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ASSOCIATIONS BETWEEN DIET, OTHER HEALTH-RELATED BEHAVIOURS, WELL-BEING AND PHYSICAL HEALTH: A SURVEY OF STUDENTS ABOUT TO START UNIVERSITY

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ABSTRACT

Background: Previous research has examined the associations of health-related behaviours with a range of different outcomes. The present study focused on well-being and physical health, measured with the well-being process questionnaire (WPQ). Diet and other health-related behaviours were measured by the Diet and Behaviour Scale (DABS). **Methods:** An online Qualtrics survey of 193 students in their first week at university was carried out. The survey, including DABS and the WPQ, asked about the last six months. **Results:** Univariate analyses showed that health-related behaviours were associated with the outcomes. When established predictors of well-being were included, most of the associations between health-related behaviours and outcomes were no longer significant. However, some remained significant, with smoking and low exercise being associated with poor physical health. **Conclusion:** Health-related behaviours were associated with well-being and health outcomes. These associations were generally not significant when established predictors of well-being and health were included in the analyses. Indeed, only the associations between smoking, low exercise and physical health remained significant when the established predictors were included in the analyses. Further research with university students further into their degree is required to determine the impact of health-related behaviours on young adults.

KEYWORDS: Well-being; Physical Health; Diet; Exercise; Sleep; Breakfast; Fruit and Vegetables; Junk Food; Caffeine; Energy Drinks; Cola.

INTRODUCTION

The aim of the present study was to examine associations between diet, other health-related behaviours (sleep and exercise), and the well-being of students immediately prior to starting university. Our previous study[1] examined this topic in a sample of secondary school students covering most of the year groups. The present study used an older sample but considered a time period where the students were still living at home (the six months prior to university). Diet and other health-related behaviours were measured using the Diet and Behaviour Scale (DABS).[2] This was developed to examine associations between diet and academic attainment and conduct in a survey of secondary school students in Cornish academies.[3-8] Well-being was measured using the Student Well-being Process Questionnaire (WPQ).[9,10] which has been extensively used with both school and university students.[11-23] The WPQ was based on the Demands, Resources and Individual Effects (DRIVE) model[26, 27] and has negative predictor variables (e.g. exposure to stressors; negative coping style) and positive predictors (e.g. psychological capital; social support and positive coping). The outcome measures cover both positive well-being (happiness, life satisfaction and positive affect) and negative well-being (e.g. stress, fatigue, anxiety and depression). Our previous study showed that there were significant associations between diet, sleep, exercise and well-being outcomes. However, the DABs scores were also correlated with many of the WPQ predictor variables. When the established predictors of well-being were included in the analyses, many of the associations between the DABS scores and the well-being outcomes were no longer significant. However, some associations remained significant. Positive well-being was associated with greater fruit and vegetable consumption and with lower consumption of fast food/takeaways. The present study used a similar methodology to our earlier study, the main difference being the older sample. Other differences were the inclusion of smoking and alcohol consumption in the questionnaire. Also, the original Student WPQ and DABS scales were used here, whereas our earlier study used shortened versions. It was predicted that associations between the DABS scores and

the well-being outcomes would be observed in the univariate analyses. It was predicted that many of these associations would no longer be significant when established predictors of well-being were included in the analyses.

MATERIALS AND METHODS

The study was carried out with the approval of the Ethics Committee, School of Psychology, Cardiff University and with the informed consent of the participants.

Participants

The participants were 193 psychology students (170 female; mean age = 19.4 years, range = 18-45 years) starting their university course.

Materials

The questionnaire contained the Diet and Behaviours Scale and Student Well-being Process Questionnaire. In addition, questions were asked about lifestyle (hours of sleep, smoking and alcohol consumption). The questions covered the six months before coming to university.

Statistical analyses

Factor scores for healthy and junk food, exercise, alcohol and energy drinks/cola were used in the analyses. Initial univariate analyses examined the association between health-related behaviours (healthy food, junk food, energy drinks and cola, sleep, water intake, smoking, alcohol, and exercise) and well-being predictors (negative affectivity, open, agreeable, conscientiousness and positive personality, negative coping, social support) and outcome variables (positive well-being factor score, negative well-being factor score and physical health). Next, three separate regression models were carried out with positive well-being, negative well-being and physical health as outcomes. The predictor variables were health-related behaviours and established well-being predictors. The analyses examined the goodness of fit of the model and the significance of predictors. The presence of multicollinearity among the independent variables of the model could be a serious issue, so the variance inflation factor (VIF) technique was used to detect the presence of multicollinearity.

RESULTS

Univariate analyses of associations between health-related behaviours predictors and the outcomes

The independent variables low energy drinks and cola, exercise, and sleep had a significant correlation with outcomes. Likewise, the association of low healthy food was significant for all dependent variables except physical health. In addition, the relationship between low smoking and negative well-being and physical health was significant (p= .050, p= .005, respectively). In contrast, there was no association between the outcomes and the other HRB variables. The correlation matrix for the health-related behaviours variables and the well-being outcomes are summarized in Table 1.

Univariate analyses of associations WPQ predictors and the outcomes

The correlation matrix with positive well-being as a dependent variable had a significant correlation with all the WPQ predictor variables. The negative well-being variable had a significant correlation with most of the predictor variables except for open personality and conscientiousness. Moreover, physical health was associated with negative affectivity, agreeable and positive personality, negative coping, and social support. The correlation matrix for the WPQ variables and the dependent variables are summarized in Table 2.

Table 1: Correlation matrix of Outcomes and Health-related behaviours predictors.

	Positive well-being		Negative well-being		Physical health	
Correlation	**r**	**p**	**r**	**P**	**r**	**p**
Low healthy diet	-.258	.001	.234**	.001	-.073	.316
Low junk meals	.044	.545	-.041	.575	.094	.197
Low energy drinks & cola	.208	.004	-.148	.040	.209**	.004
High water intake	.029	.695	-.059	.420	.049	.504
Low smoking	.119	.099	.141	.050	.201**	.005
Low exercise	-.293	.001	.231**	.001	-.304**	.000
Long sleep	.196	.007	-.157*	.030	.150*	.039
High Alcohol	-0.027	.706	-.059	.414	-.039	.587
Differences	t	p	t	p	t	p
Smoker v Non-smoker	-1.66	.099	1.97	.050	-2.82	.005

Table 2: Correlation matrix of outcomes and WPQ predictors.

	Positive well-being		Negative well-being		Physical health	
	r	p	r	P	r	p
Negative affectivity	-.760**	.000	.811**	.000	-.390**	.000
Open Personality	.267**	.000	-.102	.164	.097	.185
Agreeable Personality	.323**	.000	-.172*	.018	.164*	.024
Conscientiousness	.160*	.028	-.033	.648	.070	.336
Introversion	-.430**	.000	.440**	.000	-.127	.082
Positive personality	.810**	.000	-.725**	.000	.513**	.000
Negative coping	-.497**	.000	.516**	.000	-.325**	.000
Social support	.539**	.000	-.476**	.000	.364**	.000

The HRBs were also correlated with the WPQ predictors. High alcohol consumption was associated with low conscientiousness and a disagreeable personality. Smoking was associated with negative affectivity. Hours of sleep were positively correlated with positive personality and negatively correlated with negative coping and negative affectivity. Low energy drink/cola consumption was positively associated with a positive and agreeable personality and negatively associated with negative coping and introversion. A low healthy diet was positively associated with negative coping, introversion and negative affectivity. It was negatively associated with positive, agreeable and open personalities. Low exercise was positively associated with introversion, negative affectivity and negative coping. It was negatively associated with social support and positive, agreeable and open personalities. Low junk food and water consumption were not associated with any of the psychosocial predictors. The shared variance between the HRBs and established well-being predictors meant that both sets of variables should be included in analyses of well-being and health outcomes.

Multivariate analysis of predictors and positive well-being

The linear regression results with positive well-being as an outcome and the predictors were statistically significant, F [16, 166] = 34.79, p < .001, R2 = .770. The model explained 77% of the variance of positive well-being. This indicates a significant relationship between most WPQ variables and positive well-being except introversion, open personality, and negative coping. In contrast, there were no significant relationships between the HRB predictors and positive well-being (see Table 3).

Table 3: Multivariate analysis of predictors of positive well-being.

Model	B	S.E.	Beta	t	Sig.
Social support	.143	.046	.143	3.101	.002
Negative coping	.014	.048	.014	.290	.772
Negative affectivity	-.137	.025	-.314	-5.401	.000
Positive personality	.475	.060	.466	7.963	.000
Introversion	.004	.018	.009	.200	.842
Conscientiousness	.056	.020	.110	2.751	.007
Agreeable Personality	.074	.028	.111	2.637	.009
Open Personality	-.006	.025	-.010	-.242	.809
High Alcohol	.021	.041	.021	.509	.611
Low Exercise	-.051	.041	-.050	-1.229	.221
Low Smoking	-.016	.134	-.005	-.117	.907
Hours of sleep	.030	.044	.027	.685	.494
Low energy drinks & cola	.020	.043	.020	.456	.649
High water	-.026	.025	-.041	-1.036	.302
Low junk meals	-.014	.042	-.014	-.340	.734
Low healthy diet	-.079	.042	-.078	-1.859	.065

Multivariate analysis of Predictors and Negative well-being: The linear regression model of negative well-being was statistically significant, F[16, 166] = 29.28, p < .001, R2 = .738. It explained 73% of the variance in negative well-being. The WPQ variables were good predictors of negative well-being except for introversion, conscientiousness, agreeable personality, and social support. In contrast, there was no relationship between HRB predictors and negative well-being (see Table 4).

Table 4: Multivariate analysis of predictors of negative well-being.

Model	B	Std. Error	Beta	t	Sig.
Social support	-.070	.049	-.071	-1.436	.153
Negative coping	.130	.051	.132	2.566	**.011**
Negative affectivity	.230	.027	.532	8.571	**.000**
Positive personality	-.265	.063	-.262	-4.200	**.000**
Introversion	.007	.019	.018	.371	.711
Conscientiousness	.003	.022	.005	.127	.899
Agreeable Personality	.000	.030	.000	.008	.994
Open Personality	.063	.026	.108	2.374	**.019**
High Alcohol	-.074	.044	-.076	-1.698	.091
Low Exercise	-.009	.044	-.009	-.214	.831
Low Smoking	-.050	.142	-.016	-.355	.723
Hours of sleep	-.020	.046	-.018	-.425	.672
Low energy drinks & cola	.026	.045	.027	.578	.564
High water consumption	.020	.026	.032	.747	.456
Low junk meals	.019	.044	.018	.418	.677
Low healthy diet	.057	.045	.057	1.281	.202

Multivariate analysis of Predictors and Physical health

The results linear regression model for physical health and the predictors were statistically significant, $F[16, 166] = 6.82$, $p < .001$, $R2 = .397$; the model explained 39% of the variance in physical health. Social support, positive personality, and introversion variables were good predictors of physical health. Regarding HRB variables, there were associations between low exercise, smoking, and poor physical health see Table 5.

Table 5: Multivariate analysis of predictors of physical health.

Model	B	Std. Error	Beta	t	Sig.
Social support	.337	.130	.192	2.581	.011
Negative coping	-.081	.136	-.046	-.596	.552
Negative affectivity	.053	.072	.070	.745	.458
Positive personality	.870	.168	.491	5.172	.000
Introversion	.153	.051	.218	2.981	.003
Conscientiousness	.022	.058	.025	.388	.698
Agreeable Personality	.065	.079	.057	.829	.408
Open Personality	-.095	.070	-.093	-1.351	.178
High Alcohol	.127	.116	.074	1.090	.277
Low Exercise	-.282	.117	-.161	-2.413	.017
Low Smoking	.876	.378	.157	2.319	.022
Hours of sleep	.108	.124	.055	.873	.384
Low energy drinks & cola	.102	.121	.059	.838	.403
High water consumption	-.027	.070	-.025	-.385	.701
Low junk food	.162	.118	.092	1.369	.173
Low healthy diet	.043	.120	.025	.363	.717

DISCUSSION

A previous study examined the associations between health-related behaviours and the well-being of secondary school students. Initial univariate analyses showed significant correlations between HRBs and well-being, with positive HRBs (good sleep, healthy diet and regular exercise) being associated with positive well-being and negative HRBs being associated with negative well-being. Established psychosocial predictors of well-being were also significantly associated with both HRBs and well-being outcomes. When these established predictors were included with the HRBs in regressions examining associations with outcomes, few of the HRBs remained significant.

A very similar profile of results was obtained in the present study. Here the sample was older and probably had more control over their diet and other HRBs. Slightly different measuring instruments were also used in the present study. The study with secondary students used the short-form versions of the WPQ and DABS. The present study used the original longer versions of these questionnaires and also included HRBs relevant for an older sample (smoking and alcohol consumption). Despite these differences, the results were very similar, with initial univariate analyses showing associations between HRBs and well-being and health outcomes, with these associations being no longer significant when established predictors of well-being were included in the regressions. Again, the established predictors of well-

being had significant effects, which gives confidence in the HRB results. In addition, established associations between smoking, exercise and physical health were significant, which also gives confidence in the HRB results.

The present study has some limitations. The sample was mainly female and was going to a single university to study Psychology. This has been identified as a potential problem in previous research on this topic.[27] Further research is now required to determine whether HRBs influence the well-being of university students who often have a poor diet, do not get enough sleep and may neglect appropriate exercise.

CONCLUSION

An online survey examined the association between HRBs and well-being. HRBs were correlated with well-being outcomes, but these associations were no longer significant when established predictors of well-being were included in the analyses. The established predictors of well-being showed their usual significant effects, and smoking and exercise were associated with physical health. The replication of these established effects gives one confidence in the novel HRB/well-being results. Further research is now required to determine whether these results are observed with university students and older adults.

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