in a web-based questionnaire containing measures of a number of health related behaviors, measures of psychological status and functioning and personality variables. Participation was completely voluntary. Every respondent gave an informed consent prior to filling in the online questionnaire and respective Ethics Committees approved of this study at individual universities. The data for the purposes of this study were taken from the first two waves (baseline and one year follow up) collected in Slovakia. The study sample 1 thus consists of students attending Slovak universities (n=243; 80% females, mean age =20.84 SD=3.64) who participated in the first two waves of the study SLiCE.

The study sample 2 is a convenience sample of 141 university students who voluntarily participated in a small research study as a small extension of the SLiCE study. A total of 180 questionnaires were distributed in the campus of the Pavol Jozef Safarik University in Kosice and the response rate was 141 (78%). One respondent was excluded due to a large amount of missing data resulting in 140 respondents that were used in data analyses. All participants were students of Pavol Jozef Safarik University in Kosice (73% women, mean age 21.3 SD = 1.3).

In the study sample 1 the questionnaires were administered via an online system and students filled in the information online on their computers. After agreeing with their participation and giving an informed consent to process their data, the participants were asked to provide basic socio-demographical information and continued with filling the individual questionnaires. In the second sample a printed battery of questionnaires was administered to students along with an informed consent form in the university premises.

Measures used in the study sample 1

Individual *differences in autonomy* (Sample 1) were measured by the Self–determination scale (SDS) which is an instrument based on the Self–determination theory (Sheldon & Kasser, 1995). In this

instrument the respondents are presented with ten pairs of opposing statements and are asked to indicate their agreement with one or another on a five point Likert type scale. A summary score is calculated with higher score indicating higher autonomy or functioning in a self-determined way. Chronbach's α for this scale was 0.77.

Indicators of well-being: WHO Well-being index and depression and (Sample 2). WHO Well-being index (Study 1) measure consisted of five items addressing different aspects of well-being. Individual items were measured on a 6-point scale and a higher score indicated higher well-being. Chronbach's α was 0.79 (WHO, 1998). Depression was measured by a modified version of the Beck Depression Inventory (M-BDI) (Schmitt et al., 2003). In this questionnaire the respondents were asked how often they had experienced depressive feelings during the past few days (from 0="never" to 5="almost always"). The M-BDI score was calculated as a sum of scores for each answer. A higher score indicated a higher depression. Cronbach's alpha in this sample was 0.94.

Alcohol use was measured by a questionnaire AUDIT (Alcohol Use Disorders Identification Test). This is a standardized measure consisting of 10 items and three subscales addressing amount frequency and negative consequences of drinking. It is a standardized instrument for screening and detecting problematic alcohol use in different populations and its suitability has been shown in samples of university students (Babor et al., 2001; Murphy & Garavan, 2011).

Motivations to alcohol use was measured by the revised version of the Drinking Motivation Questionnaire (DMQ – R) (Kuntsche & Kuntsche, 2009). This method has been constructed as based on the theory of Cox and Klinger (1988). Within this instrument the respondents are asked to rate different motivations to drinking. Each motivation is measured by 5 items which capture mood enhancement, social motivation, conformity and coping. Cronbach's α for this sample was ranged from 0.75 to 0.81.

Measures used in the study sample 2

Autonomous self-regulation of life goals was measured by the relative index of autonomous functioning (RAI) Self-determination goals in life (Study 2) was measured using the procedure outlined Sheldon et al. (2004). Respondents were asked to indicate the six goals they are trying to achieve in life. Subsequently these goals

were evaluated for reasons why are individuals trying to achieve them. The reasons corresponded with the level of self-determination (external, introjected, identified and integrated). Each respondent received four different scores for each type of regulation (α=0.85-0.95) as well as a single score representing relative autonomous index.

Goal-directed behavior (study sample 2) was measured by the two subscales representing goal-setting and impulse control of the Self–regulation questionnaire short version (SSRQS) (Neal & Carey, 2005). Goal-setting consisted of 10 items and impulse control consisted of 11 items which were summed to create two individuals scores for every respondent. Within each subscale items were rated on a five point Likert type scale. A higher score indicated a higher level of the measured aspect of goal directed behavior. Chronbach's α for this scale reached the values 0.89 and 0.93 in the studied sample.

Indicators of well-being: cognitive evaluation of life satisfaction, frequency of experiencing positive and negative emotions and vitality. Life satisfaction was addressed by the Satisfaction with Life Scale (SWLS) which consists of five items evaluated on a 5 point Likert type scale. A higher score indicates a higher level life satisfaction. Chronbach's α for this scale was 0.86 (Diener et al., 1985). Positive and negative emotions were addressed by the Subjective Emotional Habitual Well-being scale (SEHP) which consists of 10 items measuring positive and negative emotions with regard to the frequency. Cronbach's α for this scale was found to be 0.75 and 0.77 respectively (Džuka & Dalbert, 2002). Finally, Vitality was measured by the Vitality scale consisting of 6 items rated on a 7-point scale with a higher score indicating higher vitality. Cronbach's α for this scale was 0.82 (Ryan & Frederick-Recascino, 1997).

STATISTICAL PROCEDURE

Descriptive statistics was used in order to present the basic characteristics of the data. Pair and independent t-tests were used in order to explore differences over time and between groups. Correlation analysis with Pearson correlation coefficient was used to investigate the relationships between the variables. Linear regression analyses were used to study associations between independent and dependent variables while allowing to control for socio-demographic differences. Finally, linear regression analyses were used to explore the moderating effect of autonomous control of life goals in the relationship between goal-

oriented behavior and alcohol use as well as indicators of well-being. The moderating analysis followed the recommendation of Baron and Kenny (Baron & Kenny, 1986).

RESULTS

Firstly, the focus of the study was to explore individual differences in autonomy (study sample 1) in relation to alcohol use, motivation to alcohol use and indicators of well-being. The means and standard deviations of measured variables in the first and second wave of data collection of university students are displayed in table 20. As can be seen alcohol use has slightly decreased when the first and second year of data collection were compared. The indicators of well-being did not significantly differ. Remaining variables were measured only at a single time point and could not be tested in with regard to changes over time.

Table 20 Descriptive statistics of the measured variables in the first and the second wave of data collection

	T1		T2		
	mean	SD	mean	SD	p
AU	5.51	5.05	5.40	4.88	0.001
ENHC	X	X	4.82	1.75	NA
SOC	X	X	5.34	2.83	NA
CONF	X	X	3.49	0.93	NA
COPE	X	X	4.15	1.54	NA
DEP	45.73	13.72	44.72	15.36	0.086
WB	18.64	4.98	18.48	4.92	0.078
SDS	38.74	6.93	X	X	NA

Note 1 X – questionnaire was not administered in the given wave; Note 2 AU - alcohol use; ENHC – enhancement motive; SOC – social motive; CONF – conformity motive; COPE – coping motive; DEP – depression; WB – well-being; SDS – individual differences in autonomy

Next, a zero order correlation analysis was performed. Depression and well-being did not demonstrate a statistically significant correlation with alcohol use. Depression showed a statistically significant positive correlation coefficient with the motive of coping with stress and conformity motive regarding the use of alcohol. The correlation between depression in the first wave and the conformity motive of alcohol use in a second wave was $r=0.20$ ($p<0.01$) and $r=0.18$ with the motive for coping with stress ($p<0.01$). Cross sectional correlations in the second wave were

r=0.26 (p<0.01) with conformity motive and r=0.27 (p<0.01) with the motive of coping with stress. Individual differences in autonomy demonstrated similarly statistically significant negative correlation with motivation to alcohol use regarding coping with stress and of conformity. The strongest correlational relationships were found with depression (r=-0.65 T1, p<0.001; T2 r=-0.41, p<0.001) and well- being (T1 r=0.37, p<0.001; T2 r=0.29, p<0.001).

Further, regression analyses were performed to explore the relationship between individual differences in autonomy at T1 and alcohol use in the first and the second waves and the motivation to alcohol use in the second wave while controlling for gender and age. As can be seen in table 21 individual differences in autonomy were significant only in the case conformity motivation for alcohol use (β=-0.238; p≤0.001). In all other instances, the relationship between individual differences in autonomy and the use of alcohol or other types of alcohol motivations were not found.

Table 21 Regression analysis of individual differences in autonomy on alcohol use in the first and the second wave and motivation to use alcohol in a second wave

	AUT1	AUT2	ENH	SOC	CON	COP
age	-.108	-.145	-.087	-.066	-.203	-.071
gender	-.005	-.092	.015	-.109	.069	.020
SDS T1	-.066	-.027	-.113	-.096	-.238**	-.138
F	.840	1.922	1.241	1.580	6.689***	1.510
R^2	0.02	0.03	0.02	0.02	0.10	0.01

*Note 1: *p<0.05; **p<0.01; ***p<0.001; T1- first wave, T2 second wave; Note 2: AU- alcohol use; ENH – enhancement motive; SOC – social motive; CON – conformity motive, COP – coping motive, SDS – individual differences in autonomy; Note 3: presented coefficients are standardized βs*

Following this, regression analysis was performed in order to examine the relationship between individual differences in autonomy and depression and well-being while controlling for gender and age. Autonomy was negatively associated with depression at the baseline (T1) (β=-0.654; p<0.001) as well as with depression at the first follow up (T2) (β=-0, 413; p<0.001). Similar

results were found with regard to the WHO index of well-being, which was also used as an indicator of well-being and positively associated with autonomy at baseline (β=0.375; p<0.001) as well as at the first follow up (β=0.305; p<0.001).

Table 22 Regression analysis of individual differences in autonomy on well-being indicators in the first and the second wave

	DEPT1	DEPT2	WBT1	WBT2
age	-.002	-.59	.138	.102
gender	-.012	-.028	-.052	-.083
SDS T1	-.654***	-.413***	.375***	.305***
F	46.185***	12.609***	12.544***	7.993***
R²	0.43	0.17	0.16	0.11

*Note 1: *p<0.05; **p<0.01; ***p<0.001; T1- first wave, T2 second wave; Note 2: SDS – individual differences in autonomy, DEP – depression, WB – well-being; Note 3: presented coefficients are standardized βs*

The results based on the first sample showed that there were only few associations between individual differences in autonomy and alcohol use. On the other hand, relatively strong associations were observed with regard to indicators of well-being.

The second main focus of this chapter was to look a bit deeper and explore autonomous self-regulation of life goals (study sample 2). Firstly, descriptive statistics was calculated and is shown in table 23. Regarding the indicators of well-being no gender differences were observed. Differences were observed only in vitality where women scored higher than men. In the case of alcohol consumption higher consumption rates were found in men. In terms of screening problematic use of alcohol in the sample 19 men and 20 women reached the level that qualifies as problematic use (AUDIT score above 8). Further gender differences were found in social motivation in which men scored higher than women. Concerning other variables significant differences were not found. With regard to autonomous regulation of life goals (external, introjected, integrated and identified) an increasing trend with the lowest score in external and the highest level score in identified regulation were observed.

Table 23 Descriptive statistics of the measured variables

	min.	max.	women		men		
			mean	SD	mean	SD	P
SWLS	5.00	35.00	22.07	5.33	21.50	7.34	.611
POZ	1.25	5.75	4.24	0.62	4.23	0.83	.955
NEG	1.50	4.50	2.88	0.50	2.71	0.63	.098
VIT	1.00	7.00	4.56	1.18	3.72	1.68	.001
AU	.00	35.00	5.31	4.67	10.54	8.50	.000
ENC	3.00	9.00	4.89	1.68	5.05	1.64	.613
SOC	3.00	9.00	5.42	1.86	6.14	1.89	.045
CON	3.00	9.00	3.95	1.52	4.05	1.49	.724
COP	3.00	9.00	4.57	1.48	4.37	1.73	.498
SR-IC	23.00	54.00	38.15	5.62	36.12	5.65	.060
SR-GS	17.00	49.00	36.82	5.36	36.07	5.36	.459
EXT	1.00	7.00	1.90	1.15	2.06	1.37	.496
IJCT	1.00	7.00	2.67	1.70	2.51	1.53	.611
INTG	1.00	7.00	5.27	1.83	4.83	1.81	.199
IDTF	1.00	7.00	5.77	1.41	5.52	1.49	.356
RAI	-9.17	18.00	10.34	5.64	9.23	5.98	.312

Note 1: *p<0.05; **p<0.01; ***p<0.001; Note 2: SWLS- Life satisfaction, POZ – frequency of experiencing positive emotions, NEG – frequency of experiencing negative emotions, VIT – vitality, AU – alcohol use, ENH – enhancement motive, SOC – social motive, CON – conformity motive, COP – coping motive, SR-IC – impulse control, SR-GS – goal setting, RAI – relative autonomous index of life goals

In the first step, correlation analysis was performed between the levels of autonomous regulation and a composite score representing the Relative Index of the Autonomous Regulation of life goals (RAI). As can be seen in table 24, the trend of correlation coefficients showed a positive correlation between the relatively external types of regulations extrinsic and introjected ($r=0.29$; $p<0.001$) and the correlation between the relatively autonomous types of regulation integrated and identified regulations ($r=0.53$; $p<0.001$). It was also shown that there was a negative relationship between external and identified regulation of life goals ($r=-0.27$; $p<0.001$). However, not all expected relationships were found. RAI as a composite score correlated positively with relative types of internal control and life goals with a relatively negative external regulation types.

Table 24 Correlation analysis between the types of regulation of life goals and the relative index of autonomous regulation of life goals

		1.	2.	3.	4.	5.
1.	RAI	1.00				
2.	EXT	-.69***	1.00			
3.	IJCT	-.40***	.29***	1.00		
4.	INTG	.63***	-.14	.05	1.00	
5.	IDTF	.79***	-.27***	-.01	.53***	1.00

Note 1 ***p<0.001; Note 2 RAI – relative index of autonomous functioning, EXT – extrinsic regulation of life goals, IJCT – introjected regulation of life goals, INTG – integrated regulation of life goals, IDTF – identified regulation of life goals

Next, the analysis focused on RAI as an overall indicator of autonomous regulation of life goals. Table 25 presents the results of the performed correlation analysis between all variables of interest. Autonomous regulation of life goals (RAI) did not show any significant associations with indicators of well-being nor with alcohol use and motivation for alcohol use. RAI was positively associated only with goal setting as a factor of goal directed behavior (r=0.23; p<0.001). However, it was not related to the second factor impulse control. Correlation analysis further demonstrated the trend of positive associations between components of goal directed behavior and well-being indicators and the trend of negative associations of these variables with alcohol and motivation for alcohol use. The relationship between alcohol use and indicators of well-being was not detected. Only vitality correlated negatively with alcohol use (r=-0.18; p<0.05). Overall, the strongest observed relationship between alcohol use and motivation to alcohol use was found with regard to social motivation (r=0.55; p<0.001), mood enhancement (r=0.49; p<0.001), drinking to cope with stress (r=0.44;p<0.001). The lowest correlation coefficient was observed with conformity motivation (r=0.27; p<0.001). Finally, a negative correlation was observed between drinking to cope with stress and the frequency of experiencing positive emotions and life satisfaction.

Then we focused on the examination autonomous regulation of life goals in relation to indicators of well-being as well as the potential moderating role assumed with respect to goal-oriented behavior, which was represented by two areas of self-regulation represented by impulse control and goal setting in relation to an indicator of well-being and alcohol use. This was explored via two

multiple regression models. As can be seen in table 26, regression analysis did not show significant relationships and the expected moderation effect was not found. From all variables only impulse control was associated positively with vitality ($β$=0.23; p<0.05).

Table 25 Correlation analysis between the explored variables

		1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1.	SWLS	1.00											
2.	POZ	.51 ***	1.00										
3.	NEG	-.23 ***	-.41 ***	1.00									
4.	VIT	.16	.21 *	-.08	1.00								
5.	AU	-.09	-.16	.07	-.18 *	1.00							
6.	ENH	-.09	.09	-.07	-.11	.49 ***	1.00						
7.	SOC	-.09	.04	-.05	-.15	.55 ***	.68 ***	1.00					
8.	CON	-.25 **	-.19 *	.11	-.06	.27 ***	.38 ***	.28 ***	1.00				
9.	COP	-.24 **	-.20 *	.11	-.07	.44 ***	.59 ***	.47 ***	.33 ***	1.00			
10.	SR-IC	.22 **	.08	-.17 *	.16	-.36 ***	-.28	-.25 **	-.19 *	-.21 *	1.00		
11.	SR-GS	.18 *	.19 *	-.17 *	-.03	-.26 **	-.18 *	-.11	-.05	-.23 **	.60 **	1.00	
12.	RAI	.10	.12	-.06	-.10	-.03	.01	.20	-.03	.02	.14	.23 **	1.00

Note 1: *p<0.05; **p<0.01; ***p<0.001; Note 2: SWLS- Life satisfaction, POZ – frequency of experiencing positive emotions, NEG – frequency of experiencing negative emotions, VIT – vitality, AU – alcohol use, ENH – enhancement motive, SOC – social motive, CON – conformity motive, COP – coping motive, SR-IC – impulse control, SR-GS – goal setting, RAI – relative autonomous index of life goals

Similarly, with respect to the indicators of well-being the moderating role the autonomous self-regulation of life goals was not demonstrated (table 27). The only variable that showed a negative relationship with alcohol after controlling for age and gender was impulse control ($β$=0.236; p<0.001). Regarding the motivation of alcohol use, a negative correlation was observed

between impulse control and all motivations to alcohol use with the exception of coping with stress. In the case of RAI the only statistically significant relationship was found with social motivation to alcohol use (β=0.224; p<0.001).

Table 26 Moderation analysis with regard to indicators of well-being

		SWLS	POZ	NEG	VIT
step 1	age	.098	.063	-.063	-.104
	gender	-.010	-.012	.194***	.294***
step 2	SR-IC	.153	-.056	-.129	.228*
	SR-GS	.061	.188	-.088	-.147
step 3	RAI	.077	.097	-.055	-.136
step 4	SRICxRAI	.130	.126	-.059	.011
	SRGSxRAI	-.069	-.105	-.072	-.130
	F	1.571	1.184	1.726	3.145**
	Df	(7,132)	(7,132)	(7,132)	(7,132)
	R^2	0.08	0.06	0.08	0.14

Note 1: *p<0.05; **p<0.01; ***p<0.001; Note 2: SWLS- Life satisfaction, POZ – frequency of experiencing positive emotions, NEG – frequency of experiencing negative emotions, VIT – vitality; Note 3: presented coefficients are standardized βs

DISCUSSION The aim of this chapter was to provide a theoretical background as well as to explore students' life perspective in relation to alcohol use and well-being. This aim has been achieved by means of providing a review of the current literature on life perspective operationalized by life goals as well as by exploration of individual differences in autonomy and addressing the role of autonomy in life goal pursuit in relation to alcohol use and different indicators of well-being. While the theoretical scope and consequentially various operationalizations of life perspective are possible the aim of the studies presented in this chapter are limited to the role of autonomy in individual differences regarding autonomous functioning and the role of autonomous regulation in goal striving. The empirical part of this chapter was based on the exploration on two individual samples testing four hypotheses.

Table 27 Moderation analysis with regard to alcohol use and motivation to alcohol use

		AU	ENH	SOC	CON	COP
step 1	age	.074	.045	-.029	-.078	.016
	gender	-.260***	-.033	-.139	-.004	.082
step 2	SR-IC	-.236***	-.245***	-.270**	-.241***	-.118
	SR-GS	-.110	-.023	.003	.131	-.166
step 3	RAI	.151	.051	.224**	-.046	.080
step 4	SRICxRAI	.042	-.055	.060	-.108	-.087
	SRGSxRAI	.066	.131	.048	.195	.141
	F	4.133***	1.614	3.006**	1.467	1.731
	Df	(7,132)	(7,132)	(7,132)	(7,132)	(7,132)
	R^2	0.18	0.08	0.11	0.07	0.08

Note 1 *p<0.05; **p<0.01; ***p<0.001; Note 2: AU – alcohol use, ENH – enhancement motive, SOC – social motive, CON – conformity motive, COP – coping motive, SR-IC – impulse control, SR-GS – goal setting, RAI – relative autonomous index of life goals; Note 3: presented coefficients are standardized βs

The first hypothesis was based on the assumption that individual differences in autonomy would be related to alcohol use as well motivations to alcohol use which are an important proximal factor of alcohol use. In fact, contrary to the expectation individual differences in autonomy were found to be mostly unrelated to any aspects of alcohol use. The only type of motivation was conformity motive with which a negative association was found. It could be argued that these findings are in contradiction with findings of some similarly based studies (Palfai & Weafer, 2006; Williams et al., 2000; Wong & Rowland, 2013). However, on the other hand, it is important to say that the research question addressed in this study stayed on a very general level of individual differences which probably was not sensitive enough to demonstrate the expected association.

The second hypothesis addressed individual differences in autonomy in relation to selected indicators of well-being. Based on the theory it was expected that respondents high in autonomy would experience higher level of well-being. Individual differences in autonomy were indeed found to be related to the chosen indicators of well-being which is in line with current literature (Deci & Ryan, 2008; Weinstein, Przybylski, & Ryan, 2012). This was found both cross-sectionally as well as longitudinally with a relatively high level of correlation. This

suggests that students who had higher autonomy and who are less prone to adjust their behavior to the controls of the environment are less depressed and experience more happiness. However, the association with alcohol use was much less clear. The results did not show a direct negative association with alcohol use as expected.

The further aim of the presented empirical research was to focus on the investigation of the relationship between autonomous regulation of life goals in relation to well-being indicators and alcohol as well as the motivation for alcohol use. The assumption was again similar but focused on the process. The basic assumption was that autonomous self-regulation of life goals would play a role in moderating the relationship between goal-oriented behavior and indicators of well-being as well as alcohol use and motivation to alcohol use. Two specific hypotheses were formulated. Firstly, autonomous self-regulation (self-determination) of life goals was expected to be positively correlated to the well-being and negatively related to alcohol use and motivation for alcohol use. Secondly, autonomous self-regulation of (self-determination) individual's life goals would play the role of a moderator in the relationship between goal-oriented behavior and indicators of well-being and alcohol use.

With regard to the firstly mentioned hypothesis autonomous regulation of life goals was not found to be directly related to the indicators of well-being. These results are generally in contrasts with the findings of other authors (Sheldon & Kasser, 1995). The observed lack of association may be due to the fact that although the respondents reported on the goals which they are yet to begin to pursue and thus were not accurately reflecting the factors which might be influencing their well-being presently. While this might be to certain extent speculative some evidence exists that the actual impact of a concrete goal takes place after it is achieved (Niemiec, Ryan, & Deci, 2009). Another important point is that within the analysis the goals had not been categorized and only a general trend of autonomous self-regulation (self-determination) was explored. However, as reported in the results based on the sample 1, individual differences in autonomy were relatively strongly related to indicators of well-being (Diener et al., 1985). Furthermore, no evidence was found in favor of the moderating role autonomous self-regulation of life goals. Even more surprisingly goal setting as part of goal directed behavior was not found to be related to any of the indicators of well-being

which in the end partially explains the lack of moderating effect.

Regarding alcohol use the results were also different to what had been expected. In particular, RAI was found to be significantly and positively related to social motivation to alcohol use. Social motivation to alcohol use has been reported to be the strongest among university students and the only one that is not directly connected with risky alcohol use. Thus this correlation might need further analysis and is probably caused by a third variable as active students, who actively pursue their goals might be motivated to live and active social life including social motivation as their main motivation to drink.

Additional information that is important for the explanation of the results regarding the last hypothesis which was not supported by our research is that not goal setting but rather impulse control was related to alcohol use. This is an important finding because goal setting or active goal engagement with autonomously regulated goals had much weaker impact on drinking than the actual ability to control one's impulsive behavior.

In the empirical part this chapter has focused on two main aspects of life perspective, autonomous functioning and goal directed behavior which were explored in relation to alcohol use and indicators of well-being. All in all, the results of the two performed studies suggest that individual differences in autonomy as an important aspect of life perspective are positively related to various indicators of well-being but not directly to alcohol use or motivations to alcohol use. As far as goal directed behavior most of the findings were statistically insignificant.

FURTHER
RESEARCH

Future research should address the role of autonomy with a more precise and detailed measurement such as measuring the autonomous aspects of drinking behavior. The results presented in this study are limited to a very general trend. This might be, in fact, misleading, as alcohol use especially driven by social motivation. While the results presented in this chapter show that impulse control is important, the active goal pursuit of autonomously regulated goals should not be completely disregarded but rather addressed longitudinally.

LIMITATIONS

While the presented studies have numerous strengths their limitations must be addressed as well. The first study used online data collection, which might have an impact on the selection of participants. Furthermore, the instrument for measuring

individual differences in autonomy contained only one dimension and recent research suggests that there might be at least three individual dimension of individual differences in autonomy (Weinstein, Przybylski, & Ryan, 2012).

With regard to the second study a content goal analysis was not performed which could have had some impact on the results, as the goals that were evaluated by individual respondents might have differed in quality but also time frame within which they had been hoped to be achieved. It must be also noted that for goal directed behavior only a standard questionnaire was used which was probably too general to capture the aspects of interest which was in the end the pursuit of individual goals.

IMPLICATIONS FOR PRACTICE

Based on the results of the present research it can be concluded that autonomy especially as a relatively stable trait is positively associated with explored indicators of well-being. However, the relationship with alcohol use is much less clear and a bit ambiguous, but certain motivations to alcohol use are more related to interpersonal differences in autonomy as well as self-determination of life goals than other types. This has been shown especially with regard to conformity motivation and social motivation to drink alcohol. These findings might be taken into consideration when designing prevention and intervention programs. However, further research is need to clarify the mechanisms and significance of autonomy and autonomous self-regulation in this process.

CONCLUSIONS

All in all, this chapter has highlighted the importance of autonomy as an important construct of SDT which is closely related to life perspective and explored its role in the context of different indicators of well-being and risk behavior among university students. The results of the presented empirical investigations showed that individual differences in autonomy are relatively strongly related to indicators of well-being. However, autonomy does not seem to directly related alcohol use and only weakly related to motivation to alcohol use as its most proximal factor. Many results in the study were statistically insignificant and require further and more detailed analysis which was beyond the scope of the presented research and should be addressed by future studies.

Decision-making styles and risk behavior

Introduction   Decision-making styles are the ways people make decisions. They are considered to be stable characteristics manifested in a variety of decision-making situations. Researchers differ in their definitions of decision-making styles only slightly and higher heterogeneity is visible in their classification. In one of the first definitions, Harren (1979, p. 125) viewed decision-making styles as "the individual's characteristic mode of perceiving and responding to decision-making tasks". Scott and Bruce (1995, p. 820) defined decision-making styles as "the learned habitual response pattern exhibited by an individual when confronted with a decision situation. It is not a personality trait, but a habit-based propensity to react in a certain way in a specific decision context". Kozhevnikov (2007) even views decision-making styles as a sub-component of cognitive styles. This view is understood easily, as cognitive styles describing the general view of information processing and decision-making styles are its application in decision situations. Similarly, Appelt et al. (2011) in a review of decision-making measures stated that the instruments originally constructed to measure cognitive styles are often used to measure decision-making styles.

Bigger differences can be found in classifications of decision-making styles that are also visible in their measures. The most general models postulate only two-decision styles which are very close to general information processing – the rational and intuitive (experiential) styles (Pacini & Epstein, 1999). Scott and Bruce (1995) identified five decision-making styles in four separate populations and described them in behavioral terms. Two of them are identical to the previously mentioned – rational and intuitive, and three more styles were added – dependent, avoidant and spontaneous. The rational style is characterized by the search for and logical evaluation of alternatives. The intuitive style is characterized by attention to detail and a tendency to rely on feeling while the dependent one is characterized by the search for and reliance on the advice of others. The avoidant style is the tendency to avoid decisions whenever possible and the spontaneous style is characterized by a sense of immediacy and desire to complete the decision-making process as soon as possible. Mann et al. (1997) propose the existence of four coping

patterns in decision-making situations - vigilance, hypervigilance, buck-passing and procrastination, which are in some aspects similar to the styles introduced by Scott and Bruce. Only vigilance is viewed as an adaptive style while the other three styles are considered to be non-adaptive.

Given that the association between decision-making styles and risk behavior was the object of interest in this study, the question of correlates of these styles in the real-world environment is essential. Do some of the decision-making styles lead to better decisions than others? Are there any real decision outcomes that can be explained by the decision-making styles? The relationships between decision-making styles and the other stable decision-making characteristic – decision-making competencies – seem to be low. Parker, Bruine de Bruin and Fischhoff (2007) have reported a very weak positive correlation between the rational style and the total decision-making competencies score, while the avoidance and spontaneous decision-making style were weakly negatively related to the decision-making competencies. While the relationship between decision-making styles and other cognitive characteristics has been investigated, little attention has been given to their connection with real-life outcomes and to their predictive validity. However, an association of all decision-making styles except for the intuitive style has been reported in relation to life outcomes (Galotti et al., 2006). Parker, Bruine de Bruin and Fischhoff (2007) found the four decision-making styles with the exception of the dependent style to be related (rational and intuitive positively, avoidant and spontaneous negatively) with decision outcomes.

One of the most important outcomes of decision-making is health. Yilmaz et al. (2013) found medium or low correlations in a university student sample between subjective well-being and all four investigated decision-making styles – positive with vigilance ($r=.24$) and negative with buck passing (-0.43), procrastination ($r=-0.40$) and hyper vigilance ($r=-0.43$). A significant relationship of the decision-making styles postulated by Janis and Mann (1997) was found with coping with stress and life events (in Deniz, 2006). Leykin and DeRubeis (2010) found significant correlations between five out of the seven extracted decision-making styles with depression (measured by the Beck Depression Inventory-II). Depression was positively correlated with the avoidant style, brooding and anxious style and negatively associated with the vigilant and intuitive decision-making styles.

The relationships between decision-making styles and risk behavior have rarely been studied. Rather, attention has been mainly focused on the consequences of substance use on decision-making abilities (e.g. Clark et al., 2012; Zorlu et al., 2013). Philips and Ogeil (2011) found that a greater risk of alcohol related problems was linked to lower vigilance scores and increased tendencies towards procrastination. A higher risk of gambling problems was associated with lower decisional self-esteem and an increased proneness to hypervigilance or panic. The authors summarize their results in the statement: problem drinkers were avoidant; problem gamblers were impulsive. Stimulant users report less competent and more maladaptive decision-making styles compared with controls (Gorodetzky et al., 2011). While no differences were found in buck-passing and hypervigilance, the control group reported more frequent use of the only competent decision making style – vigilance – in comparison with cocaine users and less frequent use of procrastination in comparison with amphetamine users.

Impulsive decision-makers have a higher probability of risky sex (Donohew et al., 2000). They use alcohol or marihuana more often before sex and are more likely to engage in intercourse in comparison with the rational decision-makers. Similarly, Tuinstra (1998) found that impulsive adolescents exhibit more unhealthy behavior (alcohol, smoking, soft drugs), but other three studied decision-making styles (docile, panic and self-confidence) were not related to risk behavior.

While the relationship of decision-making styles and risk behavior has not been the center of research, the role of other decision-making characteristics has been studied more often. One of the most popular methods in decision-making research is The Iowa Gambling Task (IGT) where subjects choose among four decks of cards with different gains and losses. This task allows subjects to learn during it and their performance in the final phase is crucial. High binge-drinking college students make less advantageous choices in comparison with the low binge-drinking group (Goudriaan, Grekin & Sher, 2007). However, initiation of substance use (tobacco, marihuana, alcohol) was not associated with risky decision-making in the IGT (Ernst et al., 2010). Methadone-maintained smokers and tobacco smokers have the worst results in the IGT (Rotheram-Fuller et al., 2004). The students with Internet addiction had better results in the IGT and did not differ from the non-addicted in risk-taking tendencies

(Ko et al., 2010). Similarly, addictive Internet gamers had lower decision-making ability in comparison with the control group (Pawlikowski & Brand, 2011).

AIMS

A lot of risk and protective factors have been found in relation to risk behavior. They belong to a variety of demographic and psychological variables, e.g. gender, education, or religion from the former group and self-regulation, self-efficacy or basic personality factors from the latter group. Although attention has been given to a variety of these factors, the role of cognitive processes in risk behavior has not been widely studied. More attention has been focused on the opposite side – the effect of risk behavior (mainly substance use) on cognitive abilities such as memory, attention or intelligence. This chapter presents the results of research focused on the relationship between decision-making characteristics and risk behavior. As people differ in their ways of approaching and solving decision-making problems, the associations of these ways (called decision-making styles) with selected kinds of risk behavior were studied. Five types of risk behavior were selected for analysis. They include two kinds of risk behavior belonging to substance use (alcohol use and smoking), risk sex behavior, problematic internet use and junk food consumption. The effect of gender was controlled.

SAMPLE

The role of decision-making styles in risk behavior was investigated in a sample consisting of university students. Data from the second round of the SLiCE study was used, when decision-making styles were first measured. Students from selected universities were asked to participate in the first round of the study. From 4062 students 814 provided data by completing an online questionnaire (response rate=20.03%) and 237 participated also in the second round (response rate=29.12% from the first round, 5.83% from all asked students). Data for decision-making styles, gender and risk behavior were obtained from 212 university students (83.49% females).

MEASURES

Decision-making styles were assessed by the General Decision-making Styles questionnaire (Scott & Bruce, 1995) with five subscales examining the five decision-making styles – rational, intuitive, dependent, avoidant and spontaneous. The measure contains 25 questions –five in each subscale and all measured on a scale between strongly disagree (1) to strongly agree (5). Higher scores in each subscale as the sum of the related items mean that this style is used more frequently. The five factor structure of the

decision-making styles model has been confirmed in Canada, Sweden, the United Kingdom and Italy (Loo, 2000; Thunholm, 2004; Spicer & Sadler-Smith, 2005; Gambetti et al., 2008). Convergent validity was investigated by analyzing the relationships between sensation seeking, locus of control and decision-making styles (Gambetti et al., 2008). Construct validity was assessed by exploring the associations between decision-making styles and values (Loo, 2000). The Slovak version was translated from English by a native English speaking translator and back-translated. It showed good psychometric characteristics and similar factor structure as foreign versions (Bavoľár & Orosová, 2015).

Various indicators of risk behavior were selected. *Alcohol use* was assessed by The Alcohol Use Disorders Identification Test (Babor et al., 2001). Ten questions are divided into three subscales – consumption (3 questions), dependence (3 questions) and alcohol-related problems (4 questions) and the total score is also used. As the score in items ranges from 0 to 4, the total score varies from 0 to 40 with values higher than 7 as indicators of hazardous and harmful alcohol use.

Smoking was assessed in the SLiCE study by several particular questions. One of them was selected for the analysis – how many cigarettes have you smoked in the last 30 days? The question was dichotomized into "have you smoked cigarettes during the last 30 days?" with two result groups – not smokers and subjects with at least one cigarette smoked in the last month.

The next inspected type of risk behavior was *junk food consumption*. The score was computed as a sum of four items inspecting the frequency of consumption of four unhealthy kinds of food (sweets (chocolate, candies), cakes/cookies, snacks and fast food).

Risk sexual behavior was assessed in a similar way to smoking by several particular questions. Two of them were selected for the analysis. They included the use of a condom during the first sexual intercourse and the number of sexual partners in the last 12 months.

The Generalized Problematic Internet Use Scale 2 (GPIUS2, Caplan, 2010) was used to assess *problems with the use of the internet*. The measure consists of 15 items and the total score and five subscores were computed. The subscores included

1. preference of online social interaction, 2. use of the internet for mood regulation, 3. compulsive use of the internet, 4. cognitive surfeit of Internet use, and 5. negative consequences of internet use).

STATISTICAL ANALYSIS

As risk behavior is an object of interest in a number of other chapters, the statistical analysis is focused mainly on decision-making styles. Firstly, their characteristics in the sample are presented– basic descriptive statistics, inner consistency and correlations among them. The core of the analysis lies in investigating the role of decision-making styles in risk behavior. Each variable in risk behavior was treated as a dichotomous variable, when participants were divided into two groups with low and high level of risk behavior. Binary logistic regression was used to assess the role of decision-making styles in all studied kinds of risk behavior – alcohol use, smoking, junk food consumption, problematic internet use and risk sexual behavior. Gender was also included to control its effect on risk behavior.

RESULTS

Decision-making styles

Firstly, the basic descriptive information about variables included in the analysis are presented. While the main aim of the present chapter is to investigate the role of decision making-styles in risk behavior, it starts with providing descriptive statistics of decision-making styles. Risk behavior characteristics will be part of the regression models results. As there is no information about the previous use of the GDMS in Slovakia (our previous article (Bavoľár & Orosová, 2015) reports data also from other samples), exploratory factor analysis was conducted to verify the postulated five-factor model in the present sample. Based on the Kaiser criterion and scree plot, five factors were identified using principal axis factoring with direct oblimin rotation (a kind of oblique rotation was used as numerous studies have confirmed the relationships among factors). Factor loadings for all GDMS items are presented in Table 28.

Table 28 Factor loadings of the GDMS items

rational style		intuitive style		dependent style		avoidant style		spontaneous style	
item	factor loading	item	factor loading	item	factor loading	item	factor loading	item	factor loading
1	.53	2	.77	3	.69	4	.74	5	.63
6	.77	7	.86	8	.66	9	.85	10	.65
11	.63	12	.62	13	.61	14	.85	15	.70
16	.55	17	.42	18	.70	19	.68	20	.82
21	.58	22	.79	23	.71	24	.66	25	.16

Factor loadings mostly confirmed the positon of items in expected decision-making styles with one serious exception. The last item ("When making decisions, I do what seems natural at the moment") had the highest loading with the dependent style (0.401), not with the spontaneous one (0.150), where it should belong. As only this item was outside the postulated style, we accepted item classification according to Scott and Bruce (1995) and used the sum of five items to obtain a style score.

The next table provides the descriptive statistics of decision-making styles (mean, median, SD, skewness) and Cronbach α as indicator of internal consistency.

Table 29 Descriptive statistics of decision-making styles

	mean	median	SD	skewness	CA
rational	18.52	19.00	3.15	–.625	0.82
intuitive	18.19	19.00	3.06	–.830	0.81
dependent	17.58	18.00	3.40	–.619	0.82
avoidant	13.22	13.00	4.21	.389	0.88
spontaneous	14.18	14.00	3.54	.259	0.80

The means ranged from 13.22 in the spontaneous style to 18.52 to the rational style (possible range is from 5 to 25). The medians were close to the mean values and skewness also indicated the normality of the data that allowed the use of parametric statistics in analysis. All Cronbach alphas were high and almost identical from .80 in the spontaneous style to the .88 in the avoidant style.

As previous studies have shown that decision-making styles are not independent constructs, the correlations between them were also inspected. Slight or medium relationships were found in most pairs of decision-making styles. The rational style had significant correlations with all other styles – positive correlations with the intuitive and dependent style, negative ones with the avoidant and spontaneous style (the strongest relationship). The intuitive style was also positively related to the dependent and spontaneous style. Only the relationships between the intuitive and avoidant style and between the dependent and spontaneous style were not significant.

Table 30 Correlations between decision-making styles

	intuitive	dependent	avoidant	spontaneous
rational	.22**	.31***	-.24***	-.43***
intuitive		.24***	-.04	.26***
dependent			.27***	.09
avoidant				.36***

**p < 0.01, ***p < 0.001

Decision-making styles and risk behavior

The relationships between decision-making styles and risk behavior were inspected in the next step of analysis. Five types of risk behavior were selected – alcohol use, cigarette smoking, risk sex behavior, junk food consumption and pathological internet use. As their measures differ substantially, risk behavior indicators could be answers to one question (smoking in the last 30 days, number of sexual partners) or total scores and scores in subscales (alcohol use, problematic internet use).

Alcohol use

212 participants provided data about alcohol use in AUDIT and they were included in the investigation of the association between decision-making styles and alcohol use. As distributions were highly positively skewed, the respondents were divided into two groups in all four variables – three subscales (consumption, dependence, alcohol-related problems) and the total score. This division of subjects was done according to AUDIT manual or according to the median. A consumption score above 5 may

indicate a risk of alcohol-related harm and 29 subjects (13.7%) were included in this category. For dependence score and alcohol-related problems most subjects had a null score. These subjects were treated as one category and the others as a category with the possibility of risk behavior. 49 subjects (23.1%) were classified in the second category in dependence and 87 (49.0%) in alcohol-related problems. Subjects with a total score over 7 (24.0%) were treated as a risk category in concordance with the AUDIT manual. A more detailed view on the distributions is provided in table 31.

Table 31 AUDIT subscales and total score descriptive statistics

	consumption	dependence	alcohol-related problems	total score
mean	3.00	0.53	1.21	4.74
median	3.00	0.00	0.00	3.00
SD	2.26	1.24	2.12	4.87
skewness	0.94	2.84	2.39	1.78
minimum	0.00	0.00	0.00	0.00
maximum	10.00	7.00	10.00	25.00

Four binary logistic regression models were computed to predict dichotomized AUDIT scores from gender and five decision-making styles. Table 32 provides their basic results.

Table 32 AUDIT binomic regression results

	AU1		AU2		AU3		AUt	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
rational DMS	1.03	.87 – 1.22	.98	.86 – 1.11	1.07	.95 – 1.21	1.05	.91 – 1.20
intuitive DMS	.99	.85 – 1.15	.95	.84 – 1.07	.98	.88 – 1.09	.94	.82 – 1.07
dependent DMS	.91	.79 – 1.04	.97	.86 – 1.09	.95	.86 – 1.05	.93	.83 – 1.05
avoidant DMS	1.13*	1.01 – 1.26	.98	.89 – 1.07	1.02	.94 – 1.10	1.08	.98 – 1.18
spontaneous DMS	1.11	.96 – 1.29	1.15*	1.02 –1.29	1.17**	1.05 – 1.30	1.12	.99 – 1.28
gender	.47	.17 – 1.27	1.14	.44 – 2.91	1.03	.47 – 2.26	.82	.32 - 2.10

*$p < 0.05$, **$p < 0.01$; AU1 ($R^2 = .06$ (Cox&Snell), .11(Nagelkerke). Model $\chi^2(6) = 13,714$, $p < .05$); AU2 ($R^2 = .04$ (Cox&Snell), .07(Nagelkerke). Model $\chi^2(6) = 6,890$, $p > .05$); AU3 ($R^2 = .05$ (Cox&Snell), .07(Nagelkerke). Model $\chi^2(6) = 11,137$, $p > .05$); AUt ($R^2 = .04$ (Cox&Snell), .07(Nagelkerke). Model $\chi^2(6) = 9,328$, $p > .05$)

Decision-making styles are only weak predictors of alcohol use. Only the avoidant style was significant in predicting the consumption score; the spontaneous style was a significant predictor of dependence and alcohol-related problems. In all three cases a higher level of a decision-making style was related to the risky behavior group. The total score was not related to any of the decision-making styles.

Smoking

Only one question was selected as an indicator of tobacco use – "Have you smoked during the past 30 days?" 52.5% of participants had smoked at least one cigarette in the last month. The results of the binary logistic regression for smoking are presented together with risk sex behavior and junk food results in table 33. The results are very similar to the previous ones, when only the spontaneous decision-making style was connected with membership in risk group.

Risk sex behavior

Risk sex behavior was assessed by two questions. The first question asked about the use of a condom during the first sexual intercourse with a new partner. 119 of 130 answers (85%) were positive, so 15% of participants belonged to the risk group. The second question identified the number of sexual partners during the last 12 months. Subjects with more than two sexual partners (8.0%) were treated as the risk group. The results of binary logistic regression are presented together with model for smoking.

While no decision-making style was related to condom use, the dependent style played a significant role in the number of partners during the last year. Risk behavior is related to a higher use of the dependent style.

Junk food

The indicator of risk behavior regarding food was made as a sum of four questions asking about the frequency of eating sweets (chocolate, candies), cakes/cookies, snacks and fast food. Answers were coded from several times a day (1) to never (5), but they were recoded to compute an overall indicator on a scale from zero (never) to four (several times a day) to have higher scores as the higher level of risk behavior.

Table 33 Smoking, risk sex behavior and junk food binomic regression results

	smoking		condom		partners		junk food	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
rational DMS	1.02	.89 – 1.16	.83	.68 – 1.01	1.02	.84 – 1.22	.97	.76 – 1.09
intuitive DMS	.90	.79 – 1.02	1.00	.83 – 1.27	.99	.82 – 1.19	.96	.86 – 1.06
dependent DMS	1.00	.89 – 1.12	1.10	.91 – 1.32	.81*	.68 – 0.97	.98	.89 – 1.09
avoidant DMS	1.00	.91 – 1.10	.89	.76 – 1.05	1.10	.96 – 1.27	.99	.92 – 1.07
spontaneous DMS	1.17*	1.03 – 1.32	1.01	.85 – 1.21	1.16	.96 – 1.39	.97	.88 – 1.08
gender	1.11	.42 – 2.94	.31	.07 – 1.50	.69	.18 – 2.61	1.93	.84 – 4.44

*$p < 0.05$; smoking ($R^2 = .06$ (Cox&Snell), .08(Nagelkerke). Model $\chi^2(6) = 21,139, p < .01$); condom ($R^2 = .05$ (Cox&Snell), .08(Nagelkerke). Model $\chi^2(6) = 5,950, p > .05$); partners ($R^2 = .05$ (Cox&Snell), .12(Nagelkerke). Model $\chi^2(6) = 11,402, p > .05$); junk food ($R^2 = .02$ (Cox&Snell), .03(Nagelkerke). Model $\chi^2(6) = 4,724, p > .05$)

Problematic Internet Use

The General Problematic Internet Use Scale provides results in five subscales and the total score. Five subscales include 1. preference of online social interaction, 2. use of the internet for mood regulation, 3. compulsive use of the internet, 4. cognitive surfeit of Internet use, and 5. negative consequences of internet use. As histograms showed highly positively skewed distributions with most people at the lower ends of the possible continuum, their dichotomization was done according to the median. Table 34 provides descriptive statistics of these variables with the proportion of people over the median. Junk food statistics are also included in table 34.

The next step of the analysis was similar to the alcohol use – six separate binary logistic regression models were computed to assess the role of decision-making styles in problematic internet use subscales and in the total score. People over the median were treated as a higher risk category.

The pattern visible in the binary regression models is quite heterogeneous across the GPIU domains. The higher reported use of the avoidant style was related to a higher risk in three subscales – the preference of online social interaction, cognitive surfeit of Internet use and negative consequences of Internet use.

Table 34. Descriptive statistics of Problematic internet use subscales, its total score and junk food indicator

	preference of online social interaction	use of the internet for mood regulation	compulsive use of the internet	cognitive surfeit of internet use	negative conseq. of internet use	GPIU total score	junk food
mean	7.25	12.61	7.12	7.19	5.80	39.96	6.26
median	6.00	12.00	5.00	6.00	3.00	37.00	6.00
std. deviation	4.53	6.32	5.10	5.11	4.64	19.65	2.06
skewness	1.03	0.14	1.45	1.33	2.24	0.95	0.92
minimum	3.00	3.00	3.00	3.00	3.00	15.00	0.00
maximum	23.00	24.00	24.00	24.00	24.00	103.00	16.00
% over median	45.80	43.40	49.10	40.60	50.00	48.20	40.60

Table 35. PIU binomic regression results

	preference of online social interaction		use of the internet for mood regulation		compulsive use of the internet		cognitive surfeit of Internet use		negative consequences of internet use		PIU total score	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
rational DMS	1.01	.90 – 1.13	.94	.84 – 1.05	1.04	.92 – 1.16	1.04	.93 – 1.17	1.04	.93 – 1.17	.94	.84 – 1.06
intuitive DMS	0.97	.88 – 1.08	1.03	.93 – 1.15	.87*	.78 – 0.97	.89*	.80 – 0.99	.87*	.79 – 0.97	.93	.84 – 1.03
dependent DMS	0.95	.86 – 1.05	1.08	.98 – 1.186	1.03	.94 – 1.14	.99	.90 – 1.10	.98	.88 – 1.08	1.08	.98 – 1.20
avoidant DMS	1.15**	1.06 – 1.25	1.01	.94 – 1.09	1.07	.99 – 1.16	1.12**	1.04 – 1.22	1.08*	1.00 – 1.17	1.07	.99 – 1.15
spontaneous DMS	0.94	.85 – 1.04	.89*	.80 – 0.98	1.05	.95 – 1.16	1.00	.91 – 1.11	1.09	.98 – 1.21	.97	.88 – 1.07
gender	0.91	.42 – 2.01	.78	.36 – 1.68	1.26	.57 - 2.76	.77	.35 – 1.07	.66	.30 – 1.46	.91	.42 – 1.99

*< 0.05, **< 0.01; Preference of online social interaction ($R^2 = .07$(Cox&Snell), 09(Nagelkerke). Model $\chi^2(6) = 15,037$, $p > .05$); Use of the internet for mood regulation ($R^2 = .04$ (Cox&Snell), .05(Nagelkerke). Model $\chi^2(6) = 7,862$, $p > .05$); Compulsive use of the internet ($R^2 = .06$ (Cox&Snell), .08(Nagelkerke). Model $\chi^2(6) = 13,629$, $p < .05$); Cognitive surfeit of Internet use ($R^2 = .08$ (Cox&Snell), .11(Nagelkerke). Model $\chi^2(6) = 17,657$, $p < .01$); Negative consequences of internet use ($R^2 = .08$ (Cox&Snell), .10(Nagelkerke). Model $\chi^2(6) = 16,830$, $p < .05$); PIU total score ($R^2 = .05$ (Cox&Snell), .07(Nagelkerke). Model $\chi^2(6) = 11,411$, $p > .05$)

The opposite is valid for the intuitive style – its more intensive use was connected with a lower risk in compulsive use of the Internet, cognitive surfeit of Internet use, and negative consequences of Internet use. None of the decision-making styles was significant in the total score model.

DISCUSSION

The main aim of this chapter was to investigate the role of decision-making styles in different types of risk behavior. Firstly, the characteristics of decision-making styles in the studied sample have been presented – basic descriptive statistics, inner consistency and correlations among decision-making styles. Most of correlations were significant, that is in concordance with previous studies. It suggests that decision-making styles are not independent and some more robust factors can be found in their background. While it can seem appropriate to shift to the more general two factor model (rational and intuitive mode of information processing), this idea is negated by the results of factor analysis that found the same number of five factors as other studies using the GDMS. The relationships with more general decision-making styles (or cognitive styles) could be useful to assess the appropriateness of the used factor structure. The current study also showed that the GDMS can be a useful measure to assess decision-making styles in the Slovak population.

The role of decision-making styles in various kinds of risk behavior was the center of our interest. Risk behavior included alcohol use, cigarette smoking, risk sexual behavior, junk food consumption and problematic internet use. While the variables were obtained by different means, they were all recoded in order to use the same method in all cases. Each variable in risk behavior was finally treated as a dichotomous variable – the subjects were divided into two groups with a low and high level of risk behavior. The median or the score stated as the border for problematic behavior in the measure description was used as the cut-off between these two groups. In the next step, polynomial binary logistic regression models were used in all cases to assess the role of decision-making styles. Although the position of decision-making styles in regression models as predictors of risk behavior is mainly the matter of this type of statistical analysis, we dare to name decision-making styles as independent variables or maybe even potential causes of risk behavior. This view is supported even by the definition of decision-making styles that are viewed as stable characteristics or habitual patterns. As we

found that some decision-making styles are associated with the mental health (Bavoľár & Orosová, 2015), it was expected to confirm that at least some decision-making styles would be proven as protective or risk factors in relation to risk behavior.

While the most general approaches distinguish the rational and intuitive decision-making styles (or cognitive styles), only the intuitive style from this pair was found to be related to risk behavior. It indicates that this classification can be very general and these broad types of information processing do not manifest directly in real world decision-making outcomes. The present results point to the importance and criterion validity of the three other decision-making styles (dependent, avoidant, spontaneous) that were found to be related to at least one risk behavior indicator. Only the intuitive and avoidant styles were significant predictors of the problematic internet use. While more frequent use of the intuitive style was associated with lower risk of problematic internet use, the avoidant style predicted risk behavior positively.

The results of the logistic regression are relatively consistent in the subscales of the more general constructs (alcohol use, problematic internet use), but substantial differences are visible across the risk behavior types. While no decision-making styles significantly predicted the total AUDIT score, the role of the avoidant and spontaneous styles was significant in two subscales. The avoidant decision-making style was related to a higher level of the consumption score; higher reported use of the spontaneous style was associated with belonging to the dependence and alcohol-related problems risk groups. Smoking and junk food consumption were not associated with any decision-making style and this is also valid for the first of two selected characteristics of risk sexual behavior (use of condom). The lower use of the dependent style was a predictor of the second indicator (number of partners in the last year). The total score in problematic internet use was not associated with any of the decision-making styles, but some subscales were positively predicted by the avoidant style (three of five subscales) and the spontaneous style (one subscale) and negatively by the intuitive decision-making style (three subscales). Three subscales significantly predicted by the intuitive and avoidant styles are the same – compulsive use of the internet, cognitive surfeit of internet use and negative consequences of internet use.

So what are the main messages of the results and how can the role of particular decision-making styles be generalized and interpreted? No style is related to all of the investigated types of risk behavior, but certain conclusions are possible. Firstly, decision-making styles can be classified as (partly) protective or risk factors with the intuitive style belonging to the former group and the avoidant and spontaneous style to the latter group. The other two styles – the rational and dependent one – seem to be unrelated to risk behavior. This is in concordance with previously reported results about the role of decision-making styles in mental health. The positive scores in three indicators of mental health – subjective well-being, stress and depression – were associated with a higher use of the intuitive style and with a lower score in the avoidant style (Bavoľár & Orosová, 2015).

The intuitive style can be described by attention to details and a tendency to rely on feeling rather than rational judgment. Its more frequent use was related to the lower level of risk behavior in the three subscales of problematic internet use but it was not associated with any other type of risk behavior. It suggests that the intuitive mode of information processing plays a more important role in an environment with a lot of information missing. But it is in some way a paradox that irrational thoughts decrease the use of internet. It is possible that online space can activate a higher need to rely not only on rational thought, but also on feelings without a direct source. As the intuitive style was not significant in any other type of risk behavior, it can be deduced that these types are inherently different in their basis.

The avoidant style was found to be a risk factor in almost the same three subscales of problematic internet use where the intuitive style was a protective factor as well as in the consumption subscale of alcohol use. As some decisions are not avoidable, an effort to avoid those means that they are only postponed or the less advantageous option is chosen.

As the decision-making styles identified by Mann et al. (1997) are classified as adaptive (vigilance) and maladaptive (hypervigilance, buck-passing and procrastination), a similar distinction can be made according to the present results. As the theoretical expectations could place the rational and intuitive style into the adaptive group, only the position of the latter style was confirmed by the results. It is in accordance with previously found associations of mental health indicators only with the

intuitive style and not with the rational one. The maladaptive group can include the other three decision-making styles – the dependent, avoidant and spontaneous style, but their position is not definite. These styles are associated with a higher level of risk behavior, but only more frequent reported use of the avoidant style was also associated with poorer mental health.

FUTURE RESEARCH

The role of decision-making styles seems to be only limited and heterogeneous across different types of risk behavior, but the provided view is very simple. Only decision-making styles (controlling for gender) were included as possible predictors of risk behavior. The inclusion of other variables can provide a different view with possible interactions, mediations and moderations. Interactions with known correlates of risk behavior (self-regulation, social characteristics, personality factors) can change the found relations.

As the research was conducted in a university sample with a majority of women, its results may be biased. Firstly, it should be extended to universities or fields of study with a higher proportion of men. While gender was not significant in any logistic regression model, a more balanced gender distribution can change it (gender differences in risk behavior are often reported). The next step for the greater generalization of the results can be directed to verifying it on non-university samples. Do decision-making styles play a similar role among non-students or among older people? Changes of decision-making characteristics during the lifespan are one of main objects of interest in present individual differences approach in judgment and decision making. Given that risk behavior changes with age, different correlates and causal factors may increase or decrease in importance.

LIMITATIONS

One of the limitations of the present research is the method of data collection. As most participants completed the measures via the internet and only self-reported data were available, the discrepancy between reported and real behavior is possible, although the reasons for it are supposed to be different. Some kinds of risk behavior are difficult to recall (e.g. frequency of alcohol use during a time period) or in some cases the social desirability can play an important role (Brener, Billy, Grady, 2003). Some risk behaviors are very sensitive to report or subjects can purposely underestimate or overestimate the frequency of their occurrence according to the perceived expectations. While

the latter argument does not apply to the decision-making styles, the former does. The measure asked about frequent behavior in past decision-making situations, but people`s perceptions can be confused and their ability to recall is questionable.

The next limitation is the possibility to generalize the present findings and lies in the sample characteristics resulting from the data collection. Internet based measures can attract only a certain group of participants who differ in studied variables from those not participating. The levels of risk behavior and preferences of decision-making styles could be different in students not participating in the SLiCE study. This initial limitation could even increase in importance in the second round. As the subjects from the first round were asked again, those with different risk behavior characteristics could not respond to the repeated request.

Another problem can arise from gender distribution. More than 80% of participants were females. This proportion is characteristic for universities with humanities and social field of study, but not for a whole population of university students so the results are not broadly generalizable. In spite of this, the study gives an insight into the role of decision-making styles in different types of risk behavior and its results can be a starting point for more specific research plans taking into consideration the interaction with other factors.

IMPLICATIONS FOR PRACTICE

One of the main contributions of the present research is the presentation of a relative unknown method for evaluating decision-making styles. Although it is a self-reported measure, the consistency of its results across different cultures demonstrates its usefulness. The GDMS can be used to identify decision-making styles of adults. As the study found a significant role of some decision-making styles in risk behavior, their identification can serve as a signal of possible problems in the future. While the rational, intuitive and dependent styles are not related to risk behavior, some connections with it were found by the avoidant and spontaneous style. Their higher values can indicate a higher tendency towards risk behavior.

CONCLUSIONS

Despite the mentioned limitations, the present study contributes to the knowledge on the role of decision-making styles on university students risk behavior. While this role is very limited and heterogeneous, some conclusions can be made. Rational, intuitive and dependent styles are associated with different types

of risk behavior only weakly or not at all. The avoidant and spontaneous style are stronger predictors of risk behavior, when their higher values are related to a higher probability of risk behavior occurrence. The present results show the importance of decision making (or broadly cognitive) characteristics as possible risk behavior predictors.

2nd part

Psychological aspects of health-risk behaviors of university students
in the Student Life Cohort in Europe study

Descriptive normative beliefs
and changes in risk behavior

INTRODUCTION   Descriptive normative beliefs represent one of the existing types of normative beliefs defined within the Norm Focus theory (Cialdini, 2007) and refer to individual's perception of the prevalence of a given behavior within a specific population (Dams-O'Connor, 2007; Rimal & Real, 2003; Neighbors at al., 2006). They are based largely on observations of how much or how often people in a given context engage in a particular behavior (Neighbors at al., 2006; Neighbors et al., 2007). In majority of studies, descriptive normative beliefs are perceived to be more important than injunctive normative beliefs and are often used in research as well as in prevention and intervention programs (e.g. Elek, Miller-Day, & Hecht, 2006; Lojewski, Rotunda, & Arruda, 2010; Corbin, Iwamoto, & Fromme, 2011; Dams-O'Connor, 2007; Barriger & Vélez-Blasini, 2013). In this chapter, the main focus will be on descriptive normative beliefs as the key factor of risk behavior among university students.

Literature addressing descriptive normative beliefs emphasizes the importance of studying their relationship with regard to actual societal norms and individual's behavior in society. This relationship is based on the differences represented by either underestimation or overestimation of the frequency of a particular behavior of others. This further affects individual's behavior due to its social impact when an individual strives to accommodate his/her behavior to his/her own perception (Berkowitz, 2004). This claim has been supported by other studies which found a positive relationship between descriptive normative beliefs and various types of risk behavior, e.g. smoking (Conrad, Flay, & Hill, 1992; Maziak et al., 2004), alcohol use (Stone et al., 2012; Lewis & Paladino, 2008), drug use (Kilmer et al., 2006; Conner, Sherlock, & Orbell, 1998), sexual risk behavior (Liu & Flay, 2009; Baumgartner, Valkenburg, & Peter, 2011), or problematic internet use (indirect e.g. Anderson, 2005). In general, university students have been shown to have normative beliefs based on a higher prevalence of risk behavior among their peers than it actually is (Lojewski, Rotunda, & Arrada, 2010; Abar & Maggs, 2010; Moreira, Smith, & Foxcroft, 2010) which subsequently leads

to their higher involvement in risk behavior (Borsari & Carey, 2003; Berkowitz, 2004; French & Cooke, 2012; Stone et al, 2012; Zimmermann & Sieverding, 2010). Based on the research which has provided empirical support for this relationship many intervention and prevention programs have been developed using the concept of descriptive normative beliefs as an important factor in decreasing the risk behavior.

Intervention and prevention programs based on modification of descriptive normative beliefs have become a popular approach especially at universities (Dams-O'Connor, 2007). The aim of these programs is to decrease the occurrence of different types of risk behavior. There are two main types of interventions – social marketing and personalized normative feedback (Lewis & Neighboors, 2006; Berkowitz, 2004). The goal of social marketing is to provide information about the actual frequency of a given type of risk behavior and norms of reference group to individual through posters, advertisements and by email. The personalized normative feedback provides a message with the aim to modify descriptive normative beliefs with the expected reduction of risk behavior using three types of information regarding: (1) individual's risk behavior; (2) descriptive normative beliefs about peer's risk behavior; (3) and the actual prevalence of risk behavior among university students (Lewis & Neighboors, 2006; Lojewski, Rotunda, & Arruda, 2010).

Effectiveness of these prevention and intervention programs has been explored in numerous research studies but findings concerning efficacy evaluation are inconsistent (Dams-O'Connor, 2007). Some studies have shown that social marketing and personalized normative feedback are effective (Dams-O'Connor, 2007; Berkowitz, 2004; Sanderson, 2012) and that they are associated with (and more realistic) descriptive normative beliefs about a lower frequency of risk behavior and subsequently a lower occurrence of risk behavior (e.g. Gomberg, Schneider, & DeJong, 2001; Collins, Carey, & Sliwinski, 2002) and the promotion of healthy behavior (Hoover, 2005). Lewis and Neighboors (2006) have found that these programs are effective only among participants with specific characteristics (e.g. for alcohol use only among participants who drink for social reasons and not for coping reason). On the other hand, there are also studies, which have not found differences between control and experimental group in these intervention and prevention programs and claim that these programs are simply not effective

(Werch et al., 2000; Baer & Carney, 1993; Wechsler et al., 2003).

In this theoretical introduction descriptive normative beliefs have been defined and their associations with different risk behaviors have been outlined. Furthermore, application of descriptive normative beliefs in intervention and prevention programs has been discussed. Next part of this this chapter will be devoted to descriptive normative beliefs and their relation to the most common types of risk behavior among university students which consist of: smoking (EMCDDA, 2008; Currie et al., 2004), alcohol use (Stone et al., 2012; Menagi, Harrell, & June, 2008), drug use, especially marijuana use (Nešpor & Csémy, 1999), sexual risky behavior (Berhan & Berhan, 2015; Yi et al., 2010) and problematic internet use (Caplan, 2010; Young, 1998). In this chapter, the findings from the research focused on exploring changes in descriptive normative beliefs over time in relation to the subsequent occurrence of different risk behaviors among university students from 5 European countries will be presented. In addition, based on these findings an online application has been developed for the Slovak university students at PJ Šafárik university in Košice with the aim of modifying their descriptive normative beliefs which had been assumed to result in a change in risk behavior. This online application consists of three steps for each risk behavior: (1) evaluates the frequency of different risk behaviors of students; (2) calculates descriptive normative beliefs about risk behavior of typical student; (3) provides information about the actual prevalence of risk behavior among university students by means of a short paragraph and graphically. Feedback concerning the actual prevalence of risk behavior among university students was calculated and this calculation was based on statistical analyses of the SLiCE study data. Finally, in this chapter presents the key findings from the data obtained by using the mentioned online application.

AIMS

The main aim was to explore the importance of descriptive normative beliefs and their change in the context of different risk behaviors.

The first aim was to explore whether changes in different risk behaviors and changes in descriptive normative beliefs concerning different risk behaviors of a typical student occur over time; and whether these changes in descriptive normative beliefs are related to the subsequent occurrence of different risk behaviors in a large sample of university students from

5 European countries longitudinally.

The second aim was to explore the data from the first wave of data collected by the developed online application which was created with the assumption that an appropriate feedback may change descriptive normative beliefs in the sample of university students at the PJ Šafárik University in Košice as well as to show that this online application may be a useful prevention tool. Thus, the aim was to explore the associations between individual risk behavior and corresponding descriptive normative beliefs regarding risk behavior of a typical student; analyze the associations between individual risk behaviors (the cumulating effect of risk behavior) and between individual descriptive normative beliefs about risk behavior of a typical student (the tendency to overestimate the frequency regardless the type of risk behavior).

SAMPLE

Two samples have been used and together amounted to a total of 2284 university students (70.55% females).

In the first analysis the data from the 1st, 2nd and 3rd wave (collected annually) of the Student Life Cohort in Europe (SLiCE) a multinational longitudinal study among first year university students from five European countries (Slovakia, Lithuania, Hungary, Czech Republic, and Germany) were used. The data were collected online from 2981 university students (71.6% females; Mage=20.63; SD=2.59) at baseline (T1, in 2011); 1041 university students (75.4% females; Mage=21.90; SD=2.46) at T2; and 534 university students (75.7% females; Mage=22.85; SD=2.44) at T3. At each participating university, students were asked to complete self-administered online questionnaires. Strategies of respondents' recruitment differed per university (country) due to legal and organizational differences in each participating country. Some universities provided access to e-mails of all enrolled students. However, in general the SLiCE project was introduced to students during regular lectures and seminars and then were invited to participate in the survey by an invitation email which was send to their email addresses. Additional means of informing students about the study were university newsletters and other formal and informal channels. When they chose to participated they were required to register on the official website of the study (www.slice-study.eu) and completed the form. Student participation in the study was voluntary and anonymous. Students were informed that by

completing the questionnaire they provide their informed consent to participate. They were also informed that they could terminate their participation at any point while completing the questionnaire. No incentives were provided. The permission to conduct the study was granted by the appropriate ethical committees of participating institutions. After receiving the invitation e-mail and registration, students completed the online questionnaire covering a range of questions about students' health behavior. The online questionnaire was prepared by the research team and the following steps were used. Firstly, selected measures and questionnaires were compiled in their original version (English language) and then translated into local languages of the participating countries using two independent forward translations for each language. The research team reviewed any cases of disagreement and the authors familiar with the respective languages (native speakers of the language of the translation) made the decision about the final wording of the items.

The second analysis was based on the data from the 1st wave of data collection by the developed online application administered to Slovak university students at PJ Šafárik University in Košice, which was created with the aim to change descriptive normative beliefs to correspond with the actual prevalence. The data were collected online from September 2013 to January 2014 from 403 university students (69.5% females) from PJ Šafárik University. Students were asked to complete online questionnaires and informed about the possibility to try the online application and to compare themselves with other students at their university. This information was provided through the Student Information System and the university webpage which contained an interactive link to the online questionnaire. This application was also introduced to students during regular lectures and seminars. Within this application the respondents were asked enter their personal email addresses at the end of questionnaire. These email addresses were then used for the second data collection (T2). Student participation in the study was voluntary and anonymous. Students were informed that by completing the questionnaire they provide their informed consent to participate. They were also informed that they could terminate the participation at any point while completing the questionnaire. No incentives were provided.

MEASURES   The first questionnaire, which was the part of the SLiCE study a multinational longitudinal study among first year university students from five European countries, included items (T1, T2 & T3) regarding:

Sociodemographic variables (gender, age and country).

Problematic internet use, which was measured by the 15-item scale GPIU2 (Generalized Problematic Internet Use Scale 2) (Caplan, 2010). Within this scale the respondents express the degree of agreement with individual items (e.g. „I prefer online social interaction over face-to-face communication.") on a 8-point scale from „totally disagree" to „totally agree" and individual items are summed to provide a total score. A higher score means more problematic internet use. Cronbach's alpha was 0.91 at T1 and T2; 0.90 at T3.

Alcohol use, which was measured by the 3-item of the AUDIT-C (The Revised Alcohol Use Disorders Identification Test Consumption) (Babor et al., 2001). This measure is a screening test for early detection of risky drinking (e.g. "How often do you have a drink containing alcohol?"). The AUDIT-C uses a 5-point scale and individual items are summed to provide a total score. A higher score means more risky alcohol use. Cronbach's alpha was 0.71 at T1, T2 and also at T3.

Smoking, which was measured by the item: „During the past 30 days (one month), on how many days did you smoke cigarettes?" Respondents answered this item on a 7-point scale from 0 days to all 30 days.

Marihuana use, which was measured by the following item: „How often in the last month have you used marihuana?" The item was answered on a 7-point scale from never to every day.

Sexual risk behavior, which was measured by the item: „Do you use a condom when you have a sexual intercourse with a new partner for the first time?" Respondents answered this question on a 3-point scale (always – sometimes – never).

Descriptive normative beliefs about risk behaviors of a typical student were measured by items formulated consistently with the items of AUDIT-C, items concerning smoking, marihuana use and sexual risk behavior e.g. „How often do you think a typical student at your university has a drink containing alcohol?" or „Do you think that a typical student uses a condom when she/he

have a sexual intercourse with a new partner for the first time?". These items were answered on the same scale as the original items measuring respective risk behaviors. Single item measures were used in the data analyses except for the descriptive normative beliefs regarding students' typical alcohol use. In this case a total score was used (Cronbach's alpha was 0.60 at T1; 0.48 at T2 and 0.56 at T3).

Only Slovak students were asked regarding their *internet use* and only at T3. It was measured by the item: "How many hours do you spend by the using the internet for leisure activities (chat, music, plays, social network etc.)?" Respondents answered this item on a 5-point scale from "1-hour" to "5 and more hours".

Similarly, only Slovak students (at T3) were asked regarding their *descriptive normative beliefs about internet use* of a typical student. This item was formulated consistently with the item about internet use: "What do you think, how many hours does a typical student spend by the using the internet for leisure activities (chat, music, plays, social network etc.)?" Respondents answered this item on a 5-point scale from "1-hour" to "5 and more hours".

The second online questionnaire, which was a part of the online application and was developed within the SLiCE study, measured sociodemographic variables, the occurrence of different risk behaviors and descriptive normative beliefs about different risk behaviors of typical students of university. Four different risk behaviors were measured:

Alcohol use – the frequency of alcohol use ("How often do you have a drink containing alcohol?") was measured with the answers from "never" to "four times or more per week" and the frequency of drinking 6 or more drinks on one occasion with the answers from "never" to "daily or almost daily". Both questions are from the AUDIT questionnaire (Babor et al., 2001).

S*moking of cigarettes* was measured by an item concerning the number of days (during the past 30 days), when the respondents smoked cigarettes assessed on a scale from "0 days" to "every day during the last 30 days".

Marihuana use was measured by a frequency of marihuana use during the last month from "never" to "every day".

Internet use was measured by an item concerning the number of hours (per day), when the respondents use internet for leisure

activities (chat, music, games, social network etc.) assessed on a scale from "one hour" to "five and more hours".

Further, *descriptive normative beliefs* about risk behavior of typical student (male/female according the gender of respondent) were measured. Items were created consistently with the above mentioned items measuring different risk behaviors in the relation to risk behavior of a typical student e.g. "How often do you think a typical student at your university has a drink containing alcohol?". Other items were transformed in the same way and were evaluated on the same scales such as items measuring different risk behaviors.

The SLiCE study data

STATISTICAL ANALYSES

Changes in measured variables over time were analyzed by ANOVA for repeated measures and Friedman test in SPSS 21. Next, the contribution of the changes in descriptive normative beliefs and subsequent occurrence of risk behaviors was analyzed by a series of binary logistic regressions. Two models were tested for each risk behavior. The first model included respective risk behaviors at T2 (dichotomized variable) as dependent variables. These dependent variables divided respondents into two groups. The first group always included respondents who (1) never drink alcohol, (2) smoked cigarettes 0 days during the last 30 days, (3) never used marihuana, (4) always use a condom when have sexual intercourse with a new partner and the second group included all other respondents. Independent variables were the changes in descriptive normative beliefs (T2-T1). Control variables were gender, country and risk behavior at T1.

The second model included respective risk behaviors at T3 (dichotomized variable) as the dependent variable, which also consisted of 2 groups as in the first model. Independent variables were changes in descriptive normative beliefs (T3-T2). Control variables were gender, country and risk behaviors at T2.

In addition, the contribution of the descriptive normative beliefs concerning internet use of a typical student to the problematic internet use among Slovak university students use was analyzed by linear regression. The dependent variable was the problematic internet use at T3, independent variable were the descriptive normative beliefs concerning internet use of typical student at T3 and control variable was gender.

Overall, the majority of the variables were measured by 1 item (smoking, marihuana use, sexual risk behavior and respective items measured descriptive normative beliefs) or the total score of dependent variable was not normally distributed (alcohol use and respective descriptive normative beliefs), therefore nonparametric statistical analyses were used. All required assumptions were checked prior to conducting individual statistical analyses.

The data from the online application

Kendal correlation coefficients in SPSS 21 were used to investigate the associations between measured variables.

RESULTS

Descriptive normative beliefs and risk behavior – changes over time

The first aim of the chapter was to explore whether the changes in different risk behaviors and in descriptive normative beliefs concerning different risk behaviors of typical student occur over time; and whether these changes in descriptive normative beliefs contribute to the subsequent occurrence of different risk behaviors while controlling for gender and country in the large sample of university students from 5 European countries studied within a longitudinal design.

In particular, it was tested whether the changes in risk behaviors and corresponding descriptive normative beliefs occurred over time (Table 36). The significant changes were observed in: (1) alcohol use between T1 and T3 (increase); (2) descriptive normative beliefs about smoking of a typical student between T1 and T2 (decrease), T1 and T3 (increase); (3) descriptive normative beliefs about sexual risk behavior between T1 and T2 (decrease), T1 and T3 (decrease). Changes over time occurred only in some variables but the more important question is whether these changes in descriptive normative beliefs contribute to the level of risk behavior at the following measurement.

Binary logistic regressions were performed to assess whether the changes in descriptive normative beliefs contribute to the level of corresponding risk behaviors at the following measurement point. Each risk behavior is described individually.

Table 36 The changes over time

	χ2	df	p	T1 mean rank	Me	T2 mean rank	Me	T3 mean rank	Me
AU	9.46	2	.009	1.90	3.00	2.7	3.00	2.4	3.00
DNB about AU	3.46	2	.177	1.95	6.00	2.6	6.00	1.99	6.00
SM	5.43	2	.066	1.96	1.00	1.98	1.00	2.6	1.00
DNB about SM	24.93	2	<.001	1.90	5.00	1.89	4.00	2.21	4.00
MU	.81	2	.669	2.00	1.00	2.1	1.00	1.99	1.00
DNB about MU	1.29	2	.524	1.97	2.00	2.1	2.00	2.2	2.00
SRB	2.99	2	.225	1.89	1.00	2.6	2.00	2.5	2.00
DNB about SRB	21.5	2	<.001	2.7	1.00	2.3	2.00	1.91	2.00
	F	df	p	M		M		M	
PIU	.44	2	.642	38.03	–	38.88	–	38.46	–
DNB about IU	it was measured only at T3							3.43	3.00

Note: AU = alcohol use; SM = smoking; MU = marihuana use; SRB = sexual risk behavior; DNB = descriptive normative beliefs; significant changes between individual times: AU: T1/T2- p=.118; T1/T3-p=.020; T2/T3-p=.763; DNB about SM: T1/T2- p<.001; T1/T3-p<.001; T2/T3-p=.885; DNB about SRB: T1/T2- p<.001; T1/T3-p<.001; T2/T3-p=.092

Alcohol use

The first regression model was statistically significant $\chi^2(7)= 402.48$, p<.001, indicating that the model was able to distinguish between respondents who reported and did not report alcohol use at T2. The model as a whole explained between 39.8 (Cox& Snell R square) and 53.2% (Nagelkerke R square) of the variance in alcohol use at T2, and correctly classified 79.9% of cases. As shown in Table 37, the change in descriptive normative beliefs made a unique statistically significant contribution to the model, recording an odd ratio of 1.26. This indicated that respondents with a higher increase of descriptive normative beliefs were 1.26 times more likely to report alcohol use than those with a lower increase of descriptive normative beliefs, controlling for all other factors (gender, country, alcohol use at T1) in the model.

Table 37 The regression model of alcohol use

dependent variable	independent variables	B	S.E.	Wald	df	p	OR	95.0% C. I.	
alcohol use at T2	gender	.28	.24	1.36	1	.244	1.32	.83	2.9
country*	Slovakia	-.18	.28	.39	1	.531	.84	.48	1.46
	Hungary	-.24	.30	.64	1	.423	.79	.43	1.42
	Czech republic	-.50	.29	3.3	1	.082	.61	.35	1.7
	Germany	.05	.30	.03	1	.863	1.5	.59	1.87
	AU at T1	1.5	.08	196.7	1	<.001	2.85	2.46	3.30
	change of DNB (T2-T1)	.23	.06	18.8	1	<.001	1.26	1.13	1.41
alcohol use at T3	gender	-.45	.33	1.91	1	.167	.64	.34	1.21
country*	Slovakia	.48	.45	1.14	1	.286	1.62	.67	3.93
	Hungary	.09	.43	.04	1	.833	1.10	.47	2.56
	Czech republic	.28	.41	.48	1	.490	1.33	.59	2.97
	Germany	.41	.41	.97	1	.326	1.50	.69	3.38
	AU at T2	1.30	.13	101.79	1	<.001	3.66	2.84	4.71
	change of DNB (T3-T2)	.20	.08	5.69	1	.017	1.22	1.4	1.43

Note: AU = alcohol use; DNB = descriptive normative beliefs;
* reference group: Lithuania

The second regression model was also statistically significant $\chi^2(7)=261.71$, p<.001, indicating that the model was able to distinguish between respondents who reported and did not report alcohol use at T3. The model as a whole explained between 45.4 (Cox& Snell R square) and 60.8% (Nagelkerke R square) of the variance in alcohol use at T3, and correctly classified 81.5% of cases. As shown in Table 37, the change in descriptive normative beliefs made a unique statistically significant contribution to the model, recording an odd ratio of 1.22. This indicated that respondents with a higher increase of descriptive normative beliefs were 1.22 times more likely to report alcohol use than those with a lower increase of descriptive normative beliefs, controlling for all other factors (gender, country, alcohol use at T2) in the model.

Smoking

The first regression model was statistically significant $\chi^2(6)=136.34$, p<.001, indicating that the model was able to distinguish between respondents who reported and did not report smoking at T2. The model as a whole explained between 29.1 (Cox & Snell R square) and 40.4% (Nagelkerke R square) of the variance in smoking status at T2, and correctly classified 79.6% of cases. As shown in Table 38, the change in descriptive normative beliefs did not contribute to the model.

The second model was also statistically significant $\chi^2(6)=77.63$, p<.001, indicating that the model was able to distinguish between respondents who reported and did not report smoking at T3. The model as a whole explained between 35.2 (Cox & Snell R square) and 48.4% (Nagelkerke R square) of the variance in smoking status at T3, and correctly classified 82.7% of cases. As shown in Table 38, the change in descriptive normative beliefs did not contribute to the model.

Marihuana use

The first regression model was statistically significan $\chi^2(7)= 167.95$, p<.001, indicating that the model was able to distinguish between respondents who reported and did not report marihuana use at T2. The model as a whole explained between 17.0 (Cox & Snell R square) and 34.2% (Nagelkerke R square) of the variance in marihuana use at T2, and correctly classified 91.3% of cases.

Table 38 The regression model of smoking

dependent variable	independent variables	B	S.E.	Wald	df	p	Odds Ratio	95% CI	
smoking at T2	gender	.06	.32	.04	1	.847	1.6	.57	1.97
country*	Slovakia	.66	2.22	.09	1	.768	1.93	.03	149.38
	Hungary	.56	2.22	.06	1	.800	1.75	.02	135.63
	Czech republic	.22	2.22	.01	1	.921	1.25	.02	97.09
	Germany	it was not measured							
	SM at T1	.71	.08	79.99	1	<.001	2.2	1.7	2.36
	change of DNB (T2-T1)	-.12	.09	1.88	1	.170	.88	.74	1.5
smoking at T3	gender	-.06	.48	.02	1	.899	.94	.37	2.40
country*	Slovakia	19.84	40193.33	<.001	1	1.00	4.143E8	<.001	-
	Hungary	19.64	40193.33	<.001	1	1.00	3.406E8	<.001	-
	Czech republic	19.27	40193.33	<.001	1	1.00	2.329E8	<.001	-
	Germany	it was not measured							
	SM at T2	1.1	.18	33.25	1	<.001	2.74	1.95	3.87
	change of DNB (T3-T2)	.17	.16	1.11	1	.292	1.18	.87	1.62

Note: SM = smoking; DNB = descriptive normative beliefs;
* reference group: Lithuania

As shown in Table 39, the change in descriptive normative beliefs made a unique statistically significant contribution to the model, recording an odd ratio of 1.43. This indicated that respondents with a higher increase of descriptive normative beliefs were 1.43 times more likely to report marihuana use than those with lower increase of descriptive normative beliefs, controlling for all other factors (gender, country, marihuana use at T1) in the model.

The second regression model was also statistically significant $\chi^2(7)=92.76$, p<.001, indicating that the model was able to distinguish between respondents who reported and did not report marihuana use at T3. The model as a whole explained between 17.0 (Cox & Snell R square) and 38.2% (Nagelkerke R square) of the variance in marihuana use status at T3, and correctly classified 93.2% of cases. As shown in Table 39, the change in descriptive normative beliefs did not contribute to the model.

Sexual risk behavior

The first regression model was statistically significant $\chi^2(7)=182.09$, p<.001, indicating that the model was able to distinguish between respondents who reported and did not report sexual risk behavior at T2. The model as a whole explained between 29.0 (Cox & Snell R square) and 40.6% (Nagelkerke R square) of the variance in sexual risk behavior status at T2, and correctly classified 81.4% of cases. As shown in Table 40, the change in descriptive normative beliefs made a unique statistically significant contribution to the model, recording an odd ratio of 1.97. This indicated that respondents with a higher increase of descriptive normative beliefs were 1.97 times more likely to report sexual risk behavior than those with a lower increase of descriptive normative beliefs, controlling for all other factors (gender, country, sexual risk behavior at T1) in the model.

The second regression model was not statistically significant $\chi^2(7)=3.31$, p=.855, indicating that the model was not able to distinguish between respondents who reported and did not report sexual risk behavior at T3.

Table 39 The regression model of marihuana use

dependent variable	independent variables	B	S.E.	Wald	df	p	OR	95.0% C. I.	
marihuana use at T2	gender	-.51	.28	3.45	1	.063	.60	.35	1.3
country*	Slovakia	.29	.42	.48	1	.490	1.33	.59	3.1
	Hungary	.29	.42	.46	1	.500	1.33	.58	3.5
	Czech republic	.39	.41	.93	1	.335	1.48	.67	3.28
	Germany	.04	.46	.01	1	.926	1.4	.43	2.55
	MU at T1	2.20	.25	78.45	1	<.001	9.4	5.55	14.72
	change of DNB (T2-T1)	.36	.13	8.4	1	.005	1.43	1.12	1.84
marihuana use at T3	gender	-1.05	.40	6.87	1	.009	.35	.16	.77
country*	Slovakia	-.10	.65	.02	1	.877	.90	.25	3.26
	Hungary	.02	.59	.01	1	.978	1.2	.32	3.24
	Czech republic	.20	.56	.13	1	.715	1.23	.41	3.64
	Germany	-.38	.67	.31	1	.578	.69	.18	2.57
	MU at T2	1.68	.27	39.79	1	<.001	5.35	3.18	9.1
	change of DNB (T3-T2)	.25	.20	1.53	1	.217	1.28	.87	1.91

Note: MU = marihuana use; DNB = descriptive normative beliefs;
* reference group: Lithuania

Table 40 The regression model of sexual risk behavior

dependent variable	independent variables	B	S.E.	Wald	df	p	OR	95.0% C. I.	
sexual risk behavior at T2	gender	.19	.28	.44	1	.508	1.21	.69	2.10
country*	Slovakia	.11	.39	.08	1	.774	1.12	.53	2.37
	Hungary	-.57	.40	2.1	1	.156	.57	.26	1.24
	Czech republic	.40	.36	1.21	1	.272	1.49	.73	1.3
	Germany	.18	.39	.21	1	.650	1.19	.56	2.57
	SRB at T1	2.29	.22	112.74	1	<.001	9.85	6.46	15.2
	change of DNB (T2-T1)	.68	.23	8.58	1	.003	1.97	1.25	3.10

Note: SRB = sexual risk behavior; DNB = descriptive normative beliefs;
* reference group: Lithuania

Problematic internet use

Although, problematic internet use was measured at all times and in all of the countries, the descriptive normative beliefs about internet use (but not about problematic internet use) were measured only among Slovak university students at T3. Therefore, only the following analysis was performed to investigate whether descriptive normative beliefs about internet use of a typical student contribute to: (a) the problematic internet use at T3 with the control of gender and problematic internet use at T2 (linear regression); and (b) the internet use (the number of spending hours on the internet) at T3 while controlling for gender (binary logistic regression).

A linear model was used in order to explore the contribution of descriptive normative beliefs about internet use of a typical student with regard to the level of problematic internet use at T3. This model was statistically significant (ESS=835.07; df=3; F=14.71; p<.001) and explained 34.7% of the variance in problematic internet use at T3. The model showed that (Table 41) descriptive normative beliefs about internet use of a typical student did not significantly contribute to problematic internet use.

Table 41 The linear model explaining problematic internet use

dependent variable	independent variables	B	SE	β	t	p
PIU at T3	gender	-.44	3.58	-.01	-.12	.903
	PIU at T2	.53	.09	.55	6.10	<.001
	DNB about IU	-2.68	1.67	-.15	-1.61	.111

Note: PIU = problematic internet use; DNB = descriptive normative beliefs; IU = internet use

Regression model was used to assess the contribution of descriptive normative beliefs about internet use of a typical student with regard to personal internet use at T3. The regression model was statistically significant $\chi^2(2)= 21.09$, p<.001, indicating that the model was able to distinguish between respondents who reported and did not report frequent internet use at T3. The model as a whole explained between 20.7 (Cox & Snell R square) and 27.6% (Nagelkerke R square) of the variance in internet use status at T3, and correctly classified 71.4% of cases. As shown in Table 42, the descriptive normative beliefs made a unique and

statistically significant contribution to the model, recording an odd ratio of 3.04. This indicated that respondents with a higher descriptive normative beliefs were 3 times more likely to report frequent internet use than those with lower descriptive normative beliefs, while controlling for gender in the model.

Table 42 The regression model of the internet use

dependent variable	independent variables	B	S.E.	Wald	df	p	OR	95.0% C. I.	
IU at T3	gender	-.41	.66	.39	1	.531	.66	.18	2.41
	DNB regarding IU	1.11	.28	15.46	1	<.001	3.4	1.75	5.30

Note: IU = internet use; DNB = descriptive normative beliefs

In summary, the changes in descriptive normative beliefs contributed to the alcohol use at T2 as well as T3, to marihuana use at T2 and did not contribute to the smoking in any point of measurement. In addition, descriptive normative beliefs contributed to the frequency of internet use (the number of hours), but not to the problematic internet use.

The analyses of the data from the online application

The next aim of the chapter was to explore the data from the first wave of data collection by the developed online application, which was created with the assumption of changing descriptive normative beliefs to correspond with the actual prevalence in university students at PJ Šafárik University in Košice.

Thus, the associations between individual risk behavior and corresponding descriptive normative beliefs about risk behavior of a typical student were explored (Table 43). All individual risk behaviors were significantly positively associated with corresponding descriptive normative beliefs. Descriptive normative beliefs about (1) more frequent alcohol use; (2) more frequent drinking of 6 and more drinks on one occasion; (3) more frequently smoking at least one cigarette per day; (4) more frequent marihuana use; and (5) spending more hours on the internet for leisure activity was associated with individual (1) more frequent alcohol use; (2) more frequently drinking 6 and more drinks; (3) more frequent smoking and (4) marihuana use; and (5) spending more hours on the internet, respectively.

Table 43 Associations between risk behavior and descriptive normative beliefs

	DNB regarding risk behavior of typical student	
	τ	p
alcohol use (frequency)	.184	<.001
alcohol use (6 and more drinks)	.266	<.001
Smoking	.109	.005
marihuana use	.124	.006
internet use	.493	<.001

The association between individual risk behaviors (the cumulating of risk behavior) and between individual descriptive normative beliefs (the tendency of overestimation regardless the type of risk behavior) was also investigate. Each type of risk behavior (substance risk behavior) was significantly positively associated with other risk behaviors, except for internet use (non-substance risk behavior) (Table 44). Thus, when university students were engaged in one type of risk behavior, they were more likely to be engaged in some other risk behavior as well. Similarly, descriptive normative beliefs were significantly positively associated with other descriptive normative beliefs (Table 45). Thus, when university students overestimated one type of risk behavior of typical student, they were more likely to overestimate also other risk behaviors of typical students.

Table 44 The associations between individual risk behaviors

	alcohol use (≥ 6 drinks)		smoking		marihuana use		internet use	
	τ	p	τ	p	τ	p	τ	p
alcohol use (frequency)	.541	<.001	.304	<.001	.165	<.001	.056	.148
alcohol use (≥ 6 drinks)	-	-	.376	<.001	.181	<.001	.048	.225
smoking			-	-	.196	<.001	-.025	.522
marihuana use					-	-	.029	.494

Table 45 The associations between individual descriptive normative beliefs

Descriptive normative beliefs about...	alcohol use (≥ 6 drinks)		smoking		marihuana use		internet use	
	τ	p	τ	P	τ	p	τ	p
alcohol use (frequency)	.459	<.001	.053	.184	.159	<.001	.039	.334
alcohol use (≥ 6 drinks)	-	-	.155	<.001	.282	<.001	.043	.275
smoking			-	-	.173	<.001	.139	<.001
marihuana use					-	-	.139	<.001

DISCUSSION

This chapter is devoted to descriptive normative beliefs and different risk behaviors. The main aim was to explore the importance of descriptive normative beliefs and their change in relation to risk behavior. This main aim consisted of two partial aims, which were achieved within different research samples and analyzed on different datasets. Therefore, the results will be also discussed separately.

The first aim was to explore whether changes in risk behaviors and the corresponding descriptive normative beliefs occurred over time. The results showed that changes over time occurred only in some variables: (1) alcohol use increased between T1 and T3; and there was an increase in descriptive normative beliefs about smoking between T1 and T3; (2) on the other hand descriptive normative beliefs about smoking decreased between T1 and T2; and a decrease in descriptive normative beliefs about sexual risk behavior was observed between T1 and T2 and also between T1 and T3 (decrease). But more importantly the underlying function of these changes was further addressed and it was explored whether these changes in descriptive normative beliefs contribute to the level of risk behavior in the following measurements. It was found that the changes in descriptive normative beliefs contributed to: alcohol use at T2 and also at T3; to marihuana use only at T2; to the sexual risk behavior at T2 and they did not contribute to smoking at any time. Thus, the respondents with a higher increase in descriptive normative beliefs were more likely to report alcohol use at T2 and T3; marihuana use at T2; sexual risk behavior at T2 in comparison to those with a lower increase in descriptive normative beliefs. Due to the fact that descriptive normative beliefs about internet use were measured only among Slovak university students at T3 the were explored in order to assess whether these descriptive

normative beliefs contributed to the problematic internet use or to the frequency of internet use only at T3. It was found that the descriptive normative beliefs about internet use of a typical student did not significantly contribute to problematic internet use but they contributed to the frequency of internet use for leisure. Respondents with a higher descriptive normative beliefs were more likely to report more frequent internet use than those with lower descriptive normative beliefs. These findings correspond with the fact that the descriptive normative beliefs are an important factor with regard to different risk behavior and that they influence its occurrence among university students (e.g. Stone et al., 2012; Kilmer et al., 2006; Baumgartner, Valkenburg, & Peter, 2011), but they were not found to be related to smoking, where was the contribution of the change in descriptive normative beliefs was not found in contrast to other studies (Maziak et al., 2004; Conrad, Flay, & Hill, 1992). However, the findings of this study are limited by the instrument which were used for measuring smoking and consisted only from one item which was asked about the number of days (during the last month) when respondents smoked cigarettes. It is important to focus on a larger variety of aspects and indicators of the smoking.

In general, the research findings showed that normative beliefs and their changes were effective in explaining all researched types of risk behavior (alcohol use, marihuana use, sexual risk behavior, and internet use) except for smoking in different European countries. Therefore, an online application for altering normative beliefs was developed with regard to the above mentioned risk behaviors at the University of PJ Šafárik in Košice. This online application was the basis for addressing of the second aim of this chapter.

The second aim of this chapter was to explore the data from the first wave from the developed online application, which was created with the aim to change normative beliefs to correspond with the actual prevalence of a given risk behavior among university students at PJ Šafárik University in Košice and to show the importance of the developed online application. The significant positive associations between risk behaviors and descriptive normative beliefs were found. Thus respondents who showed a belief about a higher level of risk behavior of a typical students had a higher level of risk behavior themselves. The similar findings were also detected in other studies concerning alcohol use (Stone et al., 2012; Lewis & Paladino, 2008); smoking

(Conrad, Flay, & Hill, 1992; Maziak et al., 2004); drug use (Kilmer et al., 2006; Conner, Sherlock, & Orbell, 1998) or indirectly also internet use (Anderson, 2005). It was also shown for the accumulation of risk behaviors, except for internet use, which represented non-substance risk behavior in comparison to other researched risk behaviors. Thus, when university students were engaged in one type of risk behavior, they were more likely to be engaged in some other risk behavior as well. The accumulation of risk behavior (mainly alcohol use, sexual risk behavior, smoking and drug use) was detected also by other authors (Dams-O'Connor, 2007; EMCDDA, 2008; Fletcher & Skinner, 2006; Sanderson, 2012; Kalina, 2012). Moreover, the tendency of overestimating different risk behaviors in comparison to the prevalence of risk behavior (alcohol use, smoking) was shown. When university students overestimated the frequency of one type of risk behavior of a typical student, they were more likely overestimate also other risk behavior of typical students. Identical findings were observed also in other studies (Abar & Maggs, 2010; Berkowitz, 2004). The evaluation of marihuana and internet use of typical students were the same as assessing one's own marihuana and internet use. Marihuana use belongs to the risk behavior with the most negative consequences therefore university students should perceive this behavior more realistically. Internet use does not belong to the risk behavior in general, it is more perceived as a normal everyday activity among university students. Although, the reported number of hours spent on the internet for leisure activity was found to be relatively high, students perceived this activity similarly for themselves and typical students without any concern about it being a potential risk behavior.

In summary, the research findings found evidence for the association between descriptive normative beliefs and different risk behaviors and also showed the importance of the developed online application, which was created with the aim to change normative belief to correspond more accurately with the actual prevalence and providing a basis for decreasing risk behavior of university students.

FUTURE RESEARCH

Although the importance of the changes in descriptive normative beliefs was shown, it is necessary to replicate these findings in further research which should measure risk behavior with more items and cover more aspects or indicators of risk behavior because this was one of the main limitations of this study (e.g.

within the smoking). It would be also interesting to focus on other risk behaviors e.g. binge eating or mobile use. Furthermore, it is also important to explore some other factors of risk behavior as the mediators or moderators of the association between descriptive normative beliefs and different risk behavior.

In the next sept the developed online application will be the used for second data collection (in progress) and the exploration of the effect of provided feedback (or the re-evaluation and editing of the existing online application), which should be efficient in modifying normative beliefs and this way reduce the occurrence of risk behaviors among university students.

LIMITATIONS It is important to address the limitations of the presented studies in the relation to the results of the statistical analyses. Some might consider online data collection as a limitation of this study, which could have lowered the response rate. But several research studies point out that online data collection is comparable with the method "paper – pencil" in regard to all the pros and cons of individual methods (Dolnicar, Laesser, & Matus, 2009). The results from both methods do not differ (van de Looij-Jansen & de Wilde, 2008), similarly the research samples obtained by first or second method did not differ in socio-demographics characteristics (Dolnicar, Laesser, & Matus, 2009). Other findings even claimed that response rate is higher in online data collection (PsychData, n.d.). Respondents provide fewer missing data on alcohol issues in the online data collection (Dolnicar, Laesser, & Matus, 2009). Next limitation is represented by the disproportion in gender in our research sample, but on the other hand, gender distribution corresponded with the count of males and females at Slovak universities. All variables were assessed by self-report. However, it was found that self-report measures of alcohol use and other substance use were largely reliable and valid (Johnston et al., 2004; Laforge, Borsari, & Bear, 2005; Wills & Cleary, 1997), when the necessary conditions (i.e., confidentiality, privacy and supervision during the data collection was provided in order to avoid participant cross-talk) are met (Babor, Stephens, & Marlatt, 1987 in Vaughan, Corbin, & Fromme, 2009; Larimer et al., 2004). Also, the instruments represent additional limitation of this study. The variables were measured mostly by one item, but these instruments were part of an international longitudinal data collection within large research sample consisting of many variables, therefore additional analyses of psychological relationships will be further examined.

IMPLICATION FOR PRACTICE
This chapter emphasized the importance of not only descriptive normative beliefs but also their change in different risk behaviors. It further, showed the importance of a developed online application, which was created with the aim to changing normative beliefs in order to decrease risk behavior of university students. Therefore, it is necessary to acknowledge the important role of normative beliefs in different prevention and intervention programs and focus not only on alcohol use as shown by most research studies (e.g. Lewis & Paladino, 2008) but also on other risk behaviors.

CONCLUSIONS
Despite several limitations, this chapter has stressed the importance of descriptive normative beliefs in different risk behaviors and supports the idea of the using the concept of descriptive normative beliefs in intervention programs in context of different risk behaviors.

Mental health, self-regulation and alcohol related patterns and their reduction

INTRODUCTION Alcohol consumption during early adulthood represents a serious public health problem in many countries (Hibbel et al., 2004; White et al., 2006). Many studies have shown that heavy drinking is related to problems and negative consequences which are prevalent among young people, regardless of whether they attend university or not (White, Labouvie, & Papadaratsakis, 2005). However, the majority of studies have found higher rates of alcohol-related problems among students when compared to non-students (Dawson, et al., 2004; Blanco, 2008; Slutske, 2005). Research into alcohol use by young people has mostly been focused on adolescents, secondary or further education students rather than university students. However, alcohol drinking among university students is a widely recognized problem.

Alcohol is part of university life, where it is socially acceptable and easily available. Drinking at parties is more or less the norm. This is in agreement with findings that drinking has been found to be more prevalent in young people who attend college or university than their peers who do not (Bennett, Miller, & Woodall, 1999; Weschler et al., 1995). People entering university may be especially vulnerable to the influence of their peers because of their need to make new friendships, so they may increase their drinking to facilitate peer interactions.

Excessive alcohol intake among university students is associated with a variety of adverse consequences. The complex linkages of risk and protective factors and problem behaviors change over time and within different cultures and countries.

Prevalence of youth drinking

Several large studies concerning alcohol and other drugs have been carried out in Slovakia in the last few years. In 2003 a large ESPAD (European School Survey Project on Alcohol and Other Drugs) project was conducted in which students from seven countries born in 1985, i.e. 17–18 year-olds, were studied. It was found that 98% of the Slovak students in this age group had drunk alcohol at least 1–2 times in their lives, which is higher than the

average for all ESPAD countries (90%). The vast majority of the students in the Slovak Republic had drunk alcohol during the previous 12 months (90%), which is also higher than the average for all ESPAD countries (83%). The tendency was the same regarding the proportion reporting drunkenness during the previous 30 days (57 compared to 53%). The highest proportion of 12-month abstainers was found in France (14%), and the smallest in Greece and the Slovak Republic (5% each). Moreover, 15 percent of the Slovak students reported frequent drunkenness behavior, three times or more during the previous 30 days (www.espad.org). According to the Slovak National Report to the EMCDDA (2006) (10 283 students, 15 – 19 years old), almost one third of the boys were routine beer drinkers, and among girls it was 5%. The average age of beer experience was 12.4 years, but there was a significant gender difference: boys usually started at 10, girls at 14 years of age. Only 22% of the students had never been drunk; 30% of them had had no experience with beer, 2% of them no experience with wine, and 25% of them no experience with spirits. Some surveys of student drinkers indicate the finding that heavy drinkers tend to be young and male, with the behavior peaking between the ages 18-22 and then gradually decreasing.

For the developing young adult, drug and alcohol abuse undermines motivation, interferes with cognitive processes, contributes to debilitating mood disorders, and increases the risk of accidental injury or death (Hawkins, Catalano, & Miller, 1992).

Individuals who increase their binge drinking from age 18 to 24 and those who consistently binge drink at least once a week during this period may have problems attaining the goals typical of the transition from adolescence to young adulthood (e.g., marriage, educational attainment, employment and financial independence) (Schulenberg, et al., 1996).

Acute health and behavioral consequences

It is useful to distinguish between the effects that happen to the individual drinker as opposed to those that occur to others in the immediate environment. The former might be called the primary effects, and the latter might be called secondary or second-hand, as in second-hand smoke (Wechsler et al., 1995). Some of the most important primary effects include educational, health, psychological, interpersonal and behavioral consequences.

In other words; fatal and nonfatal injuries; alcohol poisoning; blackouts; academic failure; violence, including rape and assault; unintended pregnancy; sexually transmitted diseases, including HIV/AIDS; property damage; and vocational and criminal consequences that could jeopardize future job prospects. Measures of the secondary effects of heavy episodic drinking include being awakened or disturbed; being insulted; being assaulted verbally, physically or sexually; or having property vandalized. Some studies (e.g., Wechsler et al., 1994) have found a strong association between current alcohol use or heavy episodic use and self-reported academic problems. Wood et al. (1997) examined how well first year university alcohol involvement predicted academic problems using a longitudinal design and academic performance data taken from university transcripts. They concluded that much of the association is due to preexisting student characteristics present at admission to university.

Alcohol consumption and mental health problems

Generally, alcohol consumption has been linked to mental health problems e.g. perceived stress or depressive symptoms (Cooper, et al, 1995; Stewart & Devine, 2000). Depressive symptoms (based on DSM-IV) include sadness, anxiety or feelings of emptiness; decreased energy; loss of interest in usual activities; sleep disturbances; weight gain/loss; feelings of worthlessness; suicidal thoughts; difficulty in concentrating or making decisions. Tension reduction theory contends that tension-producing circumstances (i.e. stressors) could lead to increased drinking (Cappel & Greeley; 1987; Young, Oei, & Knight, 1990). As alcohol is perceived to reduce tension and high levels of stress it could be one of the reasons why it is associated with drinking (Critchlow, 1986; Leigh, 1989). Another explanation could be that depressive symptoms might also result in increased alcohol consumption (Jones-Webb et al., 1996). To summarize, university students could consume alcohol to: potentially relax or relieve tension; celebrate; feel comfortable with the opposite gender; as a reward for working hard; and to get away from troubles (Lindsay, 2006).

Alcohol consumption and self-regulation

Self-regulation has been defined as "the capacity to plan, guide, and monitor one's behavior flexibly in the face of changing circumstances" (Brown, 1998). Carver and Scheier (1982) define

self-regulation as an effortful ability to make plans and use goal-directed behavior to achieve desired outcomes. According to several studies, self-regulation may not influence how much people drink, but influences the likelihood of negative consequences that occur as a result of drinking. Carey, Neal and Collins (2004) found that general self-regulation skills were not related to measures of alcohol use. Instead, self-regulation skills are related to the number and severity of alcohol-related consequences, even when controlling for the level of alcohol consumption. These findings support similar results reported in the literature (e.g., Carey, Neal, & Collins, 2004). Problems with impulse control may lead to unrestrained behavior or greater risk taking when intoxicated.

AIMS

The purpose of this chapter was to explore the prevalence of alcohol consumption (total AUDIT score), alcohol dependence and alcohol related problems among university students across several European countries.

The second aim was to explore the relationship between mental health variables, self-regulation and alcohol consumption (total AUDIT score), alcohol dependence and alcohol related problems.

The third aim was to examine the relationship between mental health variables, self-regulation and reducing alcohol consumption, alcohol dependence and reducing alcohol related problems.

METHOD

This study is part of a larger study SLiCE (Student Life Cohort in Europe). SLiCE is a multinational ongoing longitudinal study, which has enrolled the first wave of an international cohort of first year university students from several European countries. The SLiCE study has developed from the previous collaborative research activities within the Cross-National Student Health Survey which was conducted in May 2008 (El Ansari et al., 2007).

SAMPLE

This study is based on data from the first and third wave of data collection conducted in 2011/2014 within the longitudinal SLiCE study of university students from Czech Republic, Germany, Hungary, Lithuania and Slovakia. In each country, students were asked to complete self-administered online questionnaires. The strategies of recruiting respondents differed at each place because of the structural differences in the participating countries. The universities in Lithuania and the Slovak Republic provided access to the e-mails of all enrolled first year students.

The project was introduced to students during their lectures and seminars and an invitation email to participate was subsequently sent out. The Hungarian, Turkish, Czech and Bulgarian students were informed using university newsletters and other formal as well as informal methods. Following this, they registered on the SLiCE website and filled in the form. Generally, the universities included in this study represented the biomedical, social, physical, and technical sciences. Student participation in the study was voluntary and anonymous. Students were informed that by completing the questionnaire they provided their informed consent to participate. They were also informed that they could terminate their participation at any point when filling out the questionnaire. No incentives were provided. Permission to conduct the study was granted by the ethical commissions of the participating institutions. Initially the questionnaire was compiled in English and subsequently translated into the local languages using two independent forward and backward translations for each language. The research team reviewed any cases of disagreement and the authors familiar with the respective languages, usually native speakers, made the final decisions.

The final sample in first baseline data collection consisted of 2939 university students, 27.9% were males and the mean age was 20.75 (3.14). The third wave of data collection included 508 university students 24.6% were males and the mean age was 23.1.

MEASURES   The measures used in this study were part of a multi-topical questionnaire assessing health and health behaviors among university students.

Demographic variables. Demographic data including age, gender and country were collected from all participating students.

Alcohol use. Alcohol consumption was measured by the AUDIT – The Alcohol Use Disorders Identification test. AUDIT is a simple screening tool, which is sensitive to early detection of risky and high risk drinking. It has 3 questions on alcohol consumption (1 to 3), 3 questions on drinking behavior and dependence (4 to 6) and 4 questions on the consequences or problems related to drinking (7 to 10).

Self-Regulation. In order to assess self-regulation skills, the Short Self-Regulation Questionnaire was used (Carey, Neal, & Collins, 2004). Individual items were scored on a 1–5 scale (strongly

disagree–strongly agree) and summed to create the total score. A higher score indicated a higher level of self-regulation skills. Cronbach's alpha was 0.93.

Depressive symptoms. Depressive symptoms were measured using a modified version of the Beck Depression Inventory (M-BDI) (Schmitt et al., 2003). In this measure students were asked to describe how often they experienced each of the 20 depressive feelings during the past few days on a 6-point scale (from 0= "never" to 5= "almost always"). The M-BDI score was obtained by summing up the answers of individual questions. A higher score indicated a higher level of depressive symptoms. Cronbach's alpha in this sample was 0.94.

Perceived stress. Perceived stress was measured by the 4-item Perceived Stress Scale (PSS-4), each item was measured on a five-point likert scale (Cohen, Kamarck, & Mermelstein, 1983). PSS-4 scores are obtained by summing across all four items. The higher the score, the more perceived stress there is. Cronbach's alpha in this sample was 0.77.

STATISTICAL ANALYSES

Listwise deletion was performed for handling missing data. Descriptive analysis of harmful alcohol consumption, alcohol related problems and alcohol dependence was undertaken separately for each country. A paired sample T-test was used to analyze the reduction of alcohol use patterns after two years separately for each country. Linear regression was employed to explore the relationships between the predictors (self-regulation, perceived stress, depressive symptoms) and alcohol related problems. This analysis was carried out while controlling for the demographic variables of gender, age and country.

RESULTS

Prevalence of harmful alcohol consumption among university students across 5 European countries

The highest prevalence of harmful alcohol consumption (total audit score 8+) among university students (total sample) in the baseline data collection was found in the Slovak and Czech Republics followed by Lithuania, Germany and Hungary (Table 46). All countries showed a drop in percentage of harmful alcohol consumption after two years. The prevalence of harmful alcohol consumption two years after the baseline collection in the total sample was highest in the Slovak and Czech Republic followed by Lithuania, Germany and Hungary (Table 46).

Table 46 The prevalence of harmful alcohol consumption across 5 European countries in baseline data collection and in two years later

Harmful alcohol consumption (total audit score 8+) - baseline	males	females	total	Harmful alcohol consumption (total audit score 8+) - 2 years later	males	females	Total
Czech Republic (N=313)	43.4% (2.)	18.6% (2.)	26.8% (2.)	Czech Republic (N=101)	33.3% (3.)	16.0% (2.)	20.8% (2.)
Hungary (N=524)	27.9% (5.)	13.3% (5.)	16.8% (5.)	Hungary (N=81)	14.3% (5.)	9.6% (5.)	11.1% (5.)
Lithuania (N=790)	41.9% (3.)	16.5% (3.)	23.9% (3.)	Lithuania (N=115)	39.3% (1.)	14.5% (3.)	20.0% (3.)
Slovak Republic (N=487)	46.7% (1.)	22.4% (1.)	28.3% (1.)	Slovak Republic (N=83)	27.3% (4.)	23.9% (1.)	24.1% (1.)
Germany (N=229)	32.3% (4.)	16.0% (4.)	20.5% (4.)	Germany (N=99)	37.5% (2.)	10.8% (4.)	17.2% (4.)

Table 47 The prevalence of alcohol dependence across 5 European countries in baseline data collection and in two years later

Alcohol dependence – baseline	males	females	total	Alcohol dependence - 2 years later	males	females	Total
Czech Republic (N=313)	42.9% (1.)	28.9% (2.)	36.6% (1.)	Czech Republic (N=101)	38.1% (3.)	26.7% (2.)	29.7% (1.)
Hungary (N=524)	31.0% (4.)	14.5% (5.)	18.5% (5.)	Hungary (N=81)	14.3 (4.)	9.3% (5.)	10.8% (5.)
Lithuania (N=790)	31.5% (3.)	29.3% (1.)	32.3% (2.)	Lithuania (N=115)	50% (1.)	23.5% (3.)	29.1% (2.)
Slovak Republic (N=487)	40.2% (2.)	26.6% (3.)	29.9% (3.)	Slovak Republic (N=83)	9.1% (5.)	29.0% (1.)	24.7% (3.)
Germany (N=229)	30.3% (5.)	16.1% (4.)	20.0% (4.)	Germany (N=99)	41.7% (2.)	14.7% (4.)	21.0% (4.)

Prevalence of alcohol dependence among university students across 5 European countries

The highest prevalence of alcohol dependence among university students in the baseline data collection was found amongst the Czech, Lithuanian and Slovak students followed by Germany and Hungary (Table 47). The prevalence of alcohol dependence two years after the baseline collection was similar with the highest rates in Czech, Lithuanian and Slovak university students followed by Germany and Hungary (Table 47).

Prevalence of alcohol related problems among university students across 5 European countries

The alcohol-related problems score was measured by a positive score on any questions 7 to 10 of AUDIT. These questions assessed: 1. The feeling of guilt or remorse after drinking; 2. being unable to remember what happened the night before because of drinking; 3. being injured because of drinking; 4. having a relative, friend, doctor, or other health care worker expressing concern about one's drinking or suggesting cutting it down. The highest prevalence of alcohol related problems in the baseline data-collection was found in the Czech and Slovak Republics followed by Lithuania, Hungary and Germany (Table 48). All countries except Germany showed a drop in the percentage of alcohol related problems after two years. The prevalence of alcohol related problems two years after the baseline collection was similar with the highest prevalence of alcohol related problems found in the Czech and Slovak Republic followed by Hungary, Germany and Lithuania (Table 48).

Differences two years later in alcohol use patterns among university students across 5 European countries

Next, a paired sample T-test was used to analyze the reduction of alcohol use patterns after two years separately for each country. No significant reduction was found with respect to any alcohol use pattern and nor any studied country. On the contrary it was found for example in Lithuania there was a rise of alcohol consumption after two years. The specific results for each country and each alcohol use pattern can be seen in Table 49.

Table 48 The prevalence of alcohol related problems across 5 European countries in baseline data collection and two years later

Alcohol related problems - baseline				Alcohol related problems – 2 years later			
	males	females	total		males	females	Total
Czech Republic (N=321)	68.5% (1.)	54.1% (1.)	58.9% (1.)	Czech Republic (N=101)	57.1%	48%	51.5% (1.)
Hungary (N=524)	56.6% (4.)	43.6%(4.)	46.8% (4.)	Hungary (N=83)	53.6%	40.7%	44.6% (3.)
Lithuania (N=790)	64.5% (2.)	45.6% (3.)	51.0% (3.)	Lithuania (N=115)	64.3%	32.5%	40.9% (5.)
Slovak Republic (N=512)	60.8% (3.)	50.8% (2.)	53.1% (2.)	Slovak Republic (N=86)	54.5%	44.3%	45.3% (2.)
Germany (N=231)	50.8% (5.)	32.7% (5.)	37.7% (5.)	Germany (N=100)	62.5%	36%	42.0% (4.)

Table 49 Two years later differences in alcohol use patterns among university students across 5 European countries

		N	Mean	t	Df	p
Slovakia	AUDIT1 AUDIT3	73	5.205 5.137	0.135	72	0.893
	Dependance1 Dependance3	75	0.587 0.533	0.290	74	0.773
	ARP1 ARP3	75	1.413 1.453	-0.168	74	0.867
Lithuania	AUDIT1 AUDIT3	103	4.912 5.359	-1.215	102	0.227
	Dependance1 Dependance3	105	0.666 0.600	0.530	104	0.597
	ARP1 ARP3	103	1.310 1.408	-0.436	102	0.664
Hungary	AUDIT1 AUDIT3	59	4.423 4.339	0.272	58	0.787
	Dependance1 Dependance3	61	0.262 0.115	1.639	60	0.107
	ARP1 ARP3	61	0.983 0.869	0.680	60	0.499
Czech Republic	AUDIT1 AUDIT3	93	5.236 5.022	0.657	92	0.513
	Dependance1 Dependance3	95	0.674 0.526	1.366	94	0.175
	ARP1 ARP3	95	1.347 1.274	0.451	94	0.653
Germany	AUDIT1 AUDIT3	87	5.126 5.092	0.117	86	0.907
	Dependance1 Dependance3	90	0.244 0.333	-1.523	89	0.131
	ARP1 ARP3	89	1.022 1.202	-1.139	88	0.258

Relationship between depressive symptoms, perceived stress,self-regulation and alcohol consumption (total AUDIT score)

After controlling for sex, age and country it was found that male students were associated with more alcohol consumption. Age was negatively associated with alcohol consumption. Slovakia and the Czech Republic were related to higher alcohol consumption in comparison to other countries. In Germany the opposite was found. Overall, from the mental health variables the study found depressive symptoms (Time 1) and perceived stress (Time 1) to not be associated with alcohol consumption. However, the Lithuanian students with a high level of depression were more likely to be involved in high alcohol consumption compared to other involved countries (Table 50). Self-regulation (Time 1) was significantly negatively associated with alcohol consumption.

Table 50 Relationship between depressive symptoms, perceived stress, self-regulation and alcohol consumption (total AUDIT score)

	Beta	t	P
gender	-.276	-10.458	<.001
age	-.063	-2.301	.022
Slovakia vs other	.094	2.461	.014
Lithuania vs other	-.013	-.394	.693
Hungary vs other	-.027	-.727	.468
Czech Republic vs other	.079	2.233	.026
Germany vs other	-.073	- 2.233	.026
depression Time1	.012	.325	.745
perceived stress Time 1	.002	.061	.952
self-regulation Time1	-.119	-3.887	.001
depression and Lithuania vs other countries	.433	2.781	.006

Relationship between alcohol consumption, depressive symptoms, perceived stress, self-regulation and alcohol dependence.

With respect to alcohol dependence, the male students reported significantly higher level of alcohol dependence as female students. Age was not associated with alcohol dependence. In Slovakia and the Czech Republic, on the contrary to other countries, higher levels of alcohol dependence were found. From the mental health variables, the study did not find depressive symptoms (Time 1) and perceived stress (Time 1) to be associated with alcohol consumption. Self-regulation (Time 1) was again significantly negatively associated with alcohol dependence.

Table 51 Relationship between alcohol consumption, depressive symptoms, perceived stress, self-regulation and alcohol dependence.

	Beta	t	P
gender	-.163	-6.093	<.001
age	-.024	-.852	.394
Slovakia vs other	.141	3.616	<.001
Lithuania vs other	.055	1.689	.091
Hungary vs other	.030	.795	.426
Czech Republic vs other	.155	4.305	<.001
Germany vs other	-.142	-4.305	<.001
depression Time1	.017	.463	.643
perceived stress Time 1	.015	.417	.676
self-regulation Time1	-.107	-3.455	.001
depression and Lithuania vs other countries	.365	2.346	.020

Relationship between depressive symptoms, perceived stress, self-regulation and alcohol related problems

With regards to alcohol related problems again male students reported a significantly higher level of alcohol related problems than female students. This time age was not associated with alcohol related problems. Students from Slovakia and the Czech Republic reported significantly higher levels of alcohol related

problems than students in other countries. Overall with regards to the mental health variables the study did not found depressive symptoms (Time 1) and perceived stress (Time 1) to be associated with alcohol related problems. On the other hand it was found that depressive symptoms were associated with alcohol related problems in Lithuanian students. Self- regulation (Time 1) was significantly negatively associated with alcohol related problems.

Table 52 Relationship between depressive symptoms, perceived stress, self-regulation and alcohol related problems

	Beta	t	P
gender	-.198	-7.376	<.001
age	-.041	-1.472	.141
Slovakia vs other	.128	3.272	.001
Lithuania vs other	.012	.374	.709
Hungary vs other	.002	.041	.967
Czech Republic vs other	.113	3.131	.002
Germany vs other	-.103	-3.131	.002
depression Time1	.051	1.425	.154
perceived stress Time 1	.013	.386	.699
self-regulation Time	-.080	-2.586	.010
depression and Lithuania vs other countries	.546	3.515	.001

Relationship between depressive symptoms, perceived stress, self-regulation and reducing alcohol consumption (total AUDIT score)

To assess the relationship between alcohol consumption, depressive symptoms, perceived stress, self-regulation and reducing alcohol consumption (total AUDIT score), a linear regression was employed (Table 53). The study controlled for sex, age and country. It found female students to be positively associated with the total AUDIT score reduction. Age was not significantly associated with reducing alcohol consumption.

Students from the Czech Republic reduced their alcohol consumption significantly more than students from other countries.

The study also found that higher levels of alcohol consumption at Time 1 to be positively associated with reducing alcohol consumption. Depressive symptoms and perceived stress (Time 3) were not found to be associated with reducing alcohol consumption. Self- regulation was also not associated with reducing alcohol consumption.

Table 53 Relationship between depressive symptoms, perceived stress, self-regulation and reducing alcohol consumption (total AUDIT score)

	Beta	t	P
gender	.133	2.569	.011
age	.051	.976	.330
Slovakia vs other	.011	.184	.854
Lithuania vs other	-.084	-1.363	.174
Hungary vs other	.015	.247	.805
Czech Republic vs other	.139	2.084	.038
Germany vs other	.032	0.131	.834
consumption Time1	.446	8.501	<.001
depression Time3	-.037	-.498	.619
perceived stress Time 3	.092	1.243	.215
self-regulation Time3	.062	1.039	.300

Relationship between depressive symptoms, self-regulation and reducing alcohol dependence

The study was assessing the relationship between sex, age, country, alcohol consumption at time 1, depressive symptoms, perceived stress, self-regulation and reducing alcohol dependence (Table 54). Sex and age were not associated with dependence reduction. With respect to the country differences it was found that students from Slovakia and the Czech Republic reduce their alcohol dependence score after two years significantly more than students from other countries. On the contrary, the German students, who increased their alcohol dependence significantly more compared to students from other countries.

Alcohol consumption at Time 1 was positively related with reducing alcohol dependence. Depressive symptoms and perceived stress (Time 3) were not found to be associated with reducing alcohol dependence. It was found that there was a significant interaction with regards to perceived stress in Lithuanian students. Reducing alcohol dependence was positively associated with perceived stress. Self-regulation was not related to alcohol dependence reduction (Table 54).

Table 54 Relationship between depressive symptoms, perceived stress, self-regulation and reducing alcohol dependence

	Beta	t	P
gender	.004	.070	.944
age	.070	1.238	.217
Slovakia vs other	.168	2.644	.009
Lithuania vs other	.102	1.514	.131
Hungary vs other	.109	1.721	.086
Czech Republic vs other	.139	2.084	.038
Germany vs other	-.138	-2.084	.038
consumption Time1	.223	3.976	<.001
depression Time3	-.020	-.247	.805
perceived stress Time 3	.013	.167	.868
self-regulation Time3	.053	.842	.401
perceived stress and Lithuania vs others	.361	1.989	.048

Relationship between depressive symptoms, self-regulation and reducing alcohol related problems

Thirdly, the study was assessing the relationship between selected predictors and reducing alcohol related problems. It was found that only gender was related with reducing alcohol related problems (Table 55).

Table 55 Relationship between depressive symptoms, perceived stress, self-regulation and reducing alcohol related problems

	Beta	t	p
gender	.147	2.609	.009
age	-.015	-.266	.791
Slovakia vs other	.077	1.193	.234
Lithuania vs other	-.002	-.029	.977
Hungary vs other	.115	1.779	.076
Czech Republic vs other	.091	1.344	.180
Germany vs other	-.090	-1.344	.180
consumption Time1	.052	.920	.358
depression Time3	-.059	-.731	.465
perceived stress Time 3	.128	1.584	.114
self-regulation Time3	-.006	-.087	.931

DISCUSSION

In this study the AUDIT – The Alcohol Use Disorders Identification test was used and specifically three variables describing distinct patterns of alcohol use. Alcohol-related health and social problems tend to increase as alcohol consumption rises, hence the first variable that the current study employed is alcohol consumption, which is a general indicator. The other alcohol use variables are alcohol dependence and alcohol related problems, which focus more on long-term drinking habits and thus represent more serious drinking patterns. Such use of three distinct variables produced a more detailed picture of alcohol consumption and a more holistic understanding of its relationships to mental health indicators.

Prevalence of harmful alcohol consumption, alcohol dependence and alcohol related problems among university students across 5 European countries

The first aim of this study was to explore the prevalence of harmful alcohol consumption and alcohol dependence among university students across 5 European countries.

The highest prevalence of harmful alcohol consumption among university students (total sample) in the baseline and two years

later was found in the Slovak and Czech Republics followed by Lithuania, Germany and Hungary. From the total sample, almost 60% of male students and 50% of female students reported alcohol related problems. Overall, the study found the highest prevalence of alcohol related problems in the Czech and Slovak Republics followed by Lithuania, Hungary and Germany. The prevalence of alcohol related problems two years after the baseline collection was similar with the highest prevalence found in the Czech and the Slovak Republic followed by Hungary, Germany and Lithuania.

Globally, university students and first year university students face a range of academic and social challenges as they adjust to university life that can place them at risk for a number of negative outcomes, including alcohol-related problems (Reynolds et al., 2011). The previous results from Slovak university students sample have shown that 41% of students drank alcohol≥1 time per week, 77% reported heavy episodic drinking, 49% had been drunk >1 time in the last month, and problem drinking existed in 23.3% of the sample (Sebena et al., 2011).

No significant reduction with respect to any alcohol use pattern nor any studied country was found. It could be that to test the reduction with regard to a two-year difference is not sufficient for risk behavior and university student sample.

Mental health and alcohol consumption, alcohol dependence, alcohol related problems and their reduction

The second aim of this study was to assess the relationship between mental health variables (perceive stress, depressive symptoms), self-regulation and reducing alcohol consumption, alcohol dependence and alcohol related problems.

Perceived stress

In relation to perceived stress, several studies of stress and alcohol and substance use among university student populations have provided evidence that stress motivates alcohol consumption (Carpenter & Hasin, 1999; Colder & Chassin, 1993; McCreavy & Sadawa, 2000; Rutledge & Sher, 2001). Students experiencing higher levels of stress tend to use alcohol and other substances at higher levels and have a higher number of

substance-related problems (Colder & Chassin, 1993; McCreavy & Sadawa, 2000). However, no direct relationships between perceived stress and alcohol consumption, alcohol dependence and alcohol related problems was found in the current study. A possible explanation could be that students when encountering stress have more/other alternative coping mechanisms. With regards to their reduction only perceived stress was found to be related with alcohol dependence reduction. Based on the current sample of Lithuania students it could be concluded that at least in this country the reduction of alcohol dependence is associated with perceived stress.

Depressive symptoms

Depressive symptoms (based on the DSM IV) include sadness, anxiety or empty feelings; decreased energy; loss of interest in usual activities; sleep disturbances; weight gain/loss; feelings of worthlessness; suicidal thoughts; difficulty in concentrating or making decisions. Thus, depression may play an important role in risk consumption behavior. Overall, the results from this study on the sample from five European countries have shown that depressive symptoms were not independently associated with alcohol consumption, alcohol dependence and alcohol related problems, nor their reductions. It was found that only Lithuanian students with a high level of depression were more likely to be involved in high alcohol consumption compared to other countries.

These findings are in contrast to the findings of 2,529 first year university students across five European countries, where depressive symptoms were not associated with a high frequency of drinking (several times per week), but were associated with problem drinking (Sebena et al., 2012). The current findings of the lack of association between depressive symptoms and alcohol consumption, alcohol dependence and alcohol related problems also supports other recent research (Perera, Torabi, & Kay, 2011) that has found no associations between alcohol use and depressive mood across a sample of 534 university students in the United States. Unsurprisingly, the researchers noted that although some studies have shown that depressive symptoms may be associated with alcohol use in student populations, the results have not been consistent (Pedrelli et al., 2011). It is possible that the association between depressive symptoms and alcohol consumption might be sensitive to both the "level" of

alcohol use, and also the "level" of depression, where a "higher level" of either or both seems necessary before a significant association crystallizes.

Self-regulation and alcohol consumption, alcohol dependence, alcohol related problems and their reduction

In this study, the relationship between self-regulation and alcohol drinking patterns was tested. Self-regulation was found to be significantly negatively associated with alcohol consumption (total AUDIT score), alcohol dependence and also alcohol related problems. Individual differences in self-regulation have been previously shown to play a crucial role in the development and maintenance of various unhealthy behaviors and addictive behavior. In line with the growing number of studies (e.g., La Rose, Lin, & Eastin, 2003; Shaffer, Hall, & Vander Bilt, 2000) this study has confirmed the potentially important role of self-regulation in relation to alcohol consumption and, possibly the development of alcohol dependence. In addition to the exploration of self-regulation as the main effect, the indirect moderating effect of self-regulation was also addressed in our previous study, which has shown certain support for a moderating effect of self-regulation between depressive symptoms and the alcohol related problems among university students (Sebena et al., 2014). It did not find a relationship between self-regulation and a reduction of alcohol use patterns.

LIMITATIONS   There are several limitations to this study that should be mentioned. Given the self-reported measures of drinking, some underreporting, for example for alcohol dependence or alcohol related patterns, which are socially undesirable, might have occurred. The study also cannot exclude possible biases regarding missing or incorrect information due to social expectation bias in self-reported data, although several steps were made to guarantee confidentiality, which typically reduces social expectation bias. Some measures used in this study were short and might not have derived all information. In this study an online data collection was used, which resulted in a low response rate and a significantly higher portion of female students in the final sample. Thus, any generalizations from the findings for all students should be undertaken cautiously. Future research should address these limitations.

IMPLICATIONS FOR PRACTICE

In general, our findings showed an increased risk for higher level of alcohol consumption and alcohol related problems in students with higher self-regulation. Future research could examine whether within interventions programs higher levels of self-regulation capacity predict risk behavior reduction. In other words, this research should examine whether problem drinking of university students with higher levels of self-regulation capacity is likely to decrease after receiving a self-regulation based intervention (Carey et al., 2007). Self-management oriented programs focusing on providing behavioral help with e.g. self-monitoring, goal setting or based on self-regulation diagnostic can assist with any difficulties that can occur at any stage of self-regulatory processes and could be particularly useful for students with low level of self-regulation.

Predictors of disordered eating among university students from Hungary, Lithuania and Slovakia

INTRODUCTION   Eating is one of the most important behaviors connected to primary needs. It is currently within the scope of research of many experts. However, it has become the center of interest especially in the context of various eating problems/disorders, often caused by psychological and social agents, which have an adverse effect on health and functioning of the body. When eating does not fulfil its essential role of healthy nutrition, but becomes mainly a means for acquiring a certain body shape, it is called disordered, dysfunctional or disturbed. Disordered eating can take on many forms which may eventually result in the diagnosis of an eating disorder. While a single indicator does not necessarily imply the presence of a disorder, the incidence of indicators suggests a potential risk of eating disorders (Morgan, Reid, & Lacey, 1999). Eating disorders are not only a clinical matter and require, among other things, attention of social psychologists (Pavlíčková & Bratská, 2000). For prevention and early detection of eating disorders it is necessary to investigate other related factors which should be identified not only among the individuals with already diagnosed disorder but also among those without a clinical manifestation.

Body dissatisfaction is considered to be one of the most important predictors of eating disorders (Kopp & Zimmer-Gembek, 2011; Garber et al., 2008; Stice & Shaw, 2002; Graber et al., 1994). In the research of Beato-Fernandez & Rodriguez-Cano (2005) and Ferreiro, Seoane and Senra (2012) body dissatisfaction predicts abnormal eating behavior, however, only in adolescent females, not in males. Allen et al. (2008) revealed body dissatisfaction to be an important predictor of abnormal eating behavior in both adolescent boys and girls. However, dissatisfaction with one's body can bear different forms and in this study the focus will be on the attributes of body dissatisfaction contributing to the risk of disordered eating. The Self-determination theory postulates an assumption regarding motivational processes associated with engaging in risk behaviors (Williams et al., 2000). Within the

application of Self-determination theory in the context of disordered eating, protective role of general self-determination within the dispositional approach has been shown to be significant as it seems to affect the way how a body dissatisfaction is dealt with (Matusitz & Martin, 2013). Basic psychological needs satisfaction appears to be a protective factor in the development of body image which concerns unhealthy weight control strategies (Thøgersen-Ntoumani, Ntoumanis & Nikitaras, 2010; Thøgersen-Ntoumani et al., 2011). The last decade of research offers a number of empirical findings researched in the context of Self-determination theory and symptoms of eating disorders. However, further research of autonomy and basic psychological needs is needed for improving the understanding of their relationship with various aspects of body dissatisfaction and dysfunctional eating not only for women but also for men.

Disordered eating and eating disorders

The most common specific eating disorders are mental anorexia, mental bulimia and binge eating with specific diagnostic criteria for each. These disorders reach far back into history, although their original understanding from the current, varies considerably. Today, these disorders are undoubtedly considered as categorized mental disorders, defined in the International statistical classification of disorders and related health problems (ICD-10, 1994) established by the WHO - World Health organization and also in the Diagnostic and Statistical Manual of Mental Disorders DSM-5 issued by the American Psychiatric Association (American Psychiatric Association, 2013). Eating disorders are characterized by eating a disproportionate amount of food, in terms of reducing consumption - restrictive diets and excessive consumption - eating excessively, which are associated with health risks. However, not meeting these specific diagnostic criteria does not mean a perfectly healthy eating. Between normal eating on the one hand and clinical eating disorders on the other hand there is a disturbed type of eating behavior called also disordered or dysfunctional. According to Gottlieb (2014), disordered eating shares certain behavioral indicators with eating disorders, but their presence might not be as frequent or as severe. Gottlieb (2014) also warns that disordered eaters may also be at risk for developing a full-blown eating disorder.

Body dissatisfaction as a predictor of disordered eating

Body dissatisfaction is defined as a subjective discontent with one's body or its shape (Gardner & Brown, 2011). Presnell, Bearman and Stice (2004) refer to body dissatisfaction as a negative evaluation of one's figure or parts of one's body. Conti, Slater and Latorre (2009) incorporate the frequency of behavior connected to body care, body perception and social influences to the concept of body dissatisfaction. The last two definitions correlate with body dissatisfaction as it is operationalized in our study. Furthermore, an evaluation of one's body is an important part of self-esteem (Franzoi & Shields, 1984). According to Harter (1990) it is considered to be a central aspect of self-worth and mental health across lifespan. In words of Allen et al. (2008), body dissatisfaction is an important predictor of abnormal eating behavior in adolescent boys and girls and has also been found to be associated with poor life satisfaction (Esch & Zullig, 2008) and poor quality of life (Horacek, 2013). This is why it deserves attention. Body dissatisfaction plays a central role in the theoretical approach - Tripartite influence model of body image and eating disturbances, which was in 1999 introduced by Thomsonom and co-authors (Keery, van den Berg & Thompson, 2004). This theoretical framework incorporates three direct (peer, parental and media influences) and two mediational links (internalization of societal appearance standards and social appearance comparison processes), contributing to body dissatisfaction. The model includes direct link from body dissatisfaction to restrictive eating strategies which in turn are directly linked with the development of eating disturbances. It has been applied for several times in different samples, particularly among girls in puberty and in the adolescent stage of development (Papp et al., 2013; Yamamiya, Shroff & Thompson, 2008; van den Berg, et al., 2002), but also in a sample of undergraduate men (Tylka, 2011) and its validity was confirmed.

General self-determination as a predictor of body dissatisfaction and disordered eating

Within the theory of self-determination behavior of an individual can be defined as self-determined and autonomous when governed by the self. This means that it is not a subject to external contingencies or social pressures as in the case when

determined by external controlling or coercive conditions. Furthermore, autonomous behavior is also congruent with one's values and interests (Ryan & Deci, 2000). This has been shown to be positively associated with many health promoting behaviors, well-being, vitality, positive affect (Sheldon, Ryan & Reis, 1996) and lower stress (Weinstein & Ryan, 2011). On the other hand, low autonomy has been related to a lower level of self-esteem, a lower body satisfaction and a stronger drive for thinness among women (Frederick & Grow, 1996).

The "buffering effect" of general self-determination within the dispositional approach has been shown to be significant in the context of eating disorders (including binge eating) as it seems to affect the management of body dissatisfaction (Matusitz & Martin, 2013). Self-determination could indeed be an important protective factor against the influence of social pressures. In particular, self-determination, which indicates lower susceptibility to extrinsic controls, has been shown to be a buffer against sociocultural influences on body image or body image pressures (Pelletier & Dion, 2007). This has been shown to be associated with greater weight satisfaction among young adult women (Pelletier & Dion, 2007; Pelletier, Dion & Lévesque, 2004). Autonomous and intrinsic motivation can protect individuals from pursuing the thin ideal of body image which is mostly based on socially conditioned extrinsic values (Kopp & Zimmer-Gembek, 2011). Thus, it seems that high levels of self-determination represent a buffer for women against the internalization of the pressure to be thin (Pelletier & Dion, 2007). These associations are well demonstrated in the model by Pelletier and Dion (2007), where general self-determination was found to be negatively associated with the sociocultural pressures about ideal body image and the endorsement of society's beliefs about thinness and obesity. Pelletier and Dion (2007, p. 235) found that "women with greater levels of general self-determination would be less likely to perceive sociocultural messages about body image as a source of pressure, but instead as information that they are free to use or dismiss". Moreover, social pressures in their model were positively linked to the endorsement of society's beliefs about thinness and obesity, which in turn positively predicted body dissatisfaction . High self-determination also negatively predicted body dissatisfaction in a mixed gender sample of aerobics instructors (Thøgersen-Ntoumani & Ntoumanis, 2007). However, further research of perceived autonomy and autonomous

functioning is needed to understand its connection with body dissatisfaction.

According to the theory of self-determination, it is possible to explain many types of risk behavior by the lack of satisfaction with the fulfilment of autonomy and other basic psychological needs (Williams et al., 2000). For example, disordered eating could be driven by concerns about one's body image and a struggle to have control over one's body and the way it looks. This struggle is, according to the Self-determination theory, a result of an insufficient satisfaction of psychological needs (Williams et al., 2000). In particular, if the autonomy need is thwarted it can lead to the development of substitutional needs. Weight control can manifest itself by excessive body image concerns along with unhealthy weight control strategies which could serve as a means to confirm one's self-worth (Ryan & Deci 2000). These compensatory mechanisms can be understood as an attempt to re-establish ownership of at least one aspect of life and thus to feel autonomous. Weight control connected with unhealthy dieting could this way serve as a compensatory mechanism for not being able to control other areas of one's life (Ryan & Deci 2000).

Several empirical studies have provided certain evidence of the relationship between basic psychological needs and the efforts to control one's weight. It was found that meeting the need of autonomy negatively predicted body image concerns, body dissatisfaction, and the drive for thinness (Thøgersen-Ntoumani & Ntoumanis, 2007). A direct link between body dissatisfaction and unhealthy weight control was also revealed (Keery, van den Berg & Thompson, 2004). In addition, an inverse relationship between the satisfaction of the three basic psychological needs and unhealthy weight control through body image concerns was shown (Thøgersen-Ntoumani, Ntoumanis & Nikitaras, 2010). Perception of the "authorship" of one's life appears to be a protective factor in the development of body image concerns and unhealthy weight control. Next, Thøgersen-Ntoumani et al. (2011) similarly investigated and found indirect relationship between the satisfaction of the basic psychological needs and weight-related consequences (unhealthy weight control, anxiety of physical appearance) including the appearance-based self-worth. The appearance-based self-worth is understood within the extent to which meeting externally defined standards and ideals of beauty is achieved. It is a socially contingent construct by which

the sense of self-worth comes when a person is admired and respected by others for his/her physical attractiveness. As a result, positive feelings usually temporarily increase, however, in the long run, people suffer from chronic anxiety of a possible negative assessment and thus are susceptible to start an inappropriate weight control due to the continuous effort to achieve the external ideal of beauty. Anxiety regarding the physical appearance is, according the cited authors, a direct predictor of unhealthy weight control. A failure to meet the basic psychological needs has been found to predict, according to this study, unhealthy weight control indirectly through a sequence comprising the appearance based on self-worth and anxiety caused by physical appearance. Overall, basic psychological need satisfaction protects individuals against the appearance based values and anxiety caused by the physical appearance, as well as from unhealthy weight control.

AIMS

The main aim of this study is to explore how factors of body dissatisfaction and self-determination at the beginning of university studies (T1) contribute to the occurrence of disordered eating indicators two years later (T2) among university students from Hungary, Lithuania and Slovakia. Longitudinal approach of the present study enables us to explore the natural pattern of behavior, which is independent of any interventions. This study also aims to explore the mediation effect of body dissatisfaction at T1 in the relationship between general self-determination at T1 and risk of disordered eating at T2.

PROCEDURE

This work is based on the data from the Student Life Cohort in Europe (SLiCE), a multinational longitudinal study among first year university students from several European countries. Nine universities took part in the study: four universities in Kaunas, Lithuania, the University of Budapest and the University of Miskolc in Hungary and three universities in Kosice, Slovakia. The total number of the first year students attending all the above mentioned universities was 16369 (4210 in Hungary, 5793 in Lithuania and 6366 in Slovakia). At each location, students were asked to complete self-administered online questionnaires. The universities in Lithuania and Slovakia provided access to e-mails of all enrolled students. The project was introduced to students during regular lectures and seminars as well as through additional ways such as flyers, notice boards, student newspapers, websites and student associations. The students were directly invited to participate in the survey by e-mail. Hungarian students

were informed using university newsletters and other formal and informal channels. Following that, they registered on www.slice-study.eu and filled in the questionnaire. Students' participation in the study was voluntary and anonymous. Permission to conduct the study was granted by the ethical commissions of participating institutions. In total, the sample consisted of 2357 students (783 from Hungary, 976 from Lithuania and 598 from Slovakia. 310 students (91 from Hungary; 122 from Lithuania and 97 from Slovakia) participated at the study again two years later.

SAMPLE The number of participants of this study at the first round was 2357 and consisted of first year university students [Hungary: 783 participants (33.3%), 75.2% females; Lithuania: 976 (41.4%), females 69.4%; Slovakia: 598 (25.4%), females 74.2%]. The average age of the students from Hungary was 21.36, SD=5.71, the students from Lithuania 20.00, SD=2.83 and the students from Slovakia 19.61 SD=1.42. 310 students [Hungary: 91 (29.4%), females 65.9%; Lithuania: 122 (39.4%), females 73.8%; Slovakia: 97 (31.3%), females 81.4%] participated in the study two years later.

MEASURES *The Self-determination Scale*, SDS (Sheldon, 1995) is a 10-item self-report instrument that measures two domains of self-determination: Self contact/ Awareness of Self and Choicefullness/ Perceived Choice –5 items per subscale. Subjects are asked to choose which of two statements feels truer (e.g.: "A. I always feel like I choose the things I do. - B. I sometimes feel that it's not really me choosing the things I do."; "A. My emotions sometimes seem alien to me. - B. My emotions always seem to belong to me."). The score for the subscales is computed by averaging the item scores for the 5 items within each subscale and an overall SDS score is computed by summing the subscale. In the present study, we use the overall SDS score only. A higher score indicates a higher level of self-determination. Cronbach's alpha coefficient for internal consistency of SDS reached an acceptable value of 0.79.

The Body Dissatisfaction Scale, EEICA (Escala de Evaluación de la Insatisfacción Corporal para Adolescents) measures the frequency of behavior connected to body care, body perception and social influences. The EEICA (Conti, Slater & Latorre, 2009) consists of 32 questions (e.g.: "How often do you think your friends generally have a body more beautiful than yours?", "How often do you analyze the composition of calories from food, to control what is fat?", "How often do you think women of your age seem to be

fatter than you?") with 6 responses on a Likert scale (1 - never to 6 - always). The score is calculated from the sum of the responses. The higher the score, the greater the young person's body and weight dissatisfaction is (Conti, Slater, & Latorre, 2009). The internal consistency of the scale assessed by Cronbach's Alpha was 0.90. Principal axis factoring analyses of EEICA (Hricová, Orosová & Gajdošová, 2015) uncovered two main factors od body dissatisfaction which are used for further analyses in the present study. Cronbach's alpha for Factor 1 (F1) – „Self-acceptance and acceptance by others based on appearance" is .91 and for Factor 2 (F2) – „Weight control together with efforts to improve one's appearance" is .87.

Risk of disordered eating. SCOFF (Morgan, Reid & Lacey, 1999) is short screening tool for detecting a risk of eating disorders (anorexia/bulimia) consisting of 5 items (self-induced vomiting, loss of control over eating, weight-loss, body image distortion, impact of food on life). However, the first item had to be excluded from the analysis as Lithuanian translation differed significantly from the original meaning of the question. The sample was divided into those who did not report any indicator of disordered eating [not at risk of disordered eating (DE)] and those who reported at least one indicator (at risk of DE). Cronbach alpha for this instrument at T1 was .46 and .44 at T2. Spearman-Brown coefficients and Guttman Split-half coefficients for both times reached values .55. These relatively low values can be influenced by the small number of factors.

All questions were compiled in English and translated into the local languages using back translation. The research team reviewed any cases of disagreement and the authors familiar with the respective languages made the final decisions.

STATISTICAL ANALYSIS

For exploring gender differences and differences between countries nonparametric statistics were used, after violating the assumption of homogeneity of variances. The Mann-Whitney U tests were conducted to test for gender differences. The Kruskal-Wallis tests were used to see if there were significant differences between the three countries. In addition, follow-up Mann-Whitney U tests were used to examine the significant differences between each country. The Bonferroni adjustment to the alpha level was applied and after that the alpha level .017 for each comparison was set. A binary logistic regression after following all assumptions was performed to assess the ability of

factors of BD and self-determination at the beginning of university studies to predict the risk of disordered eating two years later. To explore mediation effect of body dissatisfaction at T1 on a relationship between general self-determination at T1 and risk of disordered eating at T2 series of linear and logistic regressions were done. Sobel test was used to statistically investigate the effect of the proposed mediator. SPSS 20.0 was used for the data analyses.

RESULTS

Descriptive statistics, gender differences and differences between countries

The results of descriptive analyses (Table 56) showed that more women than men reported at least one indicator of DE (at risk for DE) at both times of measurement in each country. In addition, the biggest number of students were at risk of DE was found in Lithuania when compared to other countries at both measurement periods.

Table 56 Descriptive statistics for risk of DE among women and men for Slovakia, Lithuania and Hungary separately

country	At risk of DE at T1		Not at risk of DE at T1		At risk of DE at T2		Not at risk of DE at T2	
	women	men	women	men	women	Men	women	men
Hungary	152 (26.2%)	34 (17.8%)	428 (73.8%)	157 (82.2%)	23 (38.3%)	7 (23.3)	37 (61.7%)	23 (76.7)
Lithuania	162 (53.3%)	14 (14.7%)	142 (47.7%)	58 (61.1%)	46 (51.1%)	14 (48.3%)	44 (48.9%)	15 (51.7)
Slovakia	167 (40.8%)	44 (32.6%)	242 (59.2%)	91 (67.4%)	30 (38%)	3 (20%)	49 (62%)	12 (80%)

Note. DE – disordered eating; T1 – at the beginning of university studies, T2 – two years after beginning of the studies

The results of the U-tests (Table 57, Table 58) revealed significant gender differences in body dissatisfaction, U= 105506, z=-10.078, p<.001, self-acceptance and acceptance by others based on appearance, U= 144319, z=-4,974, p<.001, weight control together with the efforts to improve one's appearance, U= 110602.5, z=-11.63, p<.001, the total score in disordered eating indicators at T1, U= 243273.5, z=-3,89, p<.001 and self-determination,U= 221039, z=-2,04, p<.05. No significant differences were found in total score

in disordered eating indicators at T2, U= 7543, z= -1.614, p=.11. The median values of body dissatisfaction, self-acceptance and acceptance by others based on appearance, weight control together with efforts to improve one's appearance and mean ranks of disordered eating all at T1 were significantly higher for women when compared to men (Table 57, Table 58). Men, on the other hand, reached significantly higher mean rank in self-determination (Table 57).

Table 57 Characteristics of the body dissatisfaction, factors of body dissatisfaction and general self-determination (median, interquartile range) by country and by gender

| | BD | | F1 | | F2 | | GSD | |
country	median	IQR	median	IQR	median	IQR	median	IQR
Hungary	81.5	39.25	34.5	21.5	16.5	11.25	41	9.25
Lithuania	96.5	49.75	37	19.5	23	16.75	36	9
Slovakia	89	44.5	33	16.5	21	12	39	11.5
male	76.5	24	29	15.75	14	6.75	832.78*	7.75
female	96	47.5	36	20	22	15	778.85*	11

*Note. BD=body dissatisfaction, F1=self-acceptance and acceptance by others based on appearance, F2= Weight control together with efforts to improve one´s appearance, GSD=general self-determination, IQR=interquartile range; *Mean Rank values (better discriminate gender differences in GSD)*

Table 58 Characteristics of the total score in disordered eating indicators at T1 and T2 (mean rank, interquartile range) by country and by gender

| | DE at T1 | | DE at T2 | |
country	mean rank	IQR	mean rank	IQR
Hungary[a]	540.17	1	95.33	1
Hungary[b]	624.36		93.57	
Lithuania[a]	699.57	1	115.70	1
Lithuania[c]	513.44		118.23	
Slovakia[b]	719.41	1	95.37	1
Slovakia[c]	451.46		99.65	
male	788.85	1	139.43	1
female	879.85		156.06	

Note. aHungary vs. Lithuania, bHungary vs. Slovakia, cLithuania vs. Slovakia; DE=total score in disordered eating indicators, T1=at the beginning of university studies, T2=two years after beginning of the studies

The results of the Kruskal-Wallis tests, reported in Table 57 and Table 58 revealed significant differences between countries in weight control and in the efforts to improve one's appearance, χ^2=11.48, p<.05, total score in disordered eating indicators at T1, χ^2=86.03, p<.001 and T2, χ^2=9.43, p<.05 and self-determination, χ^2=15.51, p<.001. No significant differences were found in body dissatisfaction, χ^2= 2.46, p=.29 and self-acceptance and acceptance by others based on the appearance, χ^2=5.59, p=.61. The follow-up U-tests showed significant differences between Slovakia and Lithuania in weight control as well as in the effort to improve one's appearance, U=90425.5, z=-3.22, p<.017, disordered eating at T1, U=97163.5, z=-3.84, p<.017 and T2, U=4913, z=-2,417, p<.017 and self-determination, U=111705.5, z=-3.35, p<.017. Lithuanians reached significantly higher median scores in weight control and in the effort to improve one's appearance, mean ranks of disordered eating at T1 and T2 and a lower median score in self-determination when compared to Slovaks (Table 57, Table 58). Similar results were observed with regard to differences between Hungary and Lithuania, F2: U=94099, z=-2.71, p<.017, DE at T1, U=116739.5, z=-9.15, p<.017, DE at T2: U=4489, z=-2,68, p<.017 and self-determination, U=117745, z=-3.57, p<.017. Differences between Slovakia and Hungary were significant only in disordered eating, U=182412.5, z=-5.52, p<.017, where Slovaks reached higher mean rank scores than the Hungarian students (Table 58).

Predictors of disordered eating

Binary logistic regression was performed to assess the impact of factors at the beginning of university studies (T1) on the likelihood that respondents would report at least one indicator of disordered eating two years later (T2). The full model contained three controlled variables (gender, country and risk of disordered eating at T1) and three independent variables (two factors of body dissatisfaction and general self-determination at T1). As cited in Hartmann, Dohle and Siegrist (2015, according to Cohen, Cohen, West, & Aiken, 2003), this approach takes into account that participants' disordered eating at T2 depends on their initial disordered eating at T1 by including T1 values as independent variables in the regression model. This enables the removal of the potential influence of the disordered eating at T1 as well as the influence of gender and country, so that the estimated effects of the other variables are independent of it. The

full model containing all predictors was statistically significant, X2=53.57, df=7, p<.001. The model explained between 21.1% and 28.4% of the variance in the occurrence of DE indicators and correctly classified 79.9% of cases.

As reported in Table 59, Weight control together with the efforts to improve one's appearance (as a second factor of body dissatisfaction) made a statistically significant contribution to the model after controlling for gender, country and a risk of DE at T1. A higher score in weight control together with the efforts to improve one's appearance at the beginning of the studies increased the likelihood of the respondents to be in the DE group after two years. On the other hand, neither Self-acceptance, acceptance by others based on appearance (as the first factor of body dissatisfaction) nor general self-determination at the beginning of the studies appeared to be significant in the model. As reported in table 59, the odds ratio of 1.10 for factor Weight control and the efforts to improve one's appearance indicated that with increasing level of the score in this factor respondents were 1.10 times more likely to report at least one indicator of DE. None of the interaction effects was found to be significant.

Table 59 Binary logistic regression predicting likelihood of risk of disordered eating at T2

		B	df	OR	p	95.0% C.I.	
gender[a]		.04	1	1.05	.91	.48	2.29
country[b]	Slovakia	.597	1	1.82	.11	.88	3.76
	Hungary	.21	1	1.23	.61	.55	2.75
risk of DE at T1[c]		1.17	1	3.23	<.001	1.65	6.34[c]
acceptance at T1		-0.02	1	0.98	0.23	0.95	1.01
control at T1		0.07	1	1.07	<.05	1.03	1.13
GSD at T1		-.02	1	.98	.43	.93	1.03

Note. [a] men as a reference group; bLithuania as a reference group; DE - disordered eating; GSD – general self-determination; T1 – at the beginning of university studies, T2 – two years after beginning of the studies

After the logistic regression analyses, mediation analysis with a dichotomous outcome variable was conducted. It was explored whether there is a significant indirect effect of general self-determination at T1 on risk of disordered eating at T2 mediated by the body dissatisfaction at T1 as well as by the factor of body dissatisfaction significant in the model predicting risk of

DE - Weight control together with efforts to improve one's appearance at T1. Series of linear and logistic regressions (Table 60, Table 61, Table 62, Table 63) were done controlling for gender, country and risk of disordered eating at T1.

Table 60 Linear Regression model of body dissatisfaction predicted by general self-determination after controlling for gender and country

		B	Beta	t	P
gender[a]		15.86	.24	10.01	<.001
country[b]	Hungary	.73	.01	.44	,66
	Slovakia	–2.21	–.03	–1.24	,22
GSD at T1		–1.69	–.39	–16.07	<.001

Note. [a]males as a reference group; [b]Lithuania as a reference group; GSD= general self-determination; T1 – at the beginning of university studies

Table 61 Binary Logistic Regression model of risk of disordered eating predicted by general self-determination (1) and risk of eating disorder predicted by general self-determination and body dissatisfaction (2) after controlling for gender, country and risk of disordered eating

		B	df	OR	p	95.0% C.I.	
Model 1							
Gender[a]		–.32	1	.72	.36	.36	1.46
Country[b]	Slovakia	–.22	1	.81	.56	.39	1.67
	Hungary	.302	1	1.353	.400	.669	2.734
Risk of DE at T1[c]		–1.613	1	.199	<.001	.112	0.356
GSD at T1		–.032	1	.969	.132	.929	1.010
Model 2							
Gender[a]		–.124	1	.884	.754	.408	1.915
Country[b]	Slovakia	–.099	1	.905	.803	.414	1.979
	Hungary	.550	1	1.733	.145	.828	3.629
Risk of DE at T1[c]		–1.231	1	.292	<.001	.151	0.562
GSD at T1		–.009	1	.991	.693	.946	1.038
BD at T1		.015	1	1.015	<.05	1.002	1.028

Note. Statistical parameters for Sobel test: z=–2.124, p<.05; [a]males as a reference group; [b]Lithuania as a reference group; [c]participants not at risk of DE as a reference group; GSD= general self-determination; DE=disordered eating; BD=body dissatisfaction

The results of the linear regression analyses revealed that general self-determination at T1 was inversely related to body dissatisfaction at T1 (Table 60). The results of the logistic regression analyses (Table 61) revealed that the probability of being at a risk for DE at T2 was increased when a higher level of body dissatisfaction was present. General self-determination was not found significant in the tested models. Furthermore, the Sobel test (Table 61) indicated a significant indirect effect of general self-determination at T1 on risk of disordered eating at T2 through body dissatisfaction at T1.

The results of the linear regression analyses revealed that general self-determination at T1 was inversely related to Weight control and the efforts to improve one's appearance (Table 62). The results of the logistic regression analyses (Table 63) indicated, that the probability of being at a risk for DE at T2 was increased by a higher level of Weight control together with the efforts to improve one's appearance at T1. General self-determination was not significant in the models. Furthermore, the Sobel test (Table 63) uncovered a significant indirect effect of general self-determination at T1 on risk of disordered eating at T2 through the Weight control together with the efforts to improve one's appearance at T1.

Table 62 Linear Regression model of Weight control together with efforts to improve one's appearance (as factor of body dissatisfaction) predicted by general self-determination after controlling for gender and country

		B	Beta	t	P
gender[a]		6.67	.273	11.240	<.001
country[b]	Hungary	-.982	-.042	-1.592	.112
	Slovakia	-1.245	-.050	-1.866	.062
GSD at T1		-0.5190	-.321	-13.223	<.001

Note. [a]males as a reference group; [b]Lithuania as a reference group; GSD= general self determination

Table 63 Binary Logistic Regression model of risk of disordered eating predicted by general self-determination (1) and risk of eating disorder predicted by general self-determination and Weight control together with efforts to improve one's appearance (as factor of body dissatisfaction) (2) after controlling for gender, country and risk of disordered eating

		B	df	OR	p	95.0% C.I.	
model 1							
gender[a]		-.32	1	.72	.36	.36	1.46
country[b]	Slovakia	-.22	1	.81	.56	.39	1.67
	Hungary	.302	1	1.353	.400	.669	2.734
risk of DE at T1[c]		-1.613	1	.199	<.001	.112	.356
GSD at T1		-.032	1	.969	.132	.929	1.010
model 2							
gender[a]		-.106	1	.899	.789	.414	1.955
country[b]	Slovakia	-.166	1	.847	.670	.395	1.82
	Hungary	.350	1	1.419	.342	.689	2.922
risk of DE at T1[c]		-1.272	1	.280	<.001	.147	.534
GSD at T1		-.016	1	.984	.474	.942	1.028
control at T1		.042	1	1.043	<.05	1.007	1.080

Note. Statistical parameters for Sobel test: z= -2,298, p<.05; [a]males as a reference group; [b]Lithuania as a reference group; [c]participants not at risk of DE as a reference group; GSD= general self-determination; DE=disordered eating; BD=body dissatisfaction

DISCUSSION The present study has explored the association between body dissatisfaction, self-determination and risk of disordered eating among university students. First of all, body dissatisfaction seems to be a complex concept consisting of numerous components. The conducted factor analyses of the Body dissatisfaction scale among Hungarian, Lithuanian and Slovak students (Hricová, Orosová, & Gajdošová, 2015) in contrast to Baile, Grima and Landivar (2003) uncovered three factors in each country. The factor 1 – „Self-acceptance and acceptance by others based on appearance" and the factor 2 – „Weight control together with efforts to improve one's appearance" were expected to be associated with risk of disordered eating. Thus, the full model with both factors of body dissatisfaction and self-determination both measured at the beginning of university studies predicted risk of disordered eating two years later while controlling for gender, country and risk of disordered eating at the baseline.

However, only the Factor F2 at the baseline was significantly associated with the risk of disordered eating two years later. The results suggest that behavioral aspects of body dissatisfaction are relevant in disordered eating in the long term. The American Psychiatry Association (APA, 2010) considers unhealthy weight control, such as fasting or skipping meals and eating very little food, to be the main predictor of eating disorders, which partially corresponds with the items of F2. The assumption of self-determination's latent role in the context of body dissatisfaction and disordered eating was further addressed by exploring the indirect effect. First of all, the relationship between self-determination and body dissatisfaction was addressed. Self-determination was found to be negatively associated with body dissatisfaction, which is in line with the previous studies of Frederick & Grow (1996), Thøgersen-Ntoumani & Ntoumanis (2007). Pelletier and Dion (2007) and Pelletier, Dion, & Lévesque (2004) highlight the importance of global self-determination which is theorized to produce a buffering effect against sociocultural pressures about body image. These pressures were found to be associated with greater body dissatisfaction of young adult women. The more self-determined women were, the less they perceived and internalized the sociocultural pressure about the body image. The above mentioned studies were all carried out on female samples. However, autonomy, when measured as need satisfaction, was found to predict body image concerns of both males and females in the group of aerobics instructors (Thøgersen-Ntoumani & Ntoumanis, 2007). All these findings seem to be congruent with our results. Furthermore, a model based on the Self-determination theory has been developed. In this model lower self-determination is assumed to lead to concerns about one's body image and the struggle for having control over the body by creating a substitutional need which in turn can result in disordered eating Williams et al., 2000; Ryan & Deci 2000). Our hypothesis was confirmed when a significant negative indirect effect of self-determination at the beginning of university studies was found with regard to risk of disordered eating two years later and mediated by weight control and the efforts to improve one's appearance. In line with our results, this inverse relationship between the satisfaction of the three basic psychological needs and unhealthy weight control mediated by body image concerns was also shown in the study of Thøgersen-Ntoumani, Ntoumanis and Nikitaras (2010). The indirect effect of self-determination on unhealthy eating behavior was also found

in the study by Thøgersen-Ntoumani et al. (2011) where the basic psychological need satisfaction was found to protect individuals against the appearance based values and the anxiety caused by physical appearance, which in turn had a protective effect with regard to unhealthy weight control. However, our study worked with the concept of general self-determination rather than with the concept of basic psychological needs satisfaction which was studied in the above mentioned studies. A similar concept with a significant role of self-esteem as a mediator between autonomy and disordered eating behavior was revealed in the study by Frederick and Grow (1996). In contrast with our study, all previously mentioned studies were cross-sectional, whereas the present study explored longitudinal relationships. To our knowledge, no previous research has documented such evidence using longitudinal data.

FUTURE RESEARCH

Our results add to the knowledge in the area of research of eating disorders and body dissatisfaction, especially with regard to the concept of self-determination, however many issues need further exploration. In particular, experimental studies are needed to address causal relationships in this area. It would be also beneficial to explore psychosocial predictors of body dissatisfaction among women and men (based on social pressure originating in different sources) and to focus on other potential mediators (internalization of body ideal, social comparisons) of the associations between eating disorders, self-determination and body dissatisfaction. Future research should continue with focusing on men as well, as males are also prone to body dissatisfaction and related problems with its negative impact to health.

LIMITATIONS

It is also important to acknowledge limitations of this study. Firstly, all collected data were based on self-report. Secondly, even though the used measures showed sufficient reliability in every country for exploring the research questions, it must be mentioned that further validation of these methods in the population of university students might improve their psychometric qualities. Thirdly, obtaining a representative sample remains a problem, especially when using an online data collection (Lefever, Dal & Matthiasdottir, 2007). This is also a limiting factor regarding the generalization of the results because those respondents who chose not to participate in the study may have differed from those who did. Although, studies examining the problems with online data collection (Hayes

& Grieve, 2013; Perkins & Haiwang, 2001) have not revealed significant differences regarding the scores in psychological variables when compared to paper based questionnaires. Finally, longitudinal nature of data also contributed to the significant drop-out of participants between the first and second round.

IMPLICATION FOR PRACTICE

The findings of this study could be beneficial for psychological prevention and intervention strategies focusing on improvement of body satisfaction among less self-determined male and female university students which could help to decrease the risk of developing eating disorders. Finally, our study highlights the relevance of behavioral indicators of body dissatisfaction in the context of eating disorders among university students shows that they significantly contribute to the disordered eating.

CONCLUSIONS

The present study aimed to explore body dissatisfaction and general self-determination as predictors of disordered eating among university students from Hungary, Lithuania and Slovakia. The association between the two factors of body dissatisfaction and disordered eating was also examined. The factor called "Weight control together with efforts to improve one's appearance" at the beginning of university studies appeared to be significantly associated with the risk of disordered eating two years later after controlling for gender, country and risk of disordered eating at the baseline. However, a direct link between self-determination at the beginning of university studies and risk of disordered eating two years later was not found. Further investigation found evidence of an indirect effect of general self-determination at the beginning of university studies on the risk of disordered eating two years later which was mediated by body dissatisfaction at the baseline. This study is of particular importance because it links self-determination and body dissatisfaction in a coherent model predicting the risk of disordered eating among university students from the three European countries. Focusing on a gender mixed sample, it does not omit males, as they also are vulnerable to body image and eating behavior problems. These findings might serve as a basis for public health strategies by stressing the importance to address behavioral aspects of body dissatisfaction in ED prevention.

Summary

Transition to university is one of the most important life changes of young adults who decide to attend university. Current research suggests that this period is often accompanied by a high prevalence of stress, stress symptoms, depression and anxiety but is also characteristic with pursuing well-being and experiencing positive emotions which are a powerful source of growth. Thus evaluation of university students' health and research of predictors of psychological health with a systematic and comprehensive approach is a very important task. The first chapter is concerned with the exploration of how much variation in health indicators can be explained by the explored predictors. The results presented in this chapter showed that the comprehensive regression models built for the purposes of this chapter were relatively effective in explaining the variance in health indicators. The models of this research explained 38% of variance in emotional well-being and 51% of variance in depressive symptoms. Multiple regression which was used for these data analyses allowed to explore associations between perceived stress, as a predictor with the hypothesized strongest predictive power, gender, social support, self-regulation, extraversion, emotional stability, resilience and the measured health indicators. Positive associations between extraversion, resilience and emotional well-being were found, and negative associations between perceived stress and emotional well-being were observed. Next, negative associations were found between social support, emotional stability, resilience and depressive symptoms and a positive association between perceived stress and depressive symptoms was observed. Perceived stress, as the strongest hypothesized predictor of both health indicators, was indeed found to fulfil this role, and in addition a partial mediating role of resilience in the relationship between university students' perceived stress and health indicators was found. The moderated mediation analysis presented in this chapter showed that resilience served as a mediator in the relationship between perceived stress and depressive symptoms after controlling for other investigated predictors but only among students with a lower level of social support. Overall, the results of this investigation indicate that resilience may be the key factor which can be used to promote well-being and reduce risk for developing mental health problems. Implementation of interventions focused on resilience may be beneficial for university students.

The second chapter firstly provides a brief theoretical overview of the main constructs used in the subsequent empirical investigation. These constructs include life perspective, autonomy, well-being and alcohol use as well as its determinants in the context of university students. Secondly, in the following

empirical investigation, this chapter focuses on the interrelations between these constructs. In particular, it addresses the association between life perspective and alcohol use as well as well-being, while it is mainly concerned with the role of autonomy. Autonomy is conceptualized within the Self-determination theory as a trait like characteristic and as a dimension related to self-regulatory process. Both conceptualizations were used in this chapter. With regard to operationalizations of other explored constructs life perspective is conceptualized as an autonomously driven goal-directed behavior and defined within the tenets of the Self-determination theory. Individual differences in autonomous functioning as well as autonomous self-regulation are then explored in relation to alcohol use, motivation to alcohol use and selected indicators of well-being. These associations are investigated by using two separate samples of university students. Individual differences were addressed in the Sample 1 containing longitudinal data (n=243; 80% females, mean age = 20.84 SD=3.64) which was taken from a larger international longitudinal study SLiCE and autonomous regulation of life goals which was addressed in a cross-sectional Sample 2 (n= 141; 73% women, mean age 21.3 SD = 1.3). Linear regression was used as the main statistical tool to analyze the data. The results of the empirical investigations showed that individual differences in autonomy were relatively strongly related to various indicators of well-being and especially indicators of mental health such as depression. However, autonomy in its explored operationalizations did not seem to be directly associated with alcohol use. Furthermore, it was found to be only weakly associated with the motivation to alcohol use as its most proximal factor. Many obtained results with this respect were found to be statistically insignificant and suggesting lack of direct associations. However, the role of autonomous processes cannot be completely disregarded but the future research should address the role of autonomy in life perspective with a more precise and detailed measurement such as measuring the autonomous aspects of drinking behavior and focus in more detail on the goal content with regard life perspective.

The third chapter explores the role of decision-making styles in the selected types of risk behavior. Data from the second round of the SLiCE study were used with 212 respondents (83.5% females) who provided data for all variables. The variables, with the exception of decision-making styles, included five kinds of risk behavior – alcohol use (identified by AUDIT, three subscales and the total score (Babor et al., 2001), smoking (number of cigarettes during the last month), junk food consumption (summed score of four questions), risk sexual behavior (two questions) and problematic internet use (GPIUS2, five subscales and the total score, Caplan, 2010). All kinds of risk behavior were dichotomized into categories (a) low, or no occurrence of risk behavior descriptive statistics with inner consistency, and (b) higher occurrence of risk behavior. As the decision-making styles measure (GDMS, Scott & Bruce, 1985) has been used for the first

time in Slovakia, its basic characteristics are presented in the first part of results. They include the GDMS factor structure, descriptive statistics with subscales` inner consistency (Cronbach alpha) and correlations among subscales. A polynomial binary logistic regression was used to assess the role of gender and mainly decision-making styles as possible predictors of risk behavior. The results are very heterogeneous across various kinds of risk behavior. A higher reported use of the avoidant and spontaneous decision-making styles was associated with more risky alcohol use but problematic internet use was related mainly to higher use of the avoidant style, but also with the lower use of the intuitive style. The spontaneous style predicted smoking positively, the dependent style predicted number of sexual partners negatively. The results indicate that there is a different base of the studied types of risk behavior and that decision-making styles play only a limited role in their explanation.

The main aim of fourth chapter was to explore the importance of the descriptive normative beliefs and their change in different risk behaviors. This aim consisted of two partial aims: (1) to explore whether the changes in descriptive normative beliefs contribute to the subsequent occurrence of different risk behaviors in a large sample of university students from 5 European countries within a longitudinal design; (2) to explore the data from the first wave from the developed online application, which was created with the aim to change descriptive normative beliefs among university students at PJ Šafárik University in Košice. Two research samples were used. The first research sample was taken from the 1st, 2nd and 3rd wave of the SLiCE study conducted among university students from 5 European countries. The data were collected from 2981 university students at the baseline (T1, in 2011); 1041 university students at T2; and 534 university students at T3. The second research sample was from the 1st wave of data collection collected via the mentioned online application. The data were collected from 403 university students from PJ Šafárik University. Both research samples completed online questionnaires which measured sociodemographic variables, different risk behaviors and descriptive normative beliefs about risk behaviors of a typical student. It was found, in line with the first aim, that the changes in risk behavior and descriptive normative beliefs occurred over time. Furthermore, it was found that the changes in descriptive normative beliefs contributed to the future occurrence of risk behavior. The respondents with a higher increase of corresponding descriptive normative beliefs were more likely to report alcohol use at T2 and T3; marihuana use at T2; sexual risk behavior at T2 in comparison to those with a lower increase of descriptive normative beliefs. Moreover, it was found among, Slovak university students, that higher descriptive normative beliefs about internet use did not significantly contribute to the problematic internet use but were related to a more frequent use of the internet for leisure activity. These findings form a base from which the online application was developed. The second aim of this

chapter was to explore the data from this online application. The significant positive associations between risk behaviors and descriptive normative beliefs about risk behavior were found. Respondents who believed in a higher level of risk behavior of a typical students had a higher level of risk behavior. It was also shown that a cumulating effect exists in risk behaviors, except for problematic internet use. Moreover, the tendency to overestimate different risk behaviors was also shown. This chapter emphasizes the importance of descriptive normative beliefs in different risk behaviors and supports the idea of using the descriptive normative beliefs within intervention programs in the context of different risk behaviors.

University students, and first year university students in particular, face a range of academic and social challenges as they adjust to college life that can place them at risk for a number of negative outcomes, including alcohol-related problems. The purpose of the fifth chapter was to explore the prevalence of alcohol consumption, alcohol dependence and alcohol related problems among university students across several European countries. We also focused on the exploration of the relationship between mental health variables, self-regulation and alcohol consumption (total AUDIT score), alcohol dependence and alcohol related problems. The third aim was to assess the relationship between mental health variables, self-regulation and reduction of alcohol consumption, alcohol dependence and reduction of alcohol related problems two years after entering the university environment. Overall, this chapter found the highest prevalence of alcohol consumption, alcohol related problems and alcohol dependence in the Czech and Slovak Republics followed by Lithuania, Hungary and Germany. No significant reduction was found with respect to any alcohol use pattern and any in studied country. In contrary, we found for example in Lithuania that alcohol consumption increased after two years. The results from this chapter on sample from five European countries showed that perceived stress, depressive symptoms were not independently associated with the alcohol consumption, alcohol dependence and alcohol related problems, nor their reductions. Self-regulation was found to be significantly negatively associated with alcohol consumption (total AUDIT score), alcohol dependence and also alcohol related problems. Self- regulation was also not associated with alcohol use reduction related patterns.

The last chapter aimed to explore body dissatisfaction and general self-determination as predictors of disordered eating among university students from Hungary, Lithuania and Slovakia. The association between the two factors of body dissatisfaction and disordered eating was also examined. Factor called "Weight control together with efforts to improve one's appearance" at the beginning of studies appeared to be significantly associated with risk of disordered eating two years later after controlling for gender, country and risk of disordered eating at the beginning of studies, whereas the direct link between

self-determination at the beginning of the studies and risk of disordered eating after two years was not found. Further investigation revealed the indirect effect of general self-determination at the beginning of the studies on the risk of disordered eating two years later through the body dissatisfaction at the beginning of the studies. This chapter is of particular importance as it links self-determination and body dissatisfaction in a coherent model predictive of risk of disordered eating among university students from the three European countries. It uses a gender mixed sample showing that males are also vulnerable to body image and eating behavior problems. These findings might serve as a basis for public health strategies by suggesting the importance to address the behavioral aspects of body dissatisfaction in ED prevention.

Zhrnutie

Výskumne je potvrdené, že tranzitné obdobie prechodu na univerzitné štúdium je obdobím najdôležitejších životných zmien charakterizované prítomnosťou stresu, depresívnych symptómov, anxiety, ako aj pohodou, pozitívnymi emóciami, ktoré sú významným zdrojom ďalšieho rozvoja a napĺňania životnej perspektívy. Dôležitou vedeckovýskumnou výzvou je systematický a komplexnejší výskum so zdravím súvisiaceho správania a jeho prediktorov. Realizované bolo skúmanie umožňujúce lepšie porozumenie tomu, aký je podiel vybraných prediktor na vysvetľovaní indikátorov zdravia. Výsledky potvrdili uspokojivú vysvetľujúcu silu mnohonásobných regresných modelov, 38% variancie vysvetľoval model emocionálnej pohody a 51% variancie vysvetľoval model depresívnych symptómov. Následne boli kreované komplexnejšie mnohonásobné regresné modely, ktoré umožnili skúmanie asociácie medzi percipovaným stresom (tzn. prediktorom s najsilnejšou hypotetizovanou predikčnou silou), rodom, sociálnou oporou, sebareguláciou, extroverziou, emocionálnou stabilitou, rezilienciou a indikátormi zdravia. Potvrdená bola štatisticky signifikantná pozitívna asociácia medzi extroverziou, rezilienciou a emocionálnou pohodou, negatívna asociácia medzi percipovaným stresom a emocionálnou pohodou. Štatisticky signifikantná negatívna asociácia bola potvrdená medzi sociálnou oporou, emocionálnou stabilitou, rezilienciou a depresívnymi symptómami, pozitívna asociácia medzi percipovaným stresom a depresívnymi symptómami. Preukázala sa tiež hypotetizovaná najsilnejšia predikčná sila percipovaného stresu vo vzťahu k depresívnym symptómom, ako aj čiastočná mediačná rola reziliencie vo vzťahu percipovaného stresu a obidvoch indikátorov zdravia. Mediačné analýzy boli realizované s kontrolou ostatných skúmaných prediktorov, podobne ako to bolo aj v prípade moderovanej mediácie, ktorá potvrdila čiastočnú mediačnú rolu reziliencie vo vzťahu percipovaného stresu a depresívnych symptómov, ale iba medzi vysokoškolákmi s nižšou úrovňou sociálnej opory. Skúmanie potvrdilo kľúčovú rolu reziliencie v podpore emocionálnej pohody a v redukcii rizika mentálnych problémov. Tieto výsledky podporujú dôležitosť dostupnosti na reziliencii založených intervencií medzi vysokoškolákmi.

Druhá kapitola prezentuje stručný teoretický prehľad hlavných konštruktov použitých v prislúchajúcom empirickom výskume (životná perspektíva, autonómia, psychická pohoda a užívanie alkoholu, ako aj jeho determinanty, hlavne z hľadiska kontextu populácie vysokoškolských študentov). Následne sú v kapitole prezentované výsledky empirického výskumu, ktorý sa zameriava na vzájomné vzťahy medzi jednotlivými konštruktmi. Týmto spôsobom je skúmaný vzťah medzi životnou perspektívou a užívaním alkoholu ako aj psychickou

pohodou. V rámci výskumu sa sústreďujeme predovšetkým na úlohu autonómie, ktorá je v rámci Seba-determinačnej teórie koncipovaná ako osobnostná charakteristika alebo ako dimenzia vzťahujúca sa k seba-regulačnému procesu. S ohľadom na uvedené je životná perspektíva chápaná ako autonómne regulované na cieľ orientované správanie a je definovaná v rámci princípov Seba-determinačnej teórie. Individuálne rozdiely v autonómnom fungovaní, rovnako ako autonómna seba-regulácia sú následne skúmané vo vzťahu k užívaniu alkoholu, motivácii k užívaniu alkoholu a k vybraným ukazovateľom psychickej pohody. Uvedené vzťahy sú skúmané pomocou dvoch samostatných vzoriek vysokoškolských študentov. Individuálne rozdiely boli skúmané vo vzorke 1 pozostávajúcej z longitudinálnych dát (n = 243, 80% žien, priemerný vek = 20,84 SD = 3,64), ktoré pochádzali z väčšej medzinárodnej longitudinálne štúdie SLiCE. Autonómna regulácia životných cieľov bola skúmaná na prierezových dátach vo vzorke 2 (n = 141, 73% žien, priemerný vek 21,3 SD = 1,3). Využitá bola lineárna regresia ako hlavný štatistický nástroj pre analýzu dát. Z výsledkov empirických analýz vyplynulo, že individuálne rozdiely v autonómii sú pomerne úzko prepojené s rôznymi ukazovateľmi psychickej pohody a to najmä s ukazovateľmi duševného zdravia, ako je depresia. Avšak, autonómia vo svojich skúmaných operacionalizáciách sa nejaví byť v priamom vzťahu s užívaním alkoholu. Zistená bola iba slabá asociácia s motiváciou k užívaniu alkoholu ako jeho najproximálnejšieho faktora. Mnoho zo získaných výsledkov nebolo štatisticky významných a naznačili nedostatok priamej asociácie. Napriek tomu, však rolu autonómnych regulačných procesov nie je možné zo skúmanej oblasti celkom vylúčiť. Budúci výskum by sa mal zamerať na úlohu autonómie s ohľadom na životnú perspektívu s presnejším a detailnejším meraním, tj. branie do úvahy autonómnych aspektov správania súvisiaceho s užívaním alkoholu a zamerať sa tiež podrobnejšie na obsah životných cieľov vzhľadom na životnú perspektívu.

Hlavným cieľom tretej kapitoly bolo sledovať možnú úlohu rozhodovacích štýlov vo výskyte rizikového správania. Použité boli dáta z druhého zberu štúdie SLiCE, konkrétne od 212 respondentov (83,5% žien), ktorí poskytli údaje o všetkých potrebných premenných. Tie zahŕňali okrem rozhodovacích štýlov aj päť druhov rizikového správania – užívanie alkoholu (zisťované dotazníkom AUDIT, tri subškály a celkové skóre), fajčenie (počet vyfajčených cigariet za posledný mesiac), konzumáciu nezdravých jedál (sumárne skóre štyroch otázok), rizikové sexuálne správanie (dve otázky) a problematické užívanie internetu (GPIUS2, päť subškál a celkové skóre). Všetky druhy rizikového správania boli dichotomizované do kategórií: (a) nízky, resp. žiaden výskyt rizikového správania a (b) vyšší výskyt rizikového správania. Vzhľadom na prvotné použitie metodiky na vyhodnotenie rozhodovacích štýlov na Slovensku (GDMS) sú v úvode výsledkovej časti prezentované jej základné parametre – faktorová štruktúra, opisná štatistika subškál s posúdením vnútornej

konzistencie a korelácie medzi subškálami. Úloha rozhodovacích štýlov v rizikovom správaní bola sledovaná prostredníctvom viacnásobnej logistickej regresie so začlenením rozhodovacích štýlov a rodu ako prediktorov. Výsledky sú naprieč rôznymi druhmi rizikového správania veľmi heterogénne. Pri užívaní alkoholu bola s rizikovým správaním spojená vyššia miera vyhýbavého a spontánneho rozhodovacieho štýlu; pri problematickom užívaní internetu najmä vyhýbavého, ale takisto nižšie využívanie intuitívneho štýlu. Spontánny štýl pozitívne predikoval fajčenie, závislý štýl negatívne predikoval počet sexuálnych partnerov. Výsledky poukazujú na výrazne odlišnú povahu skúmaných druhov rizikového správania, pri ktorých vysvetlení majú rozhodovacie štýly len obmedzenú úlohu.

Hlavným cieľom štvrtej kapitoly bolo preskúmať dôležitosť deskriptívnych normatívnych presvedčení a ich zmeny v rámci rôznych rizikových správaní. Tento cieľ pozostával z 2 parciálnych cieľov: (1) preskúmať či deskriptívne normatívne presvedčenia prispievajú k následnému výskytu rôznych rizikových správaní vo veľkej vzorke vysokoškolákov z piatich európskych krajín v rámci longitudinálneho výskumu; (2) preskúmať dáta z prvej vlny zberu z online aplikácie, ktorá bola vytvorená s predpokladom zreálňovania deskriptívnych normatívnych presvedčení u vysokoškolákov Univerzity PJ Šafárika v Košiciach. Použité boli dve výskumné vzorky. Prvá výskumná vzorka pochádzala z 1., 2. a 3. zberu SLiCE štúdie od vysokoškolákov z piatich európskych krajín, konkrétne od 2981 vysokoškolákov na začiatku (T1, 2011); 1041 vysokoškolákov v T2 a 534 vysokoškolákov v T3. Druhá výskumná vzorka pochádzala z 1. zberu vytvorenej online aplikácie. Dáta boli získané od 403 vysokoškolákov Univerzity PJ Šafárika. Obe výskumné vzorky vyplnili online dotazník, ktorý zisťoval sociodemografické premenné, rôzne rizikové správania a deskriptívne normatívne presvedčenia o rizikovom správaní typického študenta. V rámci naplnenia prvého cieľa bolo zistené, že nastávajú zmeny v čase v rizikovom správaní aj v deskriptívnych normatívnych presvedčeniach. Ďalej bolo zistené, že zmeny deskriptívnych normatívnych presvedčení prispievajú k neskoršiemu výskytu rizikového správania. Respondenti s vyšším nárastom prislúchajúcich deskriptívnych normatívnych presvedčení pravdepodobnejšie hlásili konzumáciu alkoholu v T2 a T3, užívanie marihuany v T2, sexuálne rizikové správanie v T2 v porovnaní s tými, ktorí mali nižší nárast deskriptívnych normatívnych presvedčení. Ďalej sa medzi slovenskými vysokoškolákmi zistilo, že vyššie deskriptívne normatívne presvedčenia o užívaní internetu neprispievajú signifikantne k problematickému užívaniu internetu, ale prispievajú k častejšiemu užívaniu internetu na voľnočasové aktivity. Na základe týchto výsledkov bola vytvorená online aplikácia pre zreálňovanie deskriptívnych normatívnych presvedčení. Druhým cieľom kapitoly bolo preskúmať dáta z tejto online aplikácie. Potvrdené boli pozitívne prepojenia medzi osobným rizikovým správaním a deskriptívnymi normatívnymi

presvedčeniami. Respondenti, ktorí bol presvedčení o vyššej úrovni rizikového správania typického študenta mali vyššiu úroveň osobného rizikového správania. Preukázala bola tiež kumulácia rizikového správania s výnimkou užívania internetu, ako aj tendencia nadhodnocovania rôznych rizikových správaní. Kapitola poukázala na dôležitosť deskriptívnych normatívnych presvedčení v rôznych rizikových správaniach a podporuje myšlienku ich využívania v rámci intervenčných programov vo vzťahu k rôznym rizikovým správaniam.

Pri tom, ako sa vysokoškoláci prvých ročníkov prispôsobujú svojmu novému životu čelia mnohým akademickým a sociálnym výzvam, čo im môže prinášať celý rad negatívnych dôsledkov, vrátane problémov súvisiacich s užívaním alkoholu. Cieľom piatej kapitoly bolo teda zistiť prevalenciu konzumácie alkoholu, závislosti na alkohole a problémov súvisiacich s alkoholom medzi vysokoškolákmi v niekoľkých európskych krajinách. Zamerali sme sa taktiež na vzťahy medzi mentálnym zdravím, sebareguláciou a konzumáciou alkoholu (celkové AUDIT skóre), závislosťou na alkohole, problémami súvisiacimi s alkoholom. Tretím cieľom kapitoly bolo preskúmať vzťah medzi premennými mentálneho zdravia, sebareguláciou a zmenami v konzumácii alkoholu, závislosťou na alkohole, problémami súvisiacimi s užívaním alkoholu po dvoch rokoch od nástupu na univerzitu. Celkovo bol zistený najvyšší výskyt konzumácie alkoholu, problémov súvisiacich s alkoholom a závislosti na alkohole u českých a slovenských vysokoškolákov. Nasledovali študenti z Litvy, Maďarska a Nemecka. V analýzach obsiahnutých v tejto kapitole sme nezaznamenali významnú redukciu v súvislosti so žiadnym sledovaným vzorcom pitia alkoholu. Naopak u študentov z Litvy sa preukázalo zvýšenie konzumácie alkoholu po dvoch rokoch od prvého administrovania dotazníka. Výsledky tejto kapitoly, že ukazovatele mentálneho zdravia (vnímaný stres a depresívne symptómy) nie sú asociované s konzumáciou alkoholu, so závislosťou na alkohole a s problémami súvisiacimi s alkoholom. Podobný výsledok sme zaznamenali aj pri sledovaní vzťahu medzi mentálnym zdravím a zmenou v konzumácii alkoholu, závislosťou na alkohole a problémami súvisiacimi s užívaním alkoholu. Následne sa preukázalo, že sebaregulácia bola významne negatívne asociovaná s konzumáciou alkoholu (celkové AUDIT skóre), so závislosťou na alkohole a tiež s problémami súvisiacimi s alkoholom, avšak nebola spojená s redukciou sledovaných vzorcov pitia alkoholu.

Cieľom poslednej šiestej kapitoly bolo preskúmať nespokojnosť s telom a všeobecnú seba-determináciu ako prediktory dysfunkčného stravovania medzi vysokoškolskými študentmi z Maďarska, Litvy a Slovenska. Skúmaná bola tiež súvislosť medzi dvoma faktormi nespokojnosti s telom a dysfunkčným stravovaním. Faktor s názvom "Kontrola hmotnosti spolu s úsilím o zlepšenie vzhľadu" na začiatku štúdia bol významne asociovaný s rizikom dysfunkčného stravovania o dva roky neskôr po kontrole rodu, krajiny a rizika dysfunkčného

stravovania (z T1), zatiaľ čo, priamy vzťah medzi seba-determináciou na začiatku štúdia a rizikom dysfunkčného stravovania po dvoch rokoch nebol potvrdený. Ďalšie výsledky odhalili nepriamy vplyv všeobecnej seba-determinácie na začiatku štúdia na riziko dysfunkčného stravovania po dvoch rokoch prostredníctvom nespokojnosti s telom na začiatku štúdia. Táto kapitola má mimoriadny význam, pretože integruje všeobecnú seba-determináciu a nespokojnosť s telom v koherentnom modeli predikujúcom riziko dysfunkčného stravovania u študentov VŠ z troch európskych krajín. Zameraním sa na rodovo zmiešanú vzorku, neopomína mužov, nakoľko sú tiež náchylní na problémy s telesným imidžom a stravovacími návykmi. Tieto zistenia by mohli slúžiť ako základ pre stratégie v oblasti verejného zdravia, navrhujúc dôležitosť zaoberať sa behaviorálnymi aspektmi nespokojnosti s telom v prevencii porúch stravovania.

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