

University of Louisville

ThinkIR: The University of Louisville's Institutional Repository

Faculty Scholarship

7-19-2021

Stressors and resilience are associated with well-being in young adult college students

Kimberly R. Hartson

University of Louisville, kimberly.rapp@louisville.edu

Lynne A. Hall

University of Louisville, lynne.hall@louisville.edu

Sara A. Choate

University of Louisville, sara.choate@louisville.edu

Follow this and additional works at: <https://ir.library.louisville.edu/faculty>



Part of the [Higher Education Commons](#), [Holistic Education Commons](#), [Mental and Social Health Commons](#), and the [Nursing Commons](#)

Original Publication Information

Hartson, K. R., Hall, L., & *Choate, S. (2021). Stressors and resilience are associated with well-being in young adult college students [online ahead of print]. *Journal of American College Health*, 19, 1-9.

<https://doi.org/10.1080/07448481.2021.1908309>

ThinkIR Citation

Hartson, Kimberly R.; Hall, Lynne A.; and Choate, Sara A., "Stressors and resilience are associated with well-being in young adult college students" (2021). *Faculty Scholarship*. 887.

<https://ir.library.louisville.edu/faculty/887>

This Article is brought to you for free and open access by ThinkIR: The University of Louisville's Institutional Repository. It has been accepted for inclusion in Faculty Scholarship by an authorized administrator of ThinkIR: The University of Louisville's Institutional Repository. For more information, please contact thinkir@louisville.edu.

**Stressors and Resilience are Associated with Well-being
in Young Adult College Students**

Kimberly R. Hartson,^{a*} Lynne A. Hall,^a and Sara A. Choate^b

^aSchool of Nursing, University of Louisville, Louisville, KY, USA

^bCampus Health Services, Division of Health Promotion
University of Louisville, Louisville, KY, USA

*Corresponding Author:

Kimberly R. Hartson, PhD, RN

School of Nursing, K Building

University of Louisville

555 South Floyd Street

Louisville, KY 40202

Phone: (502) 852-8388

FAX: (502) 852-0704

Email: kimberly.rapp@louisville.edu

Kimberly R. Hartson <https://orcid.org/0000-0002-7186-9892>

Lynne A. Hall <https://orcid.org/0000-0002-5030-3806>

1
2
3
4 1 **Stressors and Resilience are Associated with Well-being**
5
6 2 **in Young Adult College Students**

7
8 3 Objective: The purposes were to describe stressors and resilience behaviors of college students
9
10 4 and examine the relationships among stressors, resilience, and well-being.

11
12 5 Hypothesis: Resilience will modify the relationship between stressors and well-being.

13
14 6 Participants: The sample included 1,010 college students, ages 18–26, from an urban Midwestern
15
16 7 university.

17
18 8 Methods: A secondary analysis of cross-sectional data from an anonymous survey was
19
20 9 conducted using multiple regression and simple slopes analysis.

21
22 10 Results: Resilience did not modify the relationship between stressors and well-being. Stressors (β
23
24 11 = $-.44$, $p < .0001$) and resilience ($\beta = .33$, $p < .0001$) accounted for 42% of the variance in well-
25
26 12 being (adjusted $R^2 = .42$, $F_{2,999} = 365.98$, $p < .0001$). The most frequently endorsed stressors were
27
28 13 sleep problems, anxiety, and relationships.

29
30 14 Conclusions: Stressors and resilience warrant special attention in the allocation of resources and
31
32 15 development of programs to improve student well-being.

33
34 16 Key Words: College Students, Resilience, Stressors, Well-being
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 19 **Stressors and Resilience are Associated with Well-being**
4
5 20 **in Young Adult College Students**
6
7

8 21 Young adults, ages 18 – 26 years old, are often dismissed as a healthy group of
9
10 22 individuals; however, this is a time of developmental transition that tends to be marked by
11
12 23 unhealthy risk behaviors, psychological vulnerability, and poor health habits.¹ In 2015, a call to
13
14 24 action by the Institute of Medicine and National Research Council¹ brought to light the lack of
15
16 25 attention given to young adults in research and the critical need to explore and address the unique
17
18 26 challenges affecting the well-being of young adults in the 21st century. Although definitions
19
20 27 vary, well-being generally encompasses social, physical, and mental dimensions of health
21
22 28 including concepts such as positive emotions and satisfaction with life.^{2,3}
23
24
25

26 29 Young adults today are entering adulthood in poorer health than previous generations,
27
28 30 suggesting increased risk for future chronic health conditions.¹ Studies of young adults, ages 24 –
29
30 31 32, report surprisingly high rates of early stage chronic illnesses such as prediabetes (27%)⁴ and
31
32 32 prehypertension (49%),⁵ suggesting that young adulthood is a critical time for health promotion
33
34 33 and the prevention of chronic illness. Adolescence and early adulthood are also critical times for
35
36 34 the onset of several mental health problems including mood disorders and substance disorders.⁶
37
38 35 In 2010-2012, almost one in five young adults reported a mental illness during the past year.⁷
39
40
41

42 36 Young adults are bombarded with fast-paced technological advances combined with
43
44 37 social and economic pressures and stressors during a time when they are trying to navigate the
45
46 38 transition to adulthood.¹ Late adolescents and young adults also report higher levels of stress
47
48 39 than middle and older adults.⁸ In a recent survey of young adults aged 18 to 21 years, the vast
49
50 40 majority of participants reported finances (81%), work (77%), and health related concerns (75%)
51
52 41 as significant stressors in their lives.⁸ Additional sources of stress identified by late adolescents
53
54
55
56
57
58
59
60

1
2
3 42 and young adults include “not getting along with others” (35%), “not getting enough to eat”
4
5 43 (28%), and housing instability (31%). In addition, 91% of participants aged 18 to 21 report
6
7 44 having experienced at least one physical or emotional stress-related symptom in the past month.⁸
8
9

10 45 High levels of stress and stressors during this developmental transition into adulthood are
11
12 46 of critical importance as evidence suggests that life stressors are inversely related to
13
14 47 psychological well-being among undergraduate students.⁹ The body has amazing adaptation
15
16 48 responses to stress that can be helpful in emergent situations; however, chronic stress can have
17
18 49 detrimental effects on the mind and body. The potential effects of chronic stress include
19
20 50 conditions such as muscle tension, low back pain, chronic fatigue, and headaches as well as
21
22 51 increased inflammatory processes and risk for heart disease, hypertension, depression, and
23
24 52 stroke.¹⁰ Though stress and stressors are often unavoidable, certain factors may influence how
25
26 53 stress affects our health and well-being.
27
28
29
30

31 54 Resilience, the ability to adapt and recover from a difficult experience,¹¹ is one such
32
33 55 factor that has been examined as a potential modifier of the relationship between specific
34
35 56 stressors or adversity and various aspects of well-being. Resilience is an individual’s ability to
36
37 57 acclimate in the face of adversity,¹² and is characterized by positive adaptation to acute or
38
39 58 chronic stress.¹³ Resilience may be viewed as a trait, a process, or an outcome¹⁴ and it varies on a
40
41 59 continuum in degree.¹⁵ Resilience promotes thriving in the face of stressful situations and yields
42
43 60 positive outcomes as a result.¹⁶ It is the ability to cope while facing demands such as those
44
45 61 experienced in college life.¹⁷
46
47
48

49 62 Resilience theory proposes that resilience is a protective factor that modifies the
50
51 63 relationship between stress and health outcomes such as well-being. It is rooted in psychology
52
53 64 beginning in the 1970’s with studies of children who experienced extreme adversity but managed
54
55
56
57
58
59
60

1
2
3 65 to thrive. Garmezy,¹⁸ Werner and colleagues,¹⁹ and Rutter²⁰ were leaders in developing this field.
4
5 66 Examination of resilience of college students is critical due to the increase in stress, depression,
6
7 67 and anxiety experienced by students as they adjust to the demands of college life.¹⁷
8
9

10 68 In recent research with college students, resilience was associated with decreased
11
12 69 stress^{21,22} and lower psychological distress.²³ Resilience also modified the relationship between
13
14 70 perceived stress and binge-eating behaviors, with stress having a stronger effect on binge-eating
15
16 71 behaviors among those with lower resilience.²⁴ Furthermore, among post-doctoral fellows,
17
18 72 resilience moderated the relationships of stress with trait anxiety and depressive symptoms.²⁵
19
20 73 While resilience as a moderator of the stress and well-being relationship is theoretically sound,
21
22 74 empirical evidence is lacking in young adult, college students. Having a clear and empirically
23
24 75 supported understanding of these relationships and interactions will help college health
25
26 76 professionals prioritize their resources and efforts to improve student well-being.
27
28
29

30
31 77 The purposes of this study were to: (1) describe the stressors and resilience behaviors
32
33 78 reported by young adult college students and (2) examine the relationships of stressors and
34
35 79 resilience with well-being in young adult college students. Specifically, the hypothesis was that
36
37 80 resilience modifies the relationship between stressors and well-being in this population.
38
39

40 81 **Materials and Methods**

41 42 82 *Design and Sample*

43
44 83 Cross-sectional data for this secondary analysis were collected via an anonymous web-
45
46 84 based survey of undergraduate and graduate students from a large urban Midwestern university
47
48 85 in February 2019. The purpose of the survey, conducted by Health Promotion, a division of
49
50 86 Campus Health Services, was to obtain data to guide health promotion efforts across the
51
52 87 university. The registrar generated a random sample of 5,000 undergraduate and 1,900 graduate
53
54
55
56
57
58
59
60

1
2
3 88 students who were invited to participate in the survey. Undergraduate students had to be enrolled
4
5 89 in at least six credit hours of coursework; graduate students were both full- and part-time. The
6
7
8 90 response rate was 17.5%. Data for this secondary analysis were from a subsample of 1,010
9
10 91 young adults ages 18 to 26 years old.

12 92 ***Measures***

14 93 *Well-being*

16
17 94 The 10-item Public Health Surveillance Well-Being Scale (PHS-WB)² measures well-
18
19 95 being as a holistic construct incorporating perceived physical, mental, and social aspects of
20
21 96 health. Six items are rated on 5-point Likert-type scales; three are rated on a 10-point Likert-type
22
23 97 scale of *very dissatisfied* to *very satisfied*; and the final item on energy/vitality over the prior 30
24
25 98 days is scored 0 to 30. Item ratings of each respondent were summed, and then the sum was
26
27 99 converted to Item Response Theory scores per Bann et al.² Next, scores were converted to
28
29 100 standardized *t* scores for use in the analysis. The scale demonstrated adequate internal
30
31 101 consistency when used with a similar sample of college students ($\alpha = .86$).²⁶ In the current study,
32
33 102 the scale demonstrated good internal consistency ($\alpha = .87$) and was unidimensional based on the
34
35 103 results of principal components analysis and factor analysis conducted with the data from this
36
37 104 sample.

42 105 *Resilience*

44 106 The 6-item Brief Resilience Scale²⁷ measures trait resilience, defined as the ability to
46
47 107 recover from stress. In a systematic review of 15 existing resilience measures,²⁸ this scale was
48
49 108 one of three that had the strongest evidence of reliability and validity. It also has the advantage of
50
51 109 being short which increased the likelihood that students would respond to all items. Respondents
52
53 110 rated their degree of agreement with each item on a 5-point scale ranging from *strongly disagree*

1
2
3 111 (1) to *strongly agree* (5). Items 2, 4, and 6 are negatively worded and were reverse coded. Next,
4
5 112 the mean of the six items was calculated for each participant; higher mean scores indicated
6
7 113 greater resilience. In previous research, Cronbach's alphas ranged from .84 to .87 in three
8
9 114 different samples of college students.^{27,29} Cronbach's alpha for the current sample was .88
10
11 115 indicating good internal consistency.
12
13

14
15 116 The participants were also asked a single "select all that apply" question asking whether
16
17 117 they routinely engaged in nine behaviors theorized to build resilience such as seeking guidance
18
19 118 from trusted mentors, practicing spirituality or their religion, practicing mindfulness/meditation,
20
21 119 eating nutrient dense foods, moving daily and often, and connecting with supportive people.
22
23

24 120 *Stressors*

25
26 121 The total number of stressors was determined by asking participants to indicate which of
27
28 122 26 stressors had affected their academic performance in the prior six months. The items included
29
30 123 issues such as financial/money problems, sleep problems, illness, relationships, loss, family, and
31
32 124 work. A cumulative score was calculated for each participant by summing the number of
33
34 125 stressors endorsed.
35
36

37 126 *Sociodemographic characteristics*

38
39
40 127 Data were collected on age, gender, race, sexual orientation, academic status, and hours
41
42 128 worked per week. Participants also were asked if they were first generation college students.
43
44 129 Gender identity categories included male, female, transgender female, transgender male, gender
45
46 130 nonconforming, non-binary, and different identity. Sexual orientation response options included
47
48 131 asexual, bisexual, lesbian, gay, queer, pansexual, straight/heterosexual, and other. See Table 1
49
50 132 for additional details on collected sociodemographic characteristics.
51
52

53 133 *Procedure*

54
55
56
57
58
59
60

1
2
3 134 The university's institutional review board approved the original survey and the
4
5 135 secondary data analysis. Students received an invitation to participate in the initial study via an
6
7 136 email which included a link to the anonymous web-based survey. The consent process consisted
8
9 137 of a preamble at the beginning of the survey and a waiver of written consent. Data were collected
10
11 138 and stored on a secure server. Students in the original sample chose whether or not they wanted
12
13 139 to enter into a prize drawing for a variety of gifts including a 30-minute chair massage and a
14
15 140 \$400 voucher to a local bicycle retail store.
16
17
18

19 141 ***Data Analysis***
20

21 142 Data were analyzed using *IBM SPSS Statistics for Windows, Version 25.0*.³⁰ Descriptive
22
23 143 statistics were used to characterize the sample. Correlational analyses were conducted among the
24
25 144 variables. Potential differences in means of stressors, resilience, and well-being by
26
27 145 sociodemographic characteristics, stressors, and resilience behaviors were evaluated using *t*-tests
28
29 146 and one-way ANOVA, as appropriate. Due to low numbers of participants identifying as gender
30
31 147 identities other than male and female, the gender identity categories were combined for analysis
32
33 148 into the categories of male, female, and another identity. In addition, due to the small number of
34
35 149 participants describing their sexual orientation as other than straight/heterosexual, the sexual
36
37 150 orientation categories were combined for the analysis into the categories straight/heterosexual
38
39 151 and another sexual orientation (see Table 1).
40
41
42
43

44 152 The hypothesis that resilience modifies the relationship between stressors and well-being
45
46 153 was tested using multiple regression with backward elimination and simple slopes analysis. The
47
48 154 analysis started with the full model including the covariate of sexual orientation, main effects of
49
50 155 stressors and resilience, along with interaction terms of stressors*resilience, resilience*sexual
51
52 156 orientation, and stressors*sexual orientation as predictors of well-being. Non-significant
53
54
55
56
57
58
59
60

1
2
3 157 interaction terms were eliminated one at a time followed by non-significant main effects to arrive
4
5 158 at the best fitting model for prediction of well-being. Further, simple slopes analysis was used to
6
7
8 159 test for moderation effects.

9
10 160 Due to the number of analyses conducted and the sample size, a conservative alpha of
11
12 161 .008 was selected to prevent a Type 1 error. When multiple statistical tests are conducted in
13
14 162 multiple regression, the level of significance of the parameter estimates should be adjusted to
15
16
17 163 avoid a Type I error.³¹ An alpha of .05 may increase the Type I error rate two- to six-fold when
18
19 164 performing multiple separate significance tests of unadjusted *t* statistics using multiple regression
20
21 165 to identify a best predictive model.³¹ Using the Bonferroni adjustment to obtain a more
22
23 166 conservative alpha attenuates this problem, making a Type I error much less likely.³¹ In the
24
25 167 current study, with six predictors of well-being in the full regression model, the Bonferroni
26
27
28 168 adjustment yielded an alpha of .008.

30 169 **Results**

31
32
33 170 The mean age of the students was 21.1 years (*SD* = 2.3). A majority of the students were
34
35 171 female (57.7%), white (76.1%), straight/heterosexual (81.0%), enrolled full-time (92.2%), first
36
37 172 generation at college (76.2%), and employed at least one hour per week (71.1%) (see Table 1).
38
39 173 The number of stressors ranged from 0 to 19 with a mean number of stressors of 5.21 (*SD* =
40
41
42 174 3.63). Scores on the Brief Resilience Scale ranged from 1 to 5 with a mean of 3.43 (*SD* = 0.79).
43
44 175 PHS-WB scores ranged from 24.95 – 73.55 with a mean of 49.6 (*SD* = 8.50). There were
45
46 176 significant zero-order correlations between stressors and resilience ($r = -.40, p < .001$), resilience
47
48 177 and well-being ($r = .51, p < .001$), and stressors and well-being ($r = -.58, p < .001$).

49
50
51 178 Preliminary analysis also included testing for differences in means of major study
52
53 179 variables by sociodemographic factors. Sexual orientation was the only sociodemographic factor
54
55
56
57
58
59
60

1
2
3 180 with substantial enough differences among means to suggest the need for inclusion as a covariate
4
5 181 in the model. Participants who identified as straight/heterosexual₍₁₎ reported fewer stressors
6
7 182 ($M[SD]_1 = 4.84[3.42]$ vs. $M[SD]_2 = 6.86[4.07]$; $t_{251} = -6.31, p < .0001$), higher resilience ($M[SD]_1$
8
9 $= 3.48[0.77]$ vs. $M[SD]_2 = 3.23[0.80]$; $t_{997} = 3.91, p < .0001$), and higher well-being ($M[SD]_1 =$
10
11 183 $50.41[8.35]$ vs. $M[SD]_2 = 46.22[8.33]$; $t_{997} = 6.22, p < .0001$) compared to those who identified as
12
13 184 another sexual orientation identity₍₂₎.
14
15 185

16 186 ***Stressors***

17
18
19 187 The top five most frequently identified stressors were sleep problems (57.7%, $n = 583$),
20
21 188 anxiety (52.1%, $n = 526$), relationships (42.8%, $n = 432$), poor time management (42.3%, $n =$
22
23 189 427), and financial/money problems (41.2%, $n = 416$). Differences in mean resilience and well-
24
25 190 being scores by the most prevalent stressors are shown in Table 2. Mean resilience and well-
26
27 191 being scores were lower for students who endorsed these stressors compared to those who did
28
29 192 not endorse these stressors.
30
31

32 193 ***Resilience Behaviors***

33
34
35 194 The top five commonly identified behaviors that students reported using to increase their
36
37 195 resilience were: “Listen to music that supports my wellbeing” (65.6%, $n = 663$), “Sleep at least 6
38
39 196 hours/night” (59.0%, $n = 596$), “Move daily and often” (53.5%, $n = 538$), “Connect with
40
41 197 supportive people and/or groups” (47.4%, $n = 479$), and “Eat nutrient dense foods” (43.3%, $n =$
42
43 198 437). Students who reported eating nutrient dense food or moving daily and often also reported
44
45 199 significantly fewer stressors, higher levels of resilience, and higher levels of well-being
46
47 200 compared to those who did not report these behaviors. Sleeping at least six hours per night was
48
49 201 significantly associated with fewer stressors and increased well-being, but not resilience(see
50
51 202 Table 3).
52
53
54
55
56
57
58
59
60

203 *Stressors and Resilience as Predictors of Well-being*

204 Backward elimination began with a regression model that included stressors, resilience,
205 sexual orientation, and their interaction terms as potential predictors of well-being. The final
206 model included stressors ($\beta = -.44, p < .0001$) and resilience ($\beta = .33, p < .0001$); none of the
207 interaction terms were significant. The model explained 42% of the variance in well-being
208 (adjusted $R^2 = .42, F_{2,999} = 365.98, p < .0001$). The elimination process resulted in a
209 parsimonious model while reducing the R^2 by only 1% from the full model (see Table 4).
210 Furthermore, the results of the simple slopes analysis did not support resilience as a modifier of
211 the relationship between stressors and well-being ($\Delta R^2 = 0.003, F_{[1, 998]} = 4.95, p = 0.026$).

212 **Discussion**

213 In this study, we tested a simple moderation model of resilience which was theoretically
214 supported but infrequently empirically evaluated in the young adult college student population.
215 Resilience did not modify the relationship between stressors and well-being in this large sample
216 of young adult college students from an urban Midwestern university. However, stressors and
217 resilience were independent predictors of well-being. Together, stressors and resilience explained
218 a substantial portion of the variance in well-being. In addition, the most common stressors and
219 resilience building behaviors among young adult college students were identified and evaluated
220 for relationships with well-being.

221 While it was surprising that resilience did not modify the relationship between stressors
222 and well-being, there are potential explanations for this finding. The Brief Resilience Scale
223 consists of only six items to measure trait resilience, a theoretically complex concept; therefore,
224 it is possible the items of the scale did not adequately sample the domain of all potential items
225 for the construct of resilience, i.e., it may lack construct validity. However, psychological

1
2
3 226 resilience, measured by the Brief Resilience Scale, modified the relationship between perceived
4
5 227 stress and hair cortisol concentration in adults³² and has been used in resilience research with
6
7
8 228 university students.²³ In addition, resilience may be an independent predictor of perceived stress
9
10 229 and well-being as opposed to a moderator of the stressor - well-being relationship. There is
11
12 230 evidence supporting an inverse relationship between stress and resilience^{21,22,33} as well as a
13
14 231 positive relationship between resilience and psychological well-being.^{23,34}

15
16
17 232 In the current study, resilience was defined as a trait, as is common in resilience research;
18
19 233 however, some researchers argue that it may be more of a dynamic process or a skill rather than
20
21 234 a trait since resilience can be developed or increased to some capacity, as evidenced by
22
23 235 successful interventions.³⁵ It also can then be argued that resilience is situational suggesting that
24
25 236 someone's level of resilience could vary by context and that the relationships among resilience,
26
27 237 stressors, and well-being could vary by context. For example, in the meta-analysis of Hu et al.,³⁶
28
29 238 adversity modified the relationship between trait resilience and mental health; there were
30
31 239 significantly stronger relationships among those in adversity compared to those who were not in
32
33 240 adversity.³⁶ Hu et al.³⁶ then theorized based on their results and resilience theory that the effects
34
35 241 of resilience on other concepts could vary depending on the "type and scope" of adversity itself.
36
37
38 242 In the current study, we did not have data on the degree of adversity students had faced
39
40 243 previously or the context in which the participants were currently living. Thus, further
41
42 244 investigation into the complex relationships among these concepts and how they interact to affect
43
44 245 well-being in college students is warranted.

45 246 ***Stressors and Well-being***

46
47 247 The number of stressors reported was a significant predictor of well-being. This is
48
49
50
51 248 consistent with substantial evidence supporting relationships between stress and various aspects
52
53
54
55
56
57
58
59
60

1
2
3 249 of well-being from physiological health outcomes such as blood pressure³⁷ to psychological
4
5 250 well-being³⁸ and related mental health outcomes such as negative affect,³³ loneliness, depression,
6
7
8 251 and decreased happiness.³⁹ While much of the previous evidence has identified the effects of
9
10 252 stress on specific aspects of physical health or psychological well-being, in this study the number
11
12 253 of stressors was predictive of a more comprehensive well-being construct; the PHS-WB
13
14 254 incorporates perceived physical, mental, and social aspects of health into one holistic well-being
15
16
17 255 construct.

18
19 256 Independent stressors identified by the young adult college students were also evaluated
20
21 257 in this study. Sleep problems, anxiety, and relationships were the top three most commonly
22
23 258 identified stressors. Furthermore, students who reported these stressors also reported
24
25
26 259 significantly lower resilience and lower well-being than those who did not report these stressors.

27
28 260 Unfortunately, sleep problems are common among college students across the U.S. In a
29
30 261 large, multi-university study, 62% of college students reported poor sleep.⁴⁰ This is concerning,
31
32 262 as evidence suggests that sleep is an independent predictor of well-being among college
33
34 263 students,^{26,41} and sleep problems are associated with negative mental health outcomes such as
35
36
37 264 depressive symptoms.⁴² Sleep hygiene, cognitive behavioral therapies, and relaxation
38
39
40 265 interventions may be helpful in improving sleep among college students.⁴³ In a meta-analysis of
41
42 266 15 studies, cognitive behavioral therapy for insomnia was associated with a small effect on sleep
43
44 267 onset latency reduction and larger effects on self-report measures of sleep initiation and
45
46
47 268 maintenance.⁴⁴ In addition, in a review of 12 intervention studies, short sleep education
48
49 269 interventions and semester-long sleep education courses were significantly associated with
50
51 270 improvements in sleep behaviors and health of college students.⁴⁵ There also is promising
52
53
54
55
56
57
58
59
60

1
2
3 271 evidence indicating that mindfulness programs, such as KORU mindfulness created specifically
4
5 272 for emerging adults, helps improve sleep in young adults.⁴⁶
6

7
8 273 Anxiety was the second most common stressor endorsed by this sample of college
9
10 274 students. According to results from the National College Health Assessment, 66.4% of
11
12 275 undergraduate students felt overwhelming anxiety in the past 12 months,⁴⁷ and 29.7% of
13
14 276 undergraduate students reported that anxiety affected their academic performance.⁴⁸
15
16 277 Furthermore, 23.6% of undergraduate students reported having or having had an official
17
18 278 diagnosis of an anxiety disorder.⁴⁸ These statistics are concerning as anxiety affects all aspects of
19
20 279 well-being. For example, anxiety is associated with increases in maladaptive coping behaviors,⁴⁹
21
22 280 increased risk of coronary artery disease,⁵⁰ and increased asthmatic exacerbations among
23
24 281 individuals diagnosed with asthma.⁵¹
25
26
27

28
29 282 Anxiety and poor mental health outcomes have increased among college students over
30
31 283 the past decade.⁵² At the same time, there are substantial gaps in the availability of mental health
32
33 284 services for students on college campuses. According to a survey of 571 college and university
34
35 285 counseling centers worldwide, the average wait for a first appointment was 6.5 business days;
36
37 286 33.7% of campus counselling centers had a wait-list with a mean wait of 17.7 business days for a
38
39 287 first appointment. Based on the entire student population for each institution, the average student
40
41 288 to counselor ratio was 1,411:1.⁵³
42
43
44

45 289 Standard evidence-based treatments for anxiety typically include psychotherapy,
46
47 290 pharmacotherapy, or a combination of both types of treatments. In a meta-analysis of 79
48
49 291 randomized controlled trials, psychotherapies had a moderate to large mean effect size, whereas
50
51 292 pharmacotherapies had a small to moderate mean effect size on generalized anxiety disorder.⁵⁴
52
53 293 Complementary therapies such as meditation, yoga, and mindfulness interventions had pooled
54
55
56
57
58
59
60

294 moderate effects on anxiety and stress among college students.⁵⁵ In addition, there is promising
295 evidence that virtual health interventions may be effective for improving psychological health
296 outcomes,⁵⁶ decreasing stress,⁵⁷ and reducing anxiety.^{57,58}

297 The third most frequently identified stressor was relationships. Previous research with
298 young adult college students suggests that simply being in a significant relationship does not
299 predict well-being;²⁶ however, the quality of the relationships may play a role in how students'
300 coping behaviors and stress influence mental health outcomes.^{26,39,59} Furthermore, in a large
301 sample of young adults ages 18 – 21 years old, 35% reported not getting along with others and
302 bullying as significant stressors in their lives.¹⁰ Similarly, greater discrepancy between desired
303 level of social support and received level of social support was associated with higher levels of
304 depressive symptoms among college students.⁶⁰ This evidence supports the importance of
305 helping students cultivate and navigate healthy, supportive relationships for well-being.

306 *Resilience and Well-being*

307 In this study, resilience was an independent predictor of well-being. While this finding is
308 consistent with prior research on resilience and psychological well-being among young adult
309 college students,^{23,34,38} research on the relationship of resilience with well-being as a holistic
310 construct incorporating the physical, mental, and social aspects of well-being is lacking. As such,
311 this finding contributes to our understanding of the relationship between resilience and a more
312 holistic measure of the construct of well-being in this population.

313 In the current study, large proportions of students reported routinely partaking in
314 behaviors theorized to support resilience such as listening to music, sleeping at least six hours
315 per night, moving daily and often, connecting with supportive people, and eating nutrient dense
316 foods. However, only moving daily and often and eating nutrient dense foods were associated

1
2
3 317 with higher levels of well-being. These findings are consistent with recent research among
4
5 318 college students in which resilience was associated with vigorous physical activity⁶¹ and higher
6
7 319 intake of fruit and vegetables.⁶² Unfortunately, according to results from the Spring 2019
8
9
10 320 National College Health Assessment,⁴⁷ only 46% of students met physical activity guidelines,
11
12 321 and only 4.3% of college students reported eating five or more servings of fruits and vegetables
13
14 322 per day, suggesting significant room for improvement in physical activity and nutritional intake
15
16
17 323 among college students. In addition to individual health behaviors associated with resilience,
18
19 324 there is also empirical evidence supporting resilience-building interventions. More specifically,
20
21 325 interventions based on cognitive behavioral therapy and/or mindfulness-based programs have
22
23
24 326 had moderate positive effects on resilience.⁶³

25 26 327 ***Limitations***

27
28 328 This study was a secondary analysis of cross-sectional data that allowed for a large
29
30
31 329 sample size, but prohibited conclusions of causality and limited the measures available to those
32
33 330 at hand. Longitudinal research on the well-being of college students is necessary to identify
34
35 331 causal factors that promote long-term positive outcomes. Using the sum of individual stressors
36
37 332 did not incorporate the perceived severity or frequency of the stressors. Measures that also allow
38
39
40 333 for the identification of the perceived severity and frequency of stressors specific to college
41
42 334 students, such as the Post-Secondary Students Stressors Index,^{64,65} should be considered in future
43
44
45 335 research. In addition, while the Brief Resilience Scale was an efficient and psychometrically
46
47 336 sound option for measuring someone's ability to recover from stress, it is potentially an
48
49 337 oversimplified perspective of resilience, as it does not allow for the incorporation of some of the
50
51 338 inherent complexities of resilience as a construct, as previously discussed.

52 53 54 339 ***Conclusion***

55
56
57
58
59
60

1
2
3 340 The results of this study provide insight into the relationships among stressors, resilience,
4
5 341 and well-being in a sample of young adult college students. We tested a simple moderation
6
7 342 model of resilience that was theoretically supported but infrequently tested empirically in this
8
9 343 population. Resilience did not modify the relationship between stressors and well-being, as
10
11 344 hypothesized. However, resilience and stressors were independent predictors of well-being and
12
13 345 explained a sizeable portion of the variance in well-being. Sleep problems, anxiety, and
14
15 346 interpersonal relationships were identified as major sources of student stress. Each of these top
16
17 347 stressors was individually associated with decreased resilience and decreased well-being. These
18
19 348 findings are particularly interesting because unlike most well-being research to date in which
20
21 349 well-being is operationalized as psychological well-being, the use of the PHS-WB allowed a
22
23 350 more holistic definition of well-being that incorporated perceived physical, mental, and social
24
25 351 aspects of health.

26
27
28
29
30
31 352 Young adults are entering adulthood in worse health than prior generations. It is critical
32
33 353 to identify distinct factors that affect their well-being in order to provide guidance for the
34
35 354 allocation of resources and the development of health promotion interventions. Based on the
36
37 355 findings of this study and literature discussed, college health professionals designing health
38
39 356 promotion programs intended to improve the well-being of young adult college students should
40
41 357 consider including evidence-based components related to building resilience and managing
42
43 358 stressors, specifically anxiety, sleep problems, and relationships. The promotion of healthy
44
45 359 lifestyle behaviors should also continue to be included in such programs, as sleep, moving daily
46
47 360 and often, and eating nutrient dense foods were associated with increased well-being.

48
49
50
51 361

52
53
54 362
55
56
57
58
59
60

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

363 **Declaration of Interest Statement**

364 The authors have no interests or conflicts to declare. The authors received no financial support
365 for this research or authorship of this article.

366 **Acknowledgment**

367 The authors express their appreciation to the anonymous reviewers for their constructive
368 comments on an earlier version of this manuscript.

369

370

Draft

1
2
3 371 **References**
4

- 5 372 1. Institute of Medicine & National Research Council. *Investing in the Health and Well-Being of*
6
7 373 *Young Adults*. Washington, DC: National Academies Press; 2015.
- 8
9 374 2. Bann CM, Kobau R, Lewis MA, Zack MM, Luncheon C, Thompson WW. Development and
10
11 psychometric evaluation of the Public Health Surveillance Well-being Scale. *Qual Life*
12 375 *Res.* 2012;21(6):1031-1043. doi: 10.1007/s11136-011-0002-9. PMID 21947657.
13
14 376
15
16 377 3. Centers for Disease Control and Prevention. (2018). Well-being concepts.
17
18 <https://www.cdc.gov/hrqol/wellbeing.htm> Updated October 31, 2018. Accessed June 20,
19 378
20
21 379 2020.
- 22
23 380 4. Nguyen QC, Whitsel EA, Tabor JW, Cuthbertson CC, Wener MH, Potter AJ, et al. Blood
24
25 spot-based measures of glucose homeostasis and diabetes prevalence in a nationally
26 381
27 representative population of young US adults. *Ann Epidemiol.* 2014;24(12):903-909. doi:
28 382
29 10.1016/j.annepidem.2014.09.010. PMID: 25444890.
30 383
- 31
32 384 5. Gooding HC, McGinty S, Richmond TK, Gillman MW, Field AE. Hypertension awareness
33
34 and control among young adults in the national longitudinal study of adolescent health. *J*
35 385
36 *Gen Intern Med.* 2014;29(8):1098-1104. doi: 10.1007/s11606-014-2809-x. PMID:
37 386
38 24577758.
39 387
- 40
41 388 6. Kessler RC, Amminger GP, Aguilar-Gaxiola S, Alonso J, Lee S, Ustun TB. Age of onset of
42
43 mental disorders: A review of recent literature. *Curr Opin Psychiatry.* 2007;20(4),359-
44 389
45 364. doi: 10.1097/YCO.0b013e32816ebc8c. PMID: 17551351.
46 390
47
48 391 7. Substance Abuse and Mental Health Services Administration (SAMHSA). The CBHSQ
49
50 report: Serious mental health challenges among older adolescents and young adults.
51 392
52 Center for Behavioral Health Statistics and Quality, SAMSHA.
53 393
54
55 <https://www.samhsa.gov/data/sites/default/files/sr173-mh-challenges-young-adults->
56 394
57
58
59
60

- 1
2
3 395 2014/sr173-mh-challenges-young-adults-2014/sr173-mh-challenges-young-adults-
4
5 396 2014.htm Published May 6, 2014. Accessed June 20, 2020.
6
7
8 397 8. American Psychological Association. Stress in America: Generation Z. Stress in America
9
10 398 Survey. <https://www.apa.org/news/press/releases/stress/2018/stress-gen-z.pdf> Updated
11
12 399 October, 2018. Accessed June 20, 2020.
13
14
15 400 9. Elliot AJ, Thrash TM, Murayama K. A longitudinal analysis of self-regulation and well-being:
16
17 401 Avoidance personal goals, avoidance coping, stress generation, and subjective well-
18
19 402 being. *J Pers.* 2011;79(3):643-674. doi: 10.1111/j.1467-6494.2011.00694.x. PMID:
20
21 403 21534967.
22
23
24 404 10. American Psychological Association. Stress effects on the body. Psychology Help Center.
25
26 <https://www.apa.org/helpcenter/stress/index> Published November, 2018. Accessed June
27 405
28 26, 2020.
29 406
30
31 407 11. American Psychological Association. The road to resilience. Psychology Help Center.
32
33 <https://www.apa.org/helpcenter/road-resilience> Published 2012. Accessed June 20, 2020.
34 408
35
36 409 12. Southwick SM, Bonanno GA, Masten AS, Panter-Brick C, Yehuda R. Resilience definitions,
37
38 410 theory, and challenges: Interdisciplinary perspectives. *Eur J Psychotraumatol.*
39
40 411 2014;5(1):25338. doi: 10.3402/ejpt.v5.25338. PMID: 25317257.
42
43 412 13. Scoloveno R. A concept analysis of the phenomenon of resilience. *J Nurs Care.*
44
45 413 2016;5(4):353-358. doi: 10.4172/2167-1168.1000353.
46
47
48 414 14. Fletcher D, Sarkar M. Psychological resilience: A review and critique of definitions,
49
50 415 concepts, and theory. *Eur Psychol.* 2013;18(1):12-23. doi: 10.1027/1016-9040/a000124.
51
52
53 416 15. Pietrzak RH, Southwick SM. Psychological resilience in OEF-OIF Veterans: Application of
54
55 417 a novel classification approach and examination of demographic and psychosocial
56
57
58
59
60

- 1
2
3 418 correlates. *J Affect Disord.* 2011;133(3):560-568. doi: 10.1016/j.jad.2011.04.028. PMID:
4
5 419 21624683.
6
7
8 420 16. Hartley MT. Assessing and promoting resilience: An additional tool to address the
9
10 421 increasing number of college students with psychological problems. *Journal of College*
11
12 422 *Counseling.* 2012;15:37-51. <https://doi.org/10.1002/j.2161-1882.2012.00004.x>
13
14
15 423 17. Julian M, Cheadle ACD, Knudsen KS, Bilder RM, & Dunkel Schetter C. Resilience
16
17 424 resources scale: A brief resilience measure validated with undergraduate students.
18
19 425 *Journal of American College Health (epub).* 2020.
20
21 426 <https://doi.org/10.1080/07448481.2020.1802283>
22
23
24 427 18. Garmezny N. Vulnerability research and the issue of primary prevention. *American Journal of*
25
26 428 *Orthopsychiatry.* 1971; 41:101-116. <https://doi.org/10.1111/j.1939-0025.1971.tb01111.x>
27
28
29 429 19. Werner EE, Bierman JM, & French FE. *The children of Kauai: A longitudinal study from the*
30
31 430 *prenatal period to age ten.* 1971. University of Hawaii Press.
32
33 431 20. Rutter M. Protective factors in children's responses to stress and disadvantage. *Annals of the*
34
35 432 *Academy of Medicine, Singapore.* 1979;8(3):324-338. PMID: 547874.
36
37
38 433 21. Helou MA, Keiser V, Feldman M, Santen S, Cyrus JW, Michael SR. Student well-being and
39
40 434 the learning environment. *Clin Teach.* 2019;16(4):362-366. doi: 10.1111/tct.13070.
41
42 435 PMID: 31397105.
43
44
45 436 22. Smith GD, Yang F. Stress, resilience and psychological well-being in Chinese undergraduate
46
47 437 nursing students. *Nurse Educ Today,* 2017;49:90-95. doi: 10.1016/j.nedt.2016.10.004.
48
49 438 PMID: 27889584.
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 439 23. Bore M, Pittolo C, Kirby D, Dluzewska T, Marlin S. Predictors of psychological distress and
4
5 440 well-being in a sample of Australian undergraduate students. *High Educ Res Dev*.
6
7 441 2016;35(5):869-880. doi: 10.1080/07294360.2016.1138452.
8
9
10 442 24. Thurston IB, Hardin R, Kamody RC, Herbozo S, Kaufman C. The moderating role of
11
12 443 resilience on the relationship between perceived stress and binge eating symptoms among
13
14 444 young adult women. *Eat Behav*. 2018;29:114-119. doi: 10.1016/j.eatbeh.2018.03.009.
15
16 445 PMID: 29653301.
17
18
19 446 25. Gloria CT, Steinhardt MA. Relationships among positive emotions, coping, resilience and
20
21 447 mental health. *Stress Health*. 2016;32(2):145-156. doi: 10.1002/smi.2589. PMID:
22
23 448 24962138.
24
25
26 449 26. Ridner SL, Newton KS, Staten RR, Crawford TN, Hall LA. Predictors of well-being among
27
28 450 college students. *J Am Coll Health*. 2016;64(2):116-124. doi:
29
30 451 10.1080/07448481.1085057. PMID: 26630580.
31
32
33 452 27. Smith BW, Dalen J, Wiggins K, Toole E, Christopher P, Bernard J. The Brief Resilience
34
35 453 Scale: Assessing the ability to bounce back. *Int J Behav Med*. 2008;15(3):194-200. doi:
36
37 454 10.1080/10705500802222972. PMID: 18696313.
38
39
40 455 28. Windle G, Bennett KM, Noyes J. A methodological review of resilience measurement scales.
41
42 456 *Health and Quality of Life Outcomes*. 2011;9(8):8–18. <https://doi.org/10.1186/1477->
43
44 457 [7525-9-8](https://doi.org/10.1186/1477-7525-9-8)
45
46
47 458 29. Satici SA. Psychological vulnerability, resilience, and subjective well-being: The mediating
48
49 459 role of hope. *Pers Individ Differ*. 2016;102:68-73. doi: 10.1016/j.paid.2016.06.057.
50
51 460 30. IBM SPSS Statistics for Windows [computer software]. Version 25.0. Armonk, NY: IBM
52
53 461 Corp.;2017.
54
55
56
57
58
59
60

- 1
2
3 462 31. Mundfrom DJ, Perrett JJ, Schaffer J, Piccone A, Roozeboom M. Bonferroni adjustments in
4
5 463 tests of regression coefficients. *Multiple Linear Regression Viewpoints*. 2006; 32(1): 1-6.
6
7
8 464 32. Lehrer HM, Steinhardt MA, Dubois SK, Laudenslager ML. Perceived stress, psychological
9
10 465 resilience, hair cortisol concentration, and metabolic syndrome severity: A moderated
11
12 466 mediation model. *Psychoneuroendocrinology*. 2020;113:104510. doi:
13
14 467 10.1016/j.psyneuen.2019.104510. PMID: 31911349.
15
16
17 468 33. Denovan A, Macaskill A. Stress and subjective well-being among first year UK
18
19 469 undergraduate students. *J Happiness Stud*. 2017;18, 505-525. doi:10.1007/s10902-016-
20
21 470 9736-y.
22
23
24 471 34. Chow KM, Tang WKF, Chan WHC, Sit WHJ, Choi KC, Chan S. Resilience and well-being
25
26 472 of university nursing students in Hong Kong: A cross-sectional study. *BMC Med Educ*.
27
28 473 2018;18(1):13. doi: 10.1186/s12909-018-1119-0. PMID: 29329529.
29
30
31 474 35. Leys C, Arnal C, Wollast R, Rolin H, Kotsou I, Fossion P. (2020). Perspectives on resilience:
32
33 475 Personality trait or skill? *J Trauma Dissociation*. 2020;4(2):100074. doi:
34
35 476 10.1016/j.ejtd.2018.07.002
36
37
38 477 36. Hu T, Zhang D, Wang J. (2015). A meta-analysis of the trait resilience and mental health.
39
40 478 *Pers Individ Differ*. 2015;76:18-27. doi: 10.1016/j.paid.2014.11.039
41
42
43 479 37. Liu MY, Li N, Li WA., Khan H. Association between psychosocial stress and hypertension:
44
45 480 A systematic review and meta-analysis. *Neurol Res*. 2017;39(6):573-580. doi:
46
47 481 10.1080/01616412.2017.1317904. PMID: 28415916.
48
49
50 482 38. Tay JL, Xia XS, Tan CLR, Qu Y, Loh CJ, Lau Y, et al. Evaluating predicting factors of
51
52 483 psychological well-being among university and polytechnic students. *Singap Nurs J*.
53
54 484 2018;45(1):2-12.
55
56
57
58
59
60

- 1
2
3 485 39. Burke TJ, Ruppel EK, Dinsmore DR. Moving away and reaching out: Young adults'
4
5 486 relational maintenance and psychosocial well-being during the transition to college. *J*
6
7 487 *Fam Comm*. 2016;16(2):180-187. doi: 10.1080/15267431.2016.1146724.
8
9
10 488 40. Becker SP, Jarrett MA, Luebbe AM, Garner AA, Burns GL, Kofler MJ. Sleep in a large,
11
12 489 multi-university sample of college students: Sleep problem prevalence, sex differences,
13
14 490 and mental health correlates. *Sleep Health*. 2018;4(2):174-181. doi:
15
16 491 10.1016/j.sleh.2018.01.001.
17
18
19 492 41. Fisher D, McHill AW, Sano A, Picard RW, Barger LK, Czeisler CA, et al. Irregular sleep
20
21 493 and event schedules are associated with poorer self-reported well-being in US college
22
23 494 students. [Published online ahead of print June 15, 2020]. *Sleep*. doi:
24
25 495 10.1093/sleep/zsz300 PMID: 31837266.
26
27
28
29 496 42. Zhang Y, Peters A, Bradstreet J. Relationships among sleep quality, coping styles, and
30
31 497 depressive symptoms among college nursing students: A multiple mediator model. *J Prof*
32
33 498 *Nurs*. 2018;34:320-325. doi: 10.1016/j.profnurs.2017.12.004 PMID: 30055687.
34
35
36 499 43. Friedrich A, Schlarb AA. Let's talk about sleep: A systematic review of psychological
37
38 500 interventions to improve sleep in college students. *J Sleep Res*. 2018;27(1):4-22.
39
40 501 doi:10.1111/jsr.12568. PMID: 28618185.
41
42
43
44 502 44. Mitchell LJ, Bisdounis L, Ballesio A, Omlin X, Kyle SD. The impact of cognitive behavioral
45
46 503 therapy for insomnia on objective sleep parameters: A meta-analysis and systematic
47
48 504 review. *Sleep Med Rev*. 2019;47:90-102. doi: 10.1016/j.smr.2019.06.002. PMID:
49
50 505 31377503.
51
52
53
54
55
56
57
58
59
60

- 1
2
3 506 45. Lubas MM, Szklo-Coxe M. A critical review of education-based sleep interventions for
4
5 507 undergraduate students: Informing future directions in intervention development. *Adolesc*
6
7 508 *Res Rev.* 2019;4:249-266. doi: 10.1007/s40894-018-0100-9
8
9
10 509 46. Greeson JM, Juberg MK, Maytan M, James K, Rogers H. A randomized controlled trial of
11
12 510 KORU: A mindfulness program for college students and other emerging adults. *J Am*
13
14 511 *Coll Health.* 2014;62(4):222-233. doi: 10.1080/07448481.2014.887571
15
16
17 512 47. American College Health Association. American College Health Association – National
18
19 513 College Health Assessment II: Undergraduate student reference group data report spring
20
21 514 2019. [https://www.acha.org/documents/ncha/NCHA-](https://www.acha.org/documents/ncha/NCHA-II_SPRING_2019_UNDERGRADUATE_REFERENCE%20_GROUP_EXECUTIVE_SUMMARY.pdf)
22
23 515 [II_SPRING_2019_UNDERGRADUATE_REFERENCE%20_GROUP_EXECUTIVE_S](https://www.acha.org/documents/ncha/NCHA-II_SPRING_2019_UNDERGRADUATE_REFERENCE%20_GROUP_EXECUTIVE_SUMMARY.pdf)
24
25 516 [UMMARY.pdf](https://www.acha.org/documents/ncha/NCHA-II_SPRING_2019_UNDERGRADUATE_REFERENCE%20_GROUP_EXECUTIVE_SUMMARY.pdf). Published 2019. Accessed June 20, 2020.
26
27
28 517 48. American College Health Association. American College Health Association – National
29
30 518 College Health Assessment III: Undergraduate student reference group data report fall
31
32 519 2019. [https://www.acha.org/documents/ncha/NCHA-](https://www.acha.org/documents/ncha/NCHA-III_FALL_2019_UNDERGRADUATE_REFERENCE_GROUP_DATA_REPORT.pdf)
33
34 520 [III_FALL_2019_UNDERGRADUATE_REFERENCE_GROUP_DATA_REPORT.pdf](https://www.acha.org/documents/ncha/NCHA-III_FALL_2019_UNDERGRADUATE_REFERENCE_GROUP_DATA_REPORT.pdf).
35
36 521 Published 2020. Accessed June 20, 2020.
37
38
39
40 522 49. Becker KR, Plessow F, Coniglio KA, Tabri M, Franko DL, Zayas LV, et al. Global/local
41
42 523 processing style: Explaining the relationship between trait and anxiety and binge eating.
43
44 524 *Int J Eat Disorder.* 2017;50(11):1264-1272. doi: 10.1002/eat.22772. PMID: 28963792.
45
46
47 525 50. Liu H, Tian Y, Liu Y, Nigatu YT, Wang J. Relationship between major depressive disorder,
48
49 526 generalized anxiety disorder and coronary artery disease in the US general population. *J*
50
51 527 *Psychosom Res.* 2019;119:8-13. doi: 10.1016/j.jpsychores.2019.01.007. PMID:
52
53 528 30947822.
54
55
56
57
58
59
60

- 1
2
3 529 51. Sastre J, Crespo A, Fernandez-Sanchez A, Rial M, Plaza V. Anxiety, depression, and asthma
4
5 530 control: Changes after standardized treatment. *J Allergy Clin Immunol Practice*.
6
7 531 2018;6(6):1953-1959. doi: 10.1016/j.jaip.2018.02.002.
8
9
10 532 52. Duffy ME, Twenge JM, Joiner TE. Trends in mood and anxiety symptoms and suicide-
11
12 533 related outcomes among U.S. undergraduates, 2007 – 2018: Evidence from two national
13
14 534 surveys. *J Adolesc Health*. 2019;65(5):590-598. doi: 10.1016/j.jadohealth.2019.04.033.
15
16 535 PMID: 31279724.
17
18
19 536 53. Association for University and College Counseling Center Directors. The Association for
20
21 537 University and College Counseling Center Directors annual survey – public version 2018.
22
23 538 [https://www.aucccd.org/assets/documents/Survey/2018%20AUCCCD%20Survey-](https://www.aucccd.org/assets/documents/Survey/2018%20AUCCCD%20Survey-Public-June%2012-FINAL.pdf)
24
25 539 [Public-June%2012-FINAL.pdf](https://www.aucccd.org/assets/documents/Survey/2018%20AUCCCD%20Survey-Public-June%2012-FINAL.pdf). Published 2018. Accessed June 20, 2020.
26
27
28 540 54. Carl E, Witcraft SM, Kauffman BY, Gillespie EM, Becker ES, Cuijpers P, et al.
29
30 541 Psychological and pharmacological treatments for generalized anxiety disorder (GAD): A
31
32 542 meta-analysis of randomized controlled trials. *Cogn Behav Ther*. 2020;49(1):1-21. doi:
33
34 543 10.1080/16506073.2018.1560358. PMID: 30760112.
35
36
37 544 55. Breedvelt JFJ, Amanvermez Y, Harrer M, Karyotaki E, Gilbody S, Bockting CLH, et al. The
38
39 545 effects of meditation, yoga, and mindfulness on depression, anxiety, and stress in tertiary
40
41 546 education students: A meta-analysis [Published online ahead of print April 24, 2019].
42
43 547 *Front Psychiatry*. doi: 10.3389/fpsy.2019.00193. PMID: 31068842.
44
45
46 548 56. Lattie EG, Adkins EC, Winquist N, Stiles-Shields C, Wafford QE, Graham AK. Digital
47
48 549 mental health interventions for depression, anxiety, and enhancement of psychological
49
50 550 well-being among college students: Systematic review. *J Med Internet Res*.
51
52 551 2019;21(7):e12869. doi: 10.2196/12869. PMID: 31333198.
53
54
55
56
57
58
59
60

- 1
2
3 552 57. Harrer M, Adam SH, Baumeister H, Cuijpers P, Karyotaki E, Auerbach RP, et al. Internet
4
5 553 interventions for mental health in university students: A systematic review and
6
7 554 meta-analysis. *Int J Meth Psych Res*, 2019;28(2):e1759. doi: 10.1002/mpr.1759. PMID:
8
9 555 30585363
- 10
11
12 556 58. Bolinski F, Boumparis N, Kleiboer A, Cuijpers P, Ebert DD, Riper H. The effect of e-mental
13
14 557 health interventions on academic performance in university and college students: A meta-
15
16 558 analysis of randomized controlled trials. *Internet Interv*. 2020;20:100321. doi:
17
18 559 10.1016/j.invent.2020.100321. PMID: 32382515.
- 19
20
21 560 59. Moreira JFG, Miernicki ME, Telzer EH. Relationship quality buffers association between co-
22
23 561 rumination and depressive symptoms among first year college students. *J Youth Adolesc*.
24
25 562 2016;45(3):484-493. doi: 10.1007/s10964-015-0396-8. PMID: 26649743.
- 26
27
28 563 60. Rankin JA, Paisley CA, Mulla MM, Tomeny TS. Unmet social support needs among college
29
30 564 students: Relations between social support discrepancy and depressive and anxiety
31
32 565 symptoms. *J Couns Psychol*. 2018;65(4):474-489. doi: 10.1037/cou0000269. PMID:
33
34 566 29999372.
- 35
36
37 567 61. Dunston ER, Messina ES, Coelho AJ, Christ SN, Waldrip MP, Vahk A, et al. Physical
38
39 568 activity is associated with grit and resilience in college students: Is intensity the key to
40
41 569 success? [Published online ahead of print April 2, 2020]. *J Am Coll Health*. doi:
42
43 570 10.1080/07448481.2020.1740229. PMID: 32240056.
- 44
45
46
47 571 62. Whatnall MC, Patterson AJ, Siew YY, Kay-Lambkin F, Hutchesson MJ. Are psychological
48
49 572 distress and resilience associated with dietary intake among Australian university
50
51 573 students? *Int J Environ Res Public Health*. 2019;16(21):4099. doi:
52
53 574 10.3390/ijerph16214099. PMID: 31653026.
- 54
55
56
57
58
59
60

- 1
2
3 575 63. Joyce S, Shand F, Tighe J, Laurent SJ, Bryant RA, Harvey SB. Road to resilience: A
4
5 576 systematic review and meta-analysis of resilience training programmes and interventions.
6
7 577 *BMJ Open*. 2018;8(6):e017858. doi: 10.1136/bmjopen-2017-017858. PMID: 29903782.
8
9
10 578 64. Linden B, Stuart H. Psychometric assessment of the Post-Secondary Student Stressors Index
11
12 579 (PSSI). *BMC Public Health*. 2019;19(1):1139. doi:10.1186/s12889-019-7472-z. PMID:
13
14 580 31426767.
15
16
17 581 65. Linden B, Boyes R, Stuart H. The Post-Secondary Student Stressors Index: Proof of concept
18
19 582 and implications for use [published online ahead of print May 20, 2020]. *J Am Coll*
20
21 583 *Health*. doi:10.1080/07448481.2020.1754222.
22
23
24 584
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 1. Sociodemographic characteristics of the study sample

Characteristic	<i>n</i>	%
Gender (<i>n</i> = 860)		
Male	337	39.2
Female	493	57.3
Another identity included:		
Transgender female	1	0.1
Transgender male	5	0.6
Gender non-conforming	5	0.6
Non-binary	14	1.6
Other identity	5	0.6
Race (<i>n</i> = 995)		
White	757	76.1
Black	75	7.5
Asian	62	6.2
More than one race selected	69	6.9
Other	32	3.2
Hispanic, Latino, or Spanish Origin (<i>n</i> = 988)		
Yes	82	8.3
No	906	91.7
Sexual Orientation (<i>n</i> = 999)		
Straight/Heterosexual	809	81.0
Another identity included:		
Asexual	23	2.3
Bisexual	78	7.8
Lesbian	22	2.2
Gay	26	2.6
Queer	9	0.9
Pansexual	16	1.6
Other identity	16	1.6
Academic Status (<i>n</i> = 1,010)		
Full-time	931	92.2
Part-time	79	7.8
First Generation Student (<i>n</i> = 1,004)		
Yes	765	76.2
No	239	23.8
Hours Worked per Week (<i>n</i> = 1,005)		
None	290	28.9
1-10	154	15.3
11-20	229	22.7
21-30	200	19.9
>30	132	13.1

Table 2. *t*-tests for differences in mean levels of resilience and well-being by the top five stressors ($n = 1002$)

Stressor	Resilience		Well-being	
	<i>M</i> (<i>SD</i>)	<i>t</i> _{<i>df</i>}	<i>M</i> (<i>SD</i>)	<i>t</i> _{<i>df</i>}
Sleep problems		$t_{941} = 5.48^*$		$t_{1000} = 12.89^*$
	No			
	Yes			
	3.58 (0.74)		53.37 (7.83)	
	3.32 (0.80)		46.87 (7.90)	
Anxiety		$t_{999} = 12.12^*$		$t_{1000} = 11.94^*$
	No			
	Yes			
	3.72 (0.69)		52.74 (8.26)	
	3.16 (0.78)		46.73 (7.66)	
Relationships (intimate, friends, roommates, family, professors, boss)		$t_{887} = 7.39^*$		$t_{1000} = 9.55^*$
	No			
	Yes			
	3.59 (0.74)		51.72 (8.15)	
	3.22 (0.80)		46.77 (8.13)	
Poor time management		$t_{1000} = 3.45^*$		$t_{1000} = 6.41^*$
	No			
	Yes			
	3.50 (0.79)		51.04 (8.55)	
	3.33 (0.77)		47.63 (8.02)	
Financial/money problems		$t_{1000} = 4.49^*$		$t_{1000} = 7.03^*$
	No			
	Yes			
	3.52 (0.77)		51.14 (8.13)	
	3.30 (0.79)		47.40 (8.53)	

Note: *All *t*-tests significant at the $p < .001$ level.

Table 3. t-tests for differences in mean levels of stressors, resilience, and well-being by individual resilience building behaviors

Behavior	Stressors			Resilience			Well-being		
	<i>M</i> (<i>SD</i>)	<i>t</i> _{df}	<i>p</i>	<i>M</i> (<i>SD</i>)	<i>t</i> _{df}	<i>p</i>	<i>M</i> (<i>SD</i>)	<i>t</i> _{df}	<i>p</i>
Listen to music that supports well-being		<i>t</i> ₉₈₃ = -3.44	.001		<i>t</i> ₉₈₆ = 0.49	.622		<i>t</i> ₅₈₃ = 0.53	.631
No	4.62 (3.58)			3.45 (0.83)			49.88 (9.11)		
Yes	5.46 (3.58)			3.43 (0.77)			49.56 (8.14)		
Sleep at least 6 hours per night		<i>t</i> ₇₈₂ = 5.01	< .001		<i>t</i> ₉₈₆ = -1.67	.095		<i>t</i> ₇₇₅ = -6.64	< .001
No	5.89 (3.76)			3.38 (0.80)			47.51 (8.81)		
Yes	4.71 (3.42)			3.47 (0.78)			51.09 (7.93)		
Move daily and often		<i>t</i> ₈₉₀ = 3.82	< .001		<i>t</i> ₉₃₄ = -5.14	< .001		<i>t</i> ₉₈₆ = -9.15	< .001
No	5.66 (3.82)			3.29 (0.80)			47.08 (8.35)		
Yes	4.78 (3.36)			3.55 (0.76)			51.84 (7.96)		
Connect with supportive people		<i>t</i> ₉₈₃ = -.368	.71		<i>t</i> ₉₈₆ = -1.91	.057		<i>t</i> ₉₈₅ = -5.90	< .001
No	5.14 (3.60)			3.39 (0.82)			48.16 (8.70)		
Yes	5.22 (3.60)			3.48 (0.76)			51.28 (7.92)		
Eat nutrient dense foods		<i>t</i> ₉₇₆ = 5.91	< .001		<i>t</i> ₉₅₈ = -4.61	< .001		<i>t</i> ₉₈₆ = -8.03	< .001
No	5.77 (3.76)			3.33 (0.80)			47.80 (8.27)		
Yes	4.44 (3.24)			3.56 (0.76)			52.02 (8.15)		

Note: Sample size varies from 985 to 988.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47

Table 4. Predictors of well-being (*n* = 994).

Model	Unstandardized Beta Coefficient		Standardized Beta Coefficient β	<i>t</i> statistic	<i>p</i>	<i>R</i> ²	Adjusted <i>R</i> ²	<i>F</i> _{df}	<i>p</i>
	<i>b</i>	Standard Error							
Model 1						.43	.43	<i>F</i> _{6,987} = 123.78	< .0001
(Constant)	41.086	1.861		22.074	< .0001				
Stressors	-.565	.246	-.242	-2.300	.022				
Resilience	4.151	.489	.384	8.481	< .0001				
Sexual Orientation	-5.478	2.781	-.252	-1.970	.049				
Stressors*Resilience	-.153	.070	-.205	-2.168	.030				
Resilience*Sexual Orientation	.895	.712	.138	1.257	.209				
Stressors*Sexual Orientation	.198	.142	.075	1.398	.163				
Model 2						.43	.43	<i>F</i> _{5,988} = 148.13	< .0001
(Constant)	40.742	1.842		22.124	.000				
Stressors	-.615	.243	-.263	-2.535	.011				
Resilience	4.229	.486	.391	8.707	< .0001				
Sexual Orientation	-2.226	1.018	-.103	-2.187	.029				
Stressors*Resilience	-.133	.069	-.178	-1.933	.054				
Stressors*Sexual Orientation	.146	.135	.055	1.076	.282				
Model 3						.43	.43	<i>F</i> _{4,989} = 184.84	< .0001
(Constant)	40.242	1.782		22.580	< .0001				
Stressors	-.538	.232	-0.230	-2.321	.020				
Resilience	4.319	.479	.399	9.026	.000				
Sexual Orientation	-1.294	.535	-.060	-2.417	.016				
Stressors*Resilience	-.144	.068	-.194	-2.129	.034				
Model 4						.43	.42	<i>F</i> _{3,990} = 244.08	< .0001
(Constant)	43.121	1.163		37.081	< .0001				
Stressors	-1.014	.063	-.434	-16.212	< .0001				
Resilience	3.499	.285	.323	12.291	< .0001				
Sexual Orientation	-1.324	.536	-.061	-2.469	.014				
Model 5						.42	.42	<i>F</i> _{2,999} = 365.98	< .0001
(Constant)	42.788	1.155		37.049	< .0001				
Stressors	-1.037	.061	-.443	-16.893	< .0001				
Resilience	3.559	.283	.330	12.579	< .0001				