Psychological and lifestyle predictors of mental health in higher education

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Psychological and Lifestyle predictors of Mental Health in Higher Education:

How healthy are our students?

Data availability statement:

All data available on request from corresponding author

Abstract

Purpose: The continued increase in mental health problems in students in Higher Education is a global public health concern. This study aims to examine predictors of mental health in the context of Higher Education, focusing on first-year, female undergraduate students as a particularly vulnerable group.

Design/methodology/approach: Two-hundred first-year female undergraduates from a UK Higher Education Institution took part in a Quantitative survey Participants completed a range of questionnaires assessing resilience, perceived stress, levels of depression, hope, general anxiety, and levels of exercise.

Findings: Two significant individual predictors of depression were identified: Perceived stress and Resilience. A mediation analysis showed that Resilience acted as mediator for the impact of stress on depression. Two significant individual predictors of anxiety were identified: Stress and exercise. There were no significant mediators.

Originality: We investigated, for the first time, a range of psychological and lifestyle predictors of mental health while exploring potential mediators. From our findings we suggest that Psychoeducational interventions targeting resilience whilst also providing problem-solving strategies could augment internal resources and promote positive mental health in this particularly vulnerable group of young people.

Introduction

Rising rates of mental health problems in students in Higher Education (HE) is a global public health concern. Large epidemiological studies and reviews in the UK (e.g., Bolton & Hubble, 2020; Institute for Public Policy Research, 2017), and the USA (Goodman, 2017) have consistently reported significantly higher levels of mood and anxiety disorders, and psychological distress among university students compared to non-university peers. First-year students, in particular, seem to be at significantly higher risk for developing mental health problems usually associated with challenges resulting from transitioning from school to university life such as relocation, financial uncertainty, loss of family and peer networks, loneliness and academic pressures (Hiester et al, 2009; RCPsych, 2011). In the UK, a recent study from the Institute for Public Policy Research (Thorley, 2017) reported that in 2015/16, 15,395 first-year undergraduate students disclosed a mental health condition - almost five times the number in 2006/07. Of those, female students were more likely than males to make a disclosure (2.5 per cent compared to 1.4 per cent). Despite that rates of help-seeking are higher in young females compared to males, recently we have seen a sharp rise in mental health problems such as depression and anxiety among women aged 16-24 years (McManus et al, 2014).

Promoting students' mental health and wellbeing has now become a strategic priority for the HE sector in the UK. Public Health England (DoH, 2015) as well as the recent UK Government publication "*Transforming children and young people's mental health provision*" have stressed the importance of building resilience in young people, particularly those going through challenging transitions (e.g. adolescence to adulthood).

Resilience, however, is a complex, multi-faceted concept and lack of consensus over its operational definition has resulted in significant variability in how we understand and measure it. Masten (2014) defines resilience as the *"capacity of a dynamic system to adapt successfully to disturbances that threaten system function, viability, or development"* (p. 6), highlighting the importance of *adversity* and *positive adaptation*. Adversity refers to "*disturbances to the function or viability of a system; experiences that threaten adaptation or development*" (Wright et al, 2013, p.17) and positive adaptation can be conceptualised as achieving positive outcomes and emotional health (Luthar, 2006). Notably, measurements or assessments of human resilience vary according to the research questions being addressed. The variables may relate to resilience as an outcome or a process (Poli et al., 2013).

Focussing on resilience as an outcome, Bonanno and colleagues in a review paper stated that resilience is ''an outcome pattern following a potentially traumatic events characterized by a stable trajectory of healthy psychological and physical functioning'' (Bonanno et al., 2011, p. 513). This definition suggests a dynamic process that helps in the ''stable trajectory'' of healthy functioning. Importantly, within the context of the current research, resilience will be viewed as an outcome measure.

Alternatively, many view resilience as a process - the development of competence despite severe or pervasive adversity. Flach (1980, 1988) described the dynamic process of resilience as a system which can be learned at any point in life. In this way resilience is conceived not as a fixed innate function, but as a capacity that develops over time in the context of person-environment interactions (Egeland et al., 2009).

We know that resilience can be influenced by a number of factors within the individual (e.g. perceived stress), family (e.g. attachment) and wider community (e.g. social network, environment; Bronfenbrenner, 1979). In university students, studies examining factors that could be implicated in resilience and successful adjustment to the university life include perceived social support, psychological wellbeing as well as campus connectedness (Machuca, 2010; Pidgeon et al, 2014).

Another factor that has been demonstrated to have a positive impact on mental health is physical exercise (e.g., Anderson et al., 2013; Byrne & Byrne, 1993; Warburton et al., 2006;). The general theme from this research is that exercise can bring about many physiological changes which result in lower levels of stress, depression and anxiety. The physical effects of exercise include reduction of blood pressure, enhanced cardiovascular fitness, and weight loss. In a recent review of Physical activity and exercise in youth mental health promotion, Pascoe et al., found evidence that suggested that interventions of varying intensity may lead to a reduction in depression symptoms and that moderate-to-vigorous-intensity and light-intensity interventions may reduce anxiety symptoms.

Specifically, in a recent study with a student cohort by Herbert et al., 2020, they assessed the effect of regular physical activity, and short-term exercise on the mental health, and well-being of University students. They found that a 6 week aerobic exercise intervention resulted in significant improvements in self-reported depression, overall perceived stress, and perceived stress due to uncertainty.

Hope is probably best conceptualized by Snyder as "a positive motivational state that is based on an interactively derived sense of successful (a) agency (goal-directed energy) and (b) pathways (planning to meet goals)". It is the combination of pathway thinking of the strategies to achieve

goals, and agency thinking involving self-motivation to pursue goals, which together, enable people to be hopeful thinkers (Snyder et al, 2002). Individuals high in hope have been found to have higher levels of self-esteem (Karaırmak, 2007) and greater life satisfaction (Valle et al, 2006). In a sample of 881 university students, Demirli et al (2015) found hope to be a significant predictor of positive affect, negative affect and flourishing. The literature also highlights the role of hope as a mediator between life satisfaction and psychological distress (Rustoen et al, 2010). More recently, a study by Satici (2016) showed hope to be a significant mediator between resilience and subjective wellbeing in a sample of undergraduate university students (Satici, 2016). Examining further the potential role of hope as mediator in resilience research is paramount given emerging evidence highlighting the feasibility and acceptability of interventions targeting hope as a way of increasing wellbeing and resilience (Daugherty et al, 2018).

The aim of this study was to examine predictors of Mental Health in the context of HE focusing on first-year, female undergraduate students as a particularly vulnerable group. The study investigated, for the first time, a range of psychological (resilience, perceived stress, hope) and lifestyle (level of exercise) predictors of mental health while exploring potential mediators.

Method

Design

The research design was cross-sectional, self-report, quantitative questionnaire-based. This wasdelivered online using Survey Monkey in a British HEI. Ethical approval was obtained by Schools Research Ethics Committee.

Sample

Inclusion criteria were i) female and ii) undergraduate students in their first year of studies. Participants were recruited via the Department's Research Participation Scheme (RPS) using convenience sampling (this is a mandatory scheme for all Undergraduate students to partake in a range of research projects to gain credit.

We recruited 200 participants with a mean age 18.4 years, they were predominately White in ethnicity and all were studying on a competitive programme at a Russell Group University. All data were collected pre-COVID-19.

Materials

Connor-Davidson Resilience Scale (CD-RISC-25)

The CD-RISC-25 (Connor & Davidson, 2003) approaches resilience as a dynamic process that can be impacted by life events over time, and hence the questionnaire assesses the participants' resilience over the last month. The questionnaire consists of twenty-five statements, for example, '*Past successes give me confidence in dealing with new challenges and difficulties*' , which requires participants to respond on a five-point Likert scale, ranging from 0 (not true at all) to 4 (true nearly all the time) to report how much each statement applied to them over the last month. The final score of the scale ranges from 0 to 100; the higher the score, the greater the level of resilience. The CD-RISC-25 is deemed appropriate as it has high internal consistency (Connor & Davidson, 2003) with a Cronbach's alpha reliability from .78 to .91, and strong test-retest reliability (r=.78 to .88; Khoshoeui, 2009).

Perceived Stress Scale (PSS-10)

The PSS-10 (Cohen et al, 1983), measures perceived stress based on how often the respondent thought or felt a certain way over the past month. It consists of ten questions, for example, '*In the last month, how often have you been upset because of something that happened unexpectedly?*' Each question is rated on a five-point Likert scale, ranging from 0 (never) to 4 (very often). Total scores are obtained by reverse-scoring the positively-stated questions, four, five, seven and eight; for example, '*In the last month, how often have you felt that you were on top of things?*' All are summed to give a total score, with 40 representing the highest possible score, representing higher perceived stress. The PSS-10 is advantageous as it the best available index for measuring perceived stress (Cohen et al, 1995), with a high internal consistency (Cronbach's alpha=.84; Cohen et al., 1983).

Patient Health Questionnaire (PHQ-9)

The PHQ-9 (Kroenke & Spitzer, 2002) measures the degree of depression through nine-items that reflect on problems faced over the past two weeks. Participants rate how much the statement applies to them on a four-point Likert scale, such as '*little interest or pleasure in doing things*', ranging from 0 (not at all) to 3 (nearly every day).   The final score of the scale ranges from 0 to 27: the higher the score, the greater the depression diagnosis. The PHQ-9 is highly valid for screening depression and measuring the severity of depressive symptoms (Furukawa, 2010), with a strong internal reliability (Cronbach's alpha ranging from .86 to .89; Kroenke et al, 2001).

Adult Hope Scale (AHS)

The AHS (Snyder et al, 1991), referred to as 'The Future Scale' whilst administered, is a twelve-item measure of a respondent's level of hope. Participants rate how much statements such as, '*I can think of many ways to get out of a jam'*, apply to them, on an eight-point Likert scale ranging from 1 (definitely false) to 8 (definitely true). Negatively-worded items are reverse coded so that a high total hope score, of maximum 64, indicates the participant has high hope for the future. The Cronbach's alpha of .74 to .84 (Snyder et al, 1991) demonstrates high internal consistency, proving the scale to be a good measure of hope.

Generalised Anxiety Disorder (GAD-7)

The GAD-7 (Spitzer et al, 2006), comprising of seven-items, measures generalised anxiety disorder through self-report of how often respondents were bothered by the core symptoms of the disorder over the past two weeks. Statements such as '*feeling nervous, anxious or on edge'*, are rated on a four-point Likert scale, ranging from 0 (not at all) to 3 (nearly every day). The final score of the scale ranges from 0 to 40: the higher the score, the greater the anxiety. The acceptable level of internal consistency (Cronbach's alpha .79-.91; Williams, 2014) and high construct and procedural validity (Spitzer et al, 2006) indicate the benefits of using the GAD-7.

Exercise Scale

The Exercise Scale, comprising of three-items, was adapted from Steptoe et al (1996) and assesses the intensity and duration of exercise that participants engage with in an average week. Participants rate how much the exercise applies to them on an eight-point ratio scale, ranging from 1 (zero minutes), to 8 (more than five hours). High physical activity is recognised by a higher score.

Sample size

Power analysis calculations were undertaken for the sample size of the study. Assuming a medium effect size (0.15), a power level of 0.8, with 7 predictor variables and an alpha level of 0.05, the recommended sample size was 103.

Procedure

Written informed consent was received from all participants, acknowledging their participation was voluntary. All information was kept confidential and anonymous. Given the nature of the surveys, all participants were given information pertaining to the University Counselling support services that all particpants had access to. The survey was accessed online via the University Sona System. Participants were advised the survey would take fifteen minutes to complete, in exchange for course credit. Ethical permission was granted by the University STEM ethics Committee.

Results

Sixteen per cent (16%) of the sample were classified as moderately-severe or severely depressed based on the PHQ-9. Seventeen (17%) of the sample reported that for several days over the last two weeks they had thoughts they would be better off dead or hurt themselves (item 9 on PHQ-9). Twenty-seven (27%) per cent were classified as moderately-severe, or severely-anxious based on the GAD-7. Notably, 86% of the sample were identified with moderate to high perceived stress.

[TABLE 1 HERE]

Preliminary analysis

A Pearson's correlation test was conducted and a Bonferroni correction was applied. The correlations between the predictors: pathway, agency, hope (total), stress, depression, anxiety and level of exercise (Table 2) showed that stress was positively and moderately correlated with depression and anxiety, and negatively and moderately correlated with agency and pathway. Depression was negatively and moderately correlated with agency, and positively and moderately correlated with anxiety. Pathway was positively and moderately correlated with agency.

[TABLE 2 HERE]

Multiple regression analysis

A multiple regression analysis was conducted in order to examine the variables that predicted depression in the sample. The variables were entered automatically using a 'forward' method, and perceived stress and resilience were entered into the model which significantly predicted student resilience (F (2, 197) = 66.15, $p < 0.001$. Both variables together accounted for 40% of the variance

in student resilience in this sample. Higher Perceived Stress (β = 0.56, *p* < .001) and lower resilience (β = -.14, *p* < .05) predicted higher student depression. All other variables were not significant predictors of student resilience.

A second multiple regression analysis was conducted in order to examine the variables that predicted anxiety in the sample. The variables were entered automatically using a 'forward' method, and Perceived Stress and Exercise were entered into the model which significantly predicted student resilience (F (2, 197) = 79.64, *p* < 0.001. Both variables together accounted for 44% of the variance in student resilience in this sample. Higher Perceived Stress (β = 0.65, *p* < .001) and lower levels of Exercise (β = -.12, *p* < .05) predicted higher student anxiety. All other variables were not significant predictors of student resilience.

Mediation analysis

Consequently, following on from the first phase of analysis it was decided to undertake a mediation analysis, focussing on the potential mediating variables on the impact of stress on depression and anxiety. We conducted a mediation analysis with 10000 bootstrap samples using JASP. Figure 1 shows the results of the mediation analysis. Perceived Stress symptoms predicted individual differences in depression, such that participants with higher levels of stress symptoms reported higher levels of depression, B = -.47, SE = .05, 95%CI [.37, .56], *p* < .001. Resilience partially mediated the relation between Perceived Stress and Depression, B = .0.052, SE = .023, 95%CI [.0.01, .11], p<0.05. The final mediation model accounted for 44% of the variance in resilience, *F* (4, 195) = 36.29, *p* < .001.

No other variables were significant mediators.

[FIGURE 1 HERE]

Discussion

This study examined predictors of mental health in a female student population whilst investigating potential mediators. University students are a particularly vulnerable group of young people with levels of poor mental health and well-being gradually growing in the UK (RCPsych 2011; Thorley, 2017). Recent evidence pointing towards an upward trend in mental health problems among young women (Adult Psychiatric Morbidity Survey, 2014) are also particularly alarming. Our findings confirmed significantly high levels of stress (86%) in our sample with 16% classified as moderately-severely or severely depressed and 27% as moderately-severely, or severely anxious, in line with recent reports (Thorley, 2017).

We examined a number of psychological (resilience, perceived stress, hope) and lifestyle (level of exercise) variables to see which of these best predicted depression and anxiety in our sample. We were also interested in exploring the potential mediators. Our findings showed that higher levels of perceived stress and lower levels of resilience significantly predicted higher levels of depression in female undergraduate students. Most importantly, we found that resilience fully mediated the relationship between perceived stress and Depression. Furthermore we found that stress and levels of exercise significantly predicted anxiety, with higher stress and lower exercise levels indicating higher anxiety levels.

The relationship between Stress and poor mental health in students has long been established, and hence our significant findings linking stress to depression and anxiety are not unexpected. For example Beiter et al. (2015) found that stress stemming from pressure to succeed and academic workload significantly impacted students. In their sample, 38% showed some form of stress, and of these students 15% had moderate to severe anxiety and 11% moderate to severe depression. Furthermore, Othman et al. (2019) identified that concerns about grades and health are linked with depressive symptoms, whereas familial and socioeconomic concerns are linked to anxiety.

Specifically for students, the accumulation of homework, academic difficulties and negative feelings can lead to individuals feeling emotionally drained (Stoliker & Lafreniere, 2015) and worthless due to the perceived constant academic demands (Saravanan & Wilks, 2014). This can then lead to a negative impact on their own perceived ability to cope (Cohen et al., 1983).

However, of greater importance is our finding that resilience can act as a protective factor to moderate the effect of stress on depression. This does have potential ramifications for possible interventions. We know that in general students do have lower than expected levels of resilience (see Catling et al, in press), it would seem a good place to start to try and improve resilience levels in students at entry to University. For example, in a recent review, Joyce et al., 2018 showed that

resilience interventions based on a combination of CBT and mindfulness techniques did appear to have a positive impact on individual resilience. Furthermore, Acceptance and commitment therapy (e.g. Ryan 2014), attention and interpretation therapy (e.g. Loprinzi 2011; Sood 2014), and problem-solving therapy (e.g. Bekki 2013) have also all been shown to improve levels of resilience.

However, currently, within the majority of University support services, 'resilience' is mentioned only in name or as a general term rather than as a psychological property, with very few interventions that specifically target improving an individual's level of resilience.

Limitations

This is a cross-sectional study and therefore causality cannot be inferred. Students within our sample were all studying on a competitive undergraduate programme at a Russell Group University, hence the students would have all had to have attained a high level of achievement in their FE studies (e.g. A' levels) in order to be accepted on the programme (this grade profile represents approximately 20% of all University students)Therefore, through necessity, those students in the sample would be in the higher tiers of HE students in respect to academic performance. That said this is still a substantial proportion of the overall number of students. Furthermore we were aware that our sample was predominantly White. Consequently, our sample would have some bias to high achieving White students and not the best representation of the entire population of UK students in HE. The issue with the sample notwithstanding, we would also make the case that 'high achieving' students are also an 'at risk' group which is often overlooked, based on the assumption that because they are performing well academically that all is well.

Summary

The current study has confirmed high levels of stress, anxiety and depression within a UK student cohort. Furthermore, we have shown that resilience can fully mediated the relationship between perceived stress and Depression. Given the profound effect that poor mental health can have on young people, there would appear both a moral and practical imperative to incorporate and promote some form of resilience training, utilising these combined approaches, for our students.

Acknowledgments

Conflict of Interests

None.

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Table 1: The Sample: Descriptive statistics.

Descriptive Statistics (N=200)				
	Minimum	Maximum	Mean	(SD)
Age	17.00	22.00	18.4	
Resilience	31.00	98.00	63.8	
Stress	4.00	34.00	20.7	
Depression	1.00	26.00	8.9	
Future Agency	10.00	31.00	23.4	
Future Pathway	9.00	32.00	22.2	
Hope Total	23.00	62.00	45.7	
Anxiety	0.00	21.00	7.0	
Exercise	1.00	21.00	8.3	

Table 2. Intercorrelations between predictor variables in regression analysis (n=200)

	Exercise	Stress	Depression	Hope-Agency	Hope-Pathway	Anxiety
Exercise						
Stress	-.0.35					
Depression	-.119	.612*				
Hope-Agency	.201	-.384*	-.305*			
Hope- Pathway	.091	-.384*	-.208	.669*		
Anxiety	-.146	.657*	.690*	-.217	-.218	
Hope- Total	.159	-.418*	-.270*	.897*	.909*	-.243

* Significant at $p < .001$

Figure 1: Mediation model: Stress is predictor of Depression mediated by Resilience.