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Happiness, stress, depressive symptoms, and health behaviors among Vietnamese university students

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ABSTRACT

Happiness and stress levels differ by age, gender, and nationality and are known to impact student health. Previous studies from multiple countries have reported associations between happiness, stress, and student health outcomes. Information concerning happiness, stress, and health behaviors among Asian students is limited. Thus, this study aimed to describe and investigate (1) differences and associations between happiness, health behaviors, perceived stress, and depressive symptoms, and (2) identify significant predictors of happiness among a sample of Vietnamese university students.

A cross-sectional study conducted during the Fall semester of 2016 included 1775 undergraduate students (mean age 20.23, SD=1.48) from three universities in Vietnam. The questionnaire included subjective happiness and perceived stress scales, depressive symptoms, and health behavior questions. Analyses included descriptive statistics, Student's t-test, ANOVA, univariate, and multivariate binary regression.

Students who were: male, not living with parents, in 2nd, 3rd, and 4th year, attended public and urban universities and were in public health, sport, and physical education majors had significantly lower happiness scores than their comparison groups. Significant univariate associations of happiness included gender, age group, resident status, year in university, university name, major of study, eating more vegetables, quality and quantity of sleep, not drinking caffeinated tea every day, perceived stress, and depressive symptoms. Significant predictors of happiness included living with parents, year in university, university name, eating more vegetables, and perceived stress.

This study identified significant differences, associations, and predictors of happiness in health behaviors, mental health, perceived stress, and socio-demographic variables among Vietnamese students. A counterintuitive finding (positive association) between stress and happiness is discussed and suggestions for further research are recommended.

Implications of this study suggest that happiness plays a significant role in the health of students and provides specific areas of focus (e.g., diet, resident status, stress, type of university, and year in university) for developing future intervention programs for Asian students.

Keywords: happiness, perceived stress, health behaviors, mental health, students, Vietnam.

INTRODUCTION

University students often experience significant emotional, mental, physical, and social challenges [1]. Research has found that the transition to college can be academically and socially stressful for students [2]. Indeed, studies on the cardiovascular health of college students reported that approximately 60% of students had high or very high stress levels [3] and an increased risk of depression and poor mental health [4]. Hence, the ability to cope with stressors associated with college life is important for maintaining both mental and physical health.

To investigate student health, research has focused on understanding the negative impact of stress but also on the factors that promote health and well-being. For example, the science of positive psychology has helped to foster greater success in life, improvement in human functioning, and higher levels of happiness [5,6]. These aspects of positive psychology are believed to benefit overall student development [7].

One area of positive psychology focuses on subjective well-being. Subjective well-being can be understood in the context of two prevailing theories/perspectives (eudaimonic and hedonic). The eudaimonic perspective centers on finding meaning in life and realizing one's potential [8]. The hedonic perspective focuses on maximizing happiness and minimizing pain. The construct of happiness is described as having affective and cognitive components [9].

Moreover, research suggests that positive mental states and high levels of happiness are associated with favorable health outcomes and behaviors related to successful living, such as healthy behaviors, lower delinquent activity, higher incomes, better mental health, a higher education, improved longevity, better work performance ratings, and improved social and personal functioning [10–15]. Therefore, improving happiness levels (positive affect) may also play a causal role in developing positive health outcomes [7]. Additionally, as previously discussed, stress plays a negative role in health outcomes and may be inversely related to happiness levels [14]. This inverse association is important to understand because many of the debilitating effects of stress may be ameliorated by improving the happiness levels of students.

This inverse association between stress and happiness is elucidated by studies that show higher levels of happiness are related to higher levels of physical exercise, not smoking or less cigarette use, less alcohol use, better sleep quality, and quantity, and a sensible diet [16-19]. Thus, individuals with higher levels of happiness (and lower levels of stress) were less likely to participate in a variety of harmful and unhealthy behaviors [20]. The outcomes resulting from an increased positive affect may benefit individual health by enhancing health-promoting activities. Although trends are positive some associations remain mixed and inconsistent between happiness, stress, and behavior choices. [17,21,22]

To address these inconsistencies, studies should consider using larger sample sizes and including participants from different cultures/traditions. This may help to confirm and clarify previous associations between happiness, stress, depressive symptoms, and health outcomes. Furthermore, although there have been multiple happiness and health outcome studies few have included Asian students. [23-25] Thus, cross-cultural studies that include Asian students are needed to further the understanding of happiness and health among students from different Asian countries. Lastly, a comprehensive study on

happiness, perceived stress, depressive symptoms, and health outcomes is needed. Thus far, most research designs have included a limited number of health outcome variables. To provide a better understanding of the associations between happiness and health outcome variables a greater number of health and well-being variables should be included.

Therefore, this study aimed to describe and investigate (1) differences and associations between happiness, healthy behaviors, (including avoidance of or reduction of smoking and alcohol consumption, quality and quantity of sleep, adequate consumption of vegetables, and maintenance of healthy body mass index (BMI)), perceived stress, and depressive symptoms, and (2) identify predictors of happiness among a sample of Vietnamese university students.

METHODS

Study design

A cross-sectional study was carried out at three universities in Vietnam: one university from the north (urban and public) and two universities from the south (both urban, one public and one private).

Study sample

Participants from the three universities (N = 1848) were full-time undergraduate Vietnamese students enrolled during the school year 2016 - 2017.

Students at SouthUni1 (N = 800) and SouthUni2 (N = 800) were randomly selected (200 students from each university-level, 1st, 2nd, 3rd, and 4th year) from university class lists and attended a special session where they received an overview of the research study and instructions for filling out a paper questionnaire. The local research team determined that paper questionnaires would yield the best quality data. Ninety-six

percent of selected students (N = 1537) completed a questionnaire.

Using population sampling, all students at NorthUni (total population = 554) were eligible and invited to complete an online questionnaire (via the Survey Monkey website). Research team members visited each class (a total of 16 classes, 4 classes per university level) to give an overview of the study and invite all students to fill out the online questionnaire at their leisure using the Survey Monkey link to the online questionnaire. A total of 253 students completed the questionnaire (response rate = 45.7%). Online questionnaires were used because the administration did not allow time in class for paper questionnaires to be administered.

Approximately 4% (N = 73) of the questionnaires had more than 10% missing data. These questionnaires were excluded. The SPSS median imputation method was used to replace missing data for cases with <10% missing data.

Measurements

A 41-item research questionnaire with multiple scales and demographic questions was translated by five bi-lingual native speakers into Vietnamese using a collaborative and iterative method to produce a conceptual equivalence to the English items.[26]The questionnaire was piloted by 31 undergraduate Vietnamese students who agreed to fill out the questionnaire online. Cronbach alpha coefficients for the happiness and stress scales were 0.76 and 0.80, respectively.

Subjective Happiness (SH) was measured with the 4-item Subjective Happiness Scale (SHS).[27] The SHS is currently a leading recommended scale of measures of well-being.[28] The SHS uses a 7-point Likert scale. An individual mean SH score was calculated from the four items (range (1) Not at all to (7) A great deal). The subjective happiness scores were dichotomized into *happy* and *non-happy*

categories. The *happy* category included students scoring in the top quartile vs. the *non-happy* students scoring in the lower three quartiles.

Perceived Stress (PS) was measured with the 4-item Perceived Stress Scale (PSS).[29] The PSS is widely used and measures an individual's perception of stress in their life. The PSS uses a 5-point Likert scale, (1) Never, to (5) Very Often. The PS scores were dichotomized into *low perceived stress* and *high perceived stress* categories. The *low perceived stress* category included students scoring in the bottom quartile vs. the *high perceived stress* students scoring in the upper three quartiles.

Depressive symptoms were measured with two standardized questions (1) Have you ever had a time in your life when you felt sad, blue, or depressed for two weeks or more in a row? and (2) Have you ever had a time in your life lasting two weeks or more when you lost interest in most things like hobbies, work, or activities that usually give you pleasure?[30] Response items were Yes or No.

Health Behaviors included:

Body Mass Index (BMI) was calculated from self-reported height and weight. BMI, per se, is not a health behavior, however, sometimes it is used as a proxy for physical activity where low levels of physical activity are associated with higher BMI scores/categories.[31] BMI scores were calculated and categorized into 4 categories using the World Health Organization criteria for Asian countries[32]: underweight (BMI <= 18.49 kg m^2) normal weight (BMI=18.50 to 22.90 kg m^2), overweight (BMI= 23.00 to 24.90 kg m^2), and obesity (BMI>25.00 kg m^2).

Substance use (smoking and alcohol consumption). Smoking status and alcohol consumption were assessed using standardized items.[30] Responses for alcohol consumption were dichotomized as 'non-drinker' and 'drinker'.

Diet status was assessed using 3 standardized items (drinking tea, coffee, and eating vegetables).[30] Eating vegetables was dichotomized into, 'enough', and 'not enough' as prescribed by WHO guidelines (at least 400 gr/day).[33]

Sleep behaviors included 3 questions: (1) hours of sleep on weekends, (2) hours of sleep on weekdays, and (3) quality of sleep. Scores were dichotomized into 'sleepless' (<5 hours), 'not sleepless' (>=5 hours). Quality of sleep was measured with "In the morning when I wake up, I usually feel refreshed, well-rested, and energized...ready to start my day" (Calderon Jr, Unpublished Results). Scores ranged from 1 (not refreshed) to 7 (very refreshed). Scores were dichotomized into 'good quality sleep', and 'poor quality sleep'.

Demographic information included questions on gender, age, height, weight, residency status, birthplace, marital status, relationship, and employment status, year in university, university name, and major of study.

Data analysis and statistical method

Data were analyzed using descriptive statistics, Student's t-test, ANOVA, post hoc analysis, and binary regression (SPSS software version 20). A two-step process for the univariate and multivariate binary regression analyses was applied to test the association between happiness and each independent variable. Step 1–univariate analysis: most variables were dichotomized into two values (0 and 1) based on the highest quartile as the cut-off point to facilitate odds ratio computation and interpretation. Step 2--multivariate analysis: all variables with a p-value less than 0.20, from the univariate analysis, were entered into the multivariate model. The odds of social-demographic characteristics, health behaviors, perceived stress, and depressive symptoms for each

level of happiness were computed with "non-happy" as the reference category. Statistical significance was set at $P <= 0.05$.

Ethical approval

The HCMCUS IRB reviewed and approved the study. The first paragraph of the survey questionnaire described the study and explained that willingness to complete the questionnaire assumed informed consent to participate. The participants were free to complete part or all of the questionnaire. This form of consent to participate was deemed appropriate by the HCMCUS IRB.

RESULTS

Sample Characteristics

Of the 1775 completed questionnaires, 1090 (61.4%) were female. Age ranged from 18 to 29 (mean = 20.23, SD = 1.48), females were slightly younger than males (mean = 20.14 vs. 20.29, p = 0.03). Each 'year in university' (1st, 2nd, 3rd,

and 4th year) had approximately 25%. SouthUni1 had (45.1%), SouthUni2 (42.4%) and NorthUni 12.6% students. For the 'major of study,' the majority of students were in the combined 'Other'category (30%). Most students were born in rural areas (74.1%), single (85.8%), not in a relationship (54.9%), did not have a part-time job (75.8%), and did not live with their parents (78.8%) (See Table 1).

Happiness

Table 1 shows how happiness was distributed for each socio-demographic variable. The 'happy' category consisted of student happiness scores that fell into the top quartile. The percent of students in the top quartile of happiness for each variable are listed in the % happy column. The percentage of students in the 'happy' category ranged from 6.0% (lowest, SouthUni1) to 23.5 % (highest, 'Others' in major of study). The overall average of % happy for all the socio-demographic variables was 13.5 %.

Table 1. Distribution of happiness by socio-demographic variables

Variables	n	% of the total sample	% happy (top quartile)
Gender			
Male	680	38.3	11.8
Female	1090	61.4	16.2
Age group			
18-19	755	42.6	17.0
20-24	1000	56.4	10.8
>25	20	1.1	15.8
Year in University			
Freshman	453	25.5	16.8
Sophomore	433	24.4	14.5
Junior	456	25.7	16
Senior	433	24.4	6.2
University name			
SouthUni1	800	45.1	6.0
SouthUni2	752	42.4	21.8
NorthUni	223	12.6	12.1
Major of study			
Public Health	223	12.5	12.1
Sport	466	26.3	5.6

Table 1. Distribution of happiness by socio-demographic variables (cont.)

Variables	n	% of the total sample	% happy (top quartile)
Pharmaceutical Industry	220	12.4	17.7
Physical Education	334	18.8	6.6
Others	532	30.0	23.5
Birthplace			
Rural	1316	74.1	14.8
Urban	459	25.9	13.0
Marriage status			
Single	1523	85.8	12.9
Other	252	14.2	17.1
In relationship			
Yes	801	45.1	14.7
No	974	54.9	12.0
Part-time job			
Yes	429	24.2	13.1
No	1346	75.8	13.6
Living with parents			
Yes	377	21.2	19.6
No	1398	78.8	11.8
Total	1775	100	13.5

Happiness levels and socio-demographic characteristics

Table 2 presents differences in happiness mean scores and univariate analysis (odds ratios) by socio-demographic variables.

Table 2. Differences in happiness mean scores and associations (univariate analysis, odds ratios) for socio-demographic variables

Variables	Happiness scores			Univariate analysis	
	Mean	**SD**	**p-value**	**OR (95% CI)**	**p-value**
Gender					
Male	4.74	1.03	**0.038**	1.44 (1.09 - 1.90)	**0.009**
Female (=ref)	4.84	1.06			
Age group					
18-19 (=ref)	4.84	1.11	0.094		
>=20	4.73	0.99		1.67 (1.27 - 2.19)	**0.001**
Living with parents					
Yes	4.95	1.07	**0.001**	0.54 (0.40- 0.74)	**0.001**
No (=ref)	4.72	1.03			
Birthplace					
Rural	4.76	1.05	0.59	1.16 (0.86 - 1.57)	0.325
Urban (=ref)	4.79	1.03			
Marital status					
Single	4.76	1.04	0.138	1.39 (0.97 - 1.99)	0.072
Others (=ref)	4.86	1.06			

Table 2. Differences in happiness mean scores and associations (univariate analysis, odds ratios) for socio-demographic variables (cont.)

Variables	Happiness scores			Univariate analysis	
	Mean	**SD**	**p-value**	**OR (95% CI)**	**p-value**
In relationship					
Yes	4.78	1.02	0.636	1.26 (0.95 - 1.66)	0.098
No (=ref)	4.76	1.06			
Part-time job					
Yes	4.77	1.03	0.945	1.04 (0.76 - 1.44)	0.775
No (=ref)	4.77	1.05			
Year in university					
Freshman (a) (=ref)	4.89	1.06	**0.001**		**0.001**
Sophomore (b)	4.72	1.14		3.03 (1.91 - 4.80)	**0.001**
Junior (a)	4.87	1.05		2.55 (1.59 - 4.09)	**0.001**
Senior (c)	4.62	0.89		2.87 (1.80 - 4.56)	**0.001**
University name					
SouthUni2 (d) (=ref)	4.98	1.11	**0.001**		**0.001**
SouthUni1 (e)	4.6	0.93		2.02 (1.30 - 3.13)	**0.002**
NorthUni (e)	4.7	1.07		0.46 (0.28 - 0.76)	**0.002**
Major			**0.001**		
Public Health (f) (=ref)	4.71	1.077			**0.001**
Sport (f)	4.56	0.941		0.44 (0.28 - 0.70)	**0.001**
Pharmaceutical Ind. (g)	4.83	1.082		0.19 (0.12 - 0.30)	**0.001**
Physical Education (f)	4.66	0.924		0.70 (0.47 - 1.04)	**0.082**
Others (g)	5.04	1.123		0.23 (0.143 - 0.37)	**0.001**

: a,b,c; d,e; f, g: the same letters indicate that the difference had no statistical significance (Post hoc analysis using LSD, Tamhane's T2 test)

There were significant differences in the happiness scores across gender (MD = -0.106, p = 0.038), living with parents (MD = 0.23, p = 0.001); year in university (1st and 2nd year, MD = 0.17, p = 0.17; 1st and 4th year, MD = 0.27, p = 0.001; 2nd and 3rd, MD = -0.15, p = 0.035; 3rd and 4th, MD = 0.25, p = 0.000); university name (SouthUni2 and SouthUni1, MD = 0.38, p=0.001; SouthUni2 and NorthUni, MD = 0.28, p = 0.002); and major of study (sport and pharmaceutical, MD = -0.27, p = 0.001; 'other' and public health, sport, and physical education, MD = 0.33, 0.48, 0.38, respectively, p = 0.001).

This indicated that students who were male, not living with parents, not in 1st year, attended SouthUni1 and NorthUni, and were in public health, sport, and physical education majors had significantly lower happiness scores than their comparison groups.

Table 2, univariate analysis, also showed that students who were male (OR = 1.44, p = 0.009), older (OR = 1.67, p = 0.001), 4th and 2nd year in university (OR = 2.87 and 3.03, respectively, p = 0.001), and university name (OR = 2.02, p = 0.002), were more likely to be categorized as 'non-happy'. Students who lived with parents (OR = 0.54, p = 0.001), and were

in pharmaceutical and 'Others' majors (OR = 0.19 and 0.23, respectively, p =0.001) were less likely to be in the '*non-happy*' category.

Happiness, health behaviors, perceived stress, and depressive symptoms

Table 3 presents the happiness mean scores and associations (univariate analysis, odds ratios) for health behaviors, perceived stress, and depressive symptoms.

Table 3. Happiness mean scores and associations (univariate analysis, odds ratios) for health behaviors, perceived stress, and depressive symptoms.

Variables	% of the total sample	Happiness scores			Univariate	
		Mean	SD	P-value	OR (95% CI)	P-value
Health behaviors						
BMI (Proxy for physical activity)						
Underweight (=ref)	8.6	4.72	1.06	0.843		0.09
Normal	70.4	4.82	1.05		1.5 (0.72 - 3.13)	0.26
Overweight	13.6	4.60	1.07		1.5 (0.84 - 2.76)	0.24
Obese	7.3	4.74	0.97		0.90 (0.43 - 1.86)	0.78
Drink coffee						
Everyday	0.158	4.73	1.10	0.781	1.35 (1.00 - 1.82)	**0.048**
Someday	0.497	4.78	1.00		1.14 (0.77 - 1.70)	0.501
Not at all (=ref)	0.344	4.79	1.10			0.14
Drink caffeinated tea						
Everyday	0.150	4.64	1.01	**0.015**	0.60 (0.38 - 0.94)	**0.027**
Someday	0.406	4.85	1.10		0.83 (0.62 - 1.11)	0.21
Not at all (=ref)	0.444	4.76	1.01			0.07
Eating vegetables						
Yes	0.880	4.80	1.04	**0.001**	0.51 (0.38 - 0.68)	**0.001**
No (=ref)	0.120	4.54	1.04			
Drink alcohol						
Yes	0.772	4.79	1.06	0.72	0.83 (0.59 - 1.16)	0.28
No (=ref)	0.228	4.76	0.99			
Sleeping behaviors						
Quality of sleep						
Yes	0.208	4.97	1.03	**0.001**	0.71 (0.52- 0.97)	**0.03**
No (=ref)	0.792	4.72	1.04			
Sleepless on weekdays						
Yes	0.046	4.35	1.17	**0.001**	1.67 (0.76 - 3.64)	0.198
No (=ref)	0.955	4.80	1.04			
Sleepless on Weekends						
Yes	0.046	4.53	1.09	**0.033**	1.27 (0.62 - 2.51)	0.5
No (=ref)	0.954	4.79	1.04			
Smoking						
Everyday	0.068	4.51	1.10	**0.015**	0.88 (0.28 - 1.14)	0.57
Someday	0.176	4.85	1.12		0.57 (0.62 - 1.24)	0.88
Not at all (=ref)	0.756	4.78	1.02			0.28
Perceived stress						

Variables	% of the total sample	Happiness scores			Univariate	
		Mean	SD	P-value	OR (95% CI)	P-value
Stress	0.071	5.14	1.26	**0.001**	0.29 (0.19 - .044)	**0.001**
Few/non-stress (=ref)	0.929	4.75	1.02			
Depressive symptoms						
Yes	0.739	4.73	1.03	**0.002**	1.47 (1.10- 1.97)	**0.009**
No (=ref)	0.261	4.91	1.07			

Significant differences in happiness scores were found in drinking caffeinated tea (every day and someday (MD = -0.21, p = 0.02, every day and not at all (MD = -0.12, p = 0.01), eating vegetables (MD = 0.26, p = 0.001), quality of sleep (MD = 0.25, p = 0.001), sleepless (less than 5 hours) on weekdays (MD = -0.45, p = 0.001), sleepless on weekends (MD = -0.26, p = 0.033), smoking status (every day and someday (MD = -0.34, p = 0.002), every day and not at all (MD = -0.27, p = 0.006), perceived stress (MD = 0.39, p = 0.001), and depressive symptoms (MD = -0.18, p = 0.002) (See Table 3).

Univariate analysis identified significant associations of happiness, such as, students who were in the drink caffeinated tea everyday (OR = 0.60, p = 0.027), eating vegetables (OR = 0.51, p = 0.001), and quality of sleep (OR = 0.71, p = 0.03), and stress (OR = 0.29, p = 0.001) categories were less likely to be in the 'non-happy' category. Students who were in the drink coffee every day (OR = 1.35, p = 0.048) and had depressive symptoms (OR = 1.47, p = 0.009) were more likely to be in the 'non-happy' category. In other words, students who were categorized as '*happy*' were more likely to drink caffeinated tea, eat more vegetables, have good quality sleep, have higher perceived stress, not drink coffee every day, and not experience depressive symptoms.

Table 4. Happiness predictor variables (multivariate analysis, odds ratios) for demographic, health behaviors, and perceived stress variables.

Variable	Adjusted OR (95% CI)	P-value
Living with parents		
No (= ref)		
Yes	0.68 (0.49 - 0.93)	**0.018**
Year in university		
Freshman (= ref)		**0.001**
Sophomore	3.25 (2.02 - 5.23)	**0.001**
Junior	2.58 (1.59 - 4.20)	**0.001**
Senior	2.88 (1.78 - 4.64)	**0.001**
University name		
SouthUni2 (= ref)		**0.001**
SouthUni1	1.85 (1.17 - 2.92)	**0.008**
NorthUni	0.59 (0.30 - 0.84)	**0.009**
Eating 5 serving of vegetables		
No (= ref)		
Yes	0.66 (0.48 - 0.90)	**0.01**
Perceived stress		
Few/non stress (= ref)		
Stress	0.45 (0.29 - 0.68)	**0.001**

Table 4 presents the happiness predictor variables (multivariate analysis, odds ratios) for demographic, health behaviors, and perceived stress. In the final binary regression model, the following variables remained significant predictors of students being in the 'non-happy' category. Students living with parents (OR = 0.68, p = 0.018), attending NorthUni (OR = 0.59, p = 0.009), eating more vegetables (OR = 0.66, p = 0.01), and having higher perceived stress (OR = 0.45, p = 0.001) were less likely to be in the 'non-happy' category compared to their reference group. Students who were in the 2nd, 3rd, and 4th year (OR = 3.25, 2.58, 2.88, p = 0.001, respectively) and attended SouthUni1 were more likely to be in the 'non-happy' category (see Table 4).

DISCUSSION

A small percent (13.5%) of the students were categorized as being happy. However, this can be explained by the fact that 13.5% reflected the top quartile of happiness scores. On the other hand, if median scores were considered approximately 45% of the sample was categorized as 'happy'. This 45% proportion was higher than that of Chilean college students (30.80%)[34] , and lower compared to young Swiss adults (63.0%) [35], and young Iranian adults (65.0%).[36] A report by Peltzer et al[37] found that happiness scores among university students from the Caribbean, South America, and Sub-Saharan Africa were higher than in North Africa and Asian students. Other studies have reported that Western and Eastern European countries have higher levels of happiness compared to Asian countries.[23]

Vietnamese female students were happier than their male counterparts and gender was significantly associated with happiness in the univariate analysis. These gender differences are similar to the findings reported for Thai,[38] Chilean,[34] and Swiss students.[35] However, Ngamba[39] reported that Rwandan females were less happy than Rwandan males. Differences in age, culture, and/or religious practices may play a role in the results cited above. The authors of this paper are considering using mediation and moderation analyses, in subsequent papers, to provide insights into how age, culture, and/or religious practices may mediate/moderate the association between gender and happiness.

In terms of age, studies have reported that younger people tend to be happier. Piqueras et al.[34] and Chen et al.[40] reported higher happiness scores among younger age groups and Chinese adolescents, respectively. Previous studies have primarily used univariate binary regression analysis in their research design. This study used univariate and multivariate analysis. Older age groups were associated with being less happy in the univariate analysis, however, age was not significant in the multivariate analysis. This suggests age is not a significant predictor of happiness in the presence of multiple independent variables.

In regards to resident status, students who lived with their parents were happier than those who did not. The association between resident status and happiness was significant in univariate and multivariate analysis. This finding is significant because it endorses the important role that family plays in Asian cultures. Unlike western cultures where students typically leave home after high school, Asian cultures encourage students to live at home during their post-secondary studies. In Vietnamese culture, the family tends to play an important emotional and financial role during the student's university studies and pre-marriage life. Indeed, Fararouei et al.[41] reported that spending leisure time with family was

correlated with happiness. Thus, living at home for longer periods, maintaining family ties, receiving family care and support may play a role in the happiness levels of students.

For school factors, year in school, school name, and major were significantly associated with subjective happiness in univariate and multivariate analysis. Thus, freshmen were happier than sophomores, juniors, and seniors. Freshmen happiness levels may be explained by the excitement associated with starting university studies and perceiving more autonomy in their lives. Furthermore, students who studied at SouthUni2 had higher happiness scores than students from the other universities. This may be due to differences between public and private universities. Private universities in Vietnam, such as SouthUni2, tend to have less stringent academic standards and requirements. Differences in private university environments (relaxed, less stress), curricular practices (moderate academic demands), and more student engagement may play a role in making the academic experience more pleasurable for students.[42]

Regarding diet, eating more vegetables was the only behavioral variable that was significantly associated with subjective happiness scores in the multivariate analysis. This is consistent with previous studies showing an association between diet and happiness among students from 29 universities in 28 countries across Asia, Africa, and the Americas.[41,43,44] The direction of causality between diet and happiness remains to be determined. One possible view of causality is that happiness directly affects diet by contributing to a more mindful state of being, i.e., when a student is happier they are more mindful of what and how they eat, which in turn, may reduce unhealthy eating behaviors.[38]

This study did not find significant associations between BMI and happiness.

BMI represents the ratio of weight to height and is sometimes used as an indirect measure of physical activity. Research has found an association between physical activity and regular exercise with subjective happiness.[17,40,41,44-46] However, this study did not find a BMI/physical activity/happiness association. Future research should instead use specific physical activity instruments instead of BMI to assess associations with happiness.

For sleep behaviors, students who had adequate sleep on weekdays/weekends and good quality sleep had significantly higher happiness levels than students who did not sleep enough or well. Quality of sleep was significantly associated with happiness only in the univariate analysis. In general, these results are consistent with previous happiness studies among Japanese adults[17] and Indian students[47] indicating that sleep plays an important role in the overall health and well-being of university students.

Smoking is a particular concern in Vietnam because of the increasing trends among young adults. The proportion of current Vietnamese student smokers (24.4%), in this study, was similar to the findings of the 2015 Global Adult Tobacco Survey[48] and higher than Thai university student smokers (8.3%) (38). The smoking rates of Vietnamese students were significantly higher with corresponding lower happiness scores. The smoking/happiness association is not new but should be of particular concern for Vietnamese policymakers, i.e., improving happiness levels may affect smoking behavior (avoidance of or smoking cessation). This possibility is worth further study.

The association between perceived stress and happiness was highly significant in both univariate and multivariate analyses. However, the direction of the association was counterintuitive, i.e., a positive association was found between

perceived stress and happiness meaning that students with more stress were also happier. Most research findings have reported negative associations between stress and happiness. For example, cultural studies found a negative association between perceived stress and happiness among Chilean university students[34] and Korean adults, [46] indicating that when stress goes up happiness goes down. One explanation for the counterintuitive finding may be due to differences in the time-frame used in the measurement instruments of happiness and perceived stress. In other words, when students filled out the happiness questions they were instructed to think about life in general (a broad time-frame), and when students filled out the perceived stress questions they were instructed to think about the last month (a narrow time-frame). This mismatch in time-frames could have altered the true association between happiness and stress. For example, if a student happened to encounter some stressful events (e.g., exams, family, or relationship problems) during the last month time-frame they might indicate high levels of stress, but outside of this one-month time-frame the student typically experiences and reports low levels of stress and high happiness. In this situation, the actual association between stress and happiness would be misrepresented. For this reason, congruent time-frame instruments of happiness and stress should be considered in future research. Another reason for the counterintuitive finding could be that the positive association between stress and happiness is, in fact, a unique finding. If this is the case, further research is needed to confirm and determine the factors responsible for this unusual finding.

For depressive symptoms, there was a significant negative association with happiness. Students who reported more depressive symptoms were less happy. This is consistent with the World Health Organization's (WHO)[49] definition of mental health and research findings showing a negative association between depression and happiness among Swiss students.[35]

CONCLUSION

In summary, happiness is associated with healthy behaviors (eating more vegetables, getting enough sleep, avoidance of or smoking cessation) among Vietnamese students, which is consistent with previous studies.[43,44,47] Other noteworthy findings included greater happiness among students who lived with parents, attended a private university, and had positive mental health (reported less depressive symptoms). The novel and unexpected finding of this study included a positive association between stress and happiness, i.e., students who reported higher levels of stress also reported higher happiness scores. This finding is counterintuitive. Research tends to support a negative association between stress and happiness, i.e., students who experience more stress tend to report lower levels of happiness. Further research is needed to clarify this association among Vietnamese students.

A potential limitation of this study was using scales containing few items, e.g., the subjective happiness and perceived stress scales each have 4-items. In general, longer scales (with a greater number of items) tend to have more robust psychometric properties. Therefore, using different happiness and stress scales may produce slightly different results. Lastly, this study used a cross-sectional design, which cannot infer causality. Other potential mitigating factors of happiness, such as socioeconomic status and spirituality were not included.

RECOMMENDATIONS

Further research is recommended to identify possible explanatory factors for the counterintuitive association between happiness and perceived stress. Also, the overall findings reported in this study have public health implications for the development of intervention programs. For example, developing programs to increase happiness levels may also help to increase healthy behaviors among Vietnamese students.

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