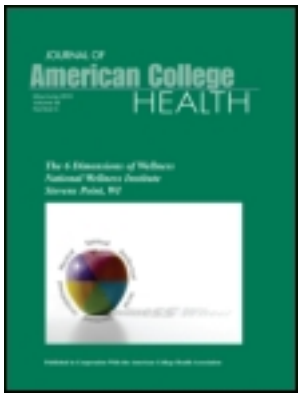

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Examining the Relationships Between Resilience, Mental Health, and Academic Persistence in Undergraduate College Students

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Examining the Relationships Between Resilience, Mental Health, and Academic Persistence in Undergraduate College Students

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Abstract. Objective: In this study, the relationships between measures of interpersonal resilience, intrapersonal resilience, and mental health were examined with respect to academic and social integration, key determinants of academic persistence. **Participants**: A sample ($n = 605$) of undergraduate students was recruited from 2 midwestern universities during the 2007–2008 academic year. **Methods**: Hierarchal (or sequential) regression analysis examined whether the inter- and intrapersonal resilience and mental health measures contributed to explaining variance in the response variables of university cumulative grade point average (GPA) and university sense of belonging. **Results**: The intrapersonal resilience factors contributed to explaining variance in cumulative GPA in addition to aptitude and achievement. Furthermore, there was a strong statistical correlation between the inter- and intrapersonal resilience factors and mental health. **Conclusions**: The demands in college are significant and there is a need for more research on the concept of resilience as it relates to college health and academic persistence.

Keywords: academic persistence, college, counseling, mental health, resilience

Resilience is a relatively new research concept that has emerged to explain why some individuals behave adaptively under great stress.[1–3] As a term, resilience is almost pedestrian in its use and there are many definitions and numerous instruments assessing resilience factors, such as tenacity and emotional intelligence.[4] Masten et al define resilience as "the process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances."[5(p426)] One way to understand resilience is in relation to the classic stress-diathesis model, where "stress activates a diathesis, transforming the potential of predisposition into the presence of psychopathology."[6(p406)] However, from a resilience perspective, the stress-diathesis model fails to account for protective factors. As an interactionalist framework, resilience is the complex interplay between an individual and his/her environment, in which the individual can influence a successful outcome by using internal and external protective factors, defined as the personal qualities or contexts that predict positive outcomes under high-risk conditions.[7] Today, resilience is measured by "constitutional variables like temperament and personality, in addition to specific skills (eg, active problem solving)."[8(p586)] In today's demanding college environment,[9–12] resilience is critical.

Consistent evidence suggests that stress impedes the academic performance of approximately a third of the college population,[11,12] causing problems with sleeping and eating,[13,14] physical ailments[15,16] and anxiety and depression.[17,18] Particularly at a large university, the environment can be stressful and often is characterized by (a) high-stakes academic pressure, (b) minimal academic support compared to high school, (c) potential social isolation during the transition, and (d) long-term financial debt.[9,10] Since it is difficult to eliminate all college stressors, it is important to examine how students cope.[19–21]

According to Tinto's theory of student departure, a well-established theory with strong empirical support, key determinants of academic persistence are academic and social integration.[22–25] Tinto theorized that students enter college with background characteristics, and once in college, students interact with peers and teachers.[25] Hence, academic persistence is the complex interplay between the student and his/her ability to integrate *academically*, referring to student's motivation to attend class and study, and *socially*, referring to student's subjective sense of fitting in the university.[25] According to Pascarella and Terenzini, there is clear evidence that academic and social integration shape college retention.[22] Tinto's work[25] can be forwarded by examining if intrapersonal resilience, such as (a) tenacity and persistence,[26,27] (b) emotional intelligence and the ability

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to tolerate stress,[28–30] (c) positive acceptance of change and self-control,[30–32] (d) spirituality and the belief that things will work out,[33,34] and interpersonal resilience, such as (e) social support,[35,36] can explain variance in academic persistence in addition to known factors, such as aptitude,[37] achievement,[37] hours employed per week,[38] and extracurricular hours per week.[38] Research is needed to examine the utility of a resilience framework in college health and to understand if the relationship between resilience and academic persistence is more important for some students as they are learning to cope with the social and emotional demands of college.

This article reports the results of a study that examined if intrapersonal resilience (ie, tenacity, tolerance of stress and negative emotions, positive acceptance of change, control, and spirituality) and interpersonal resilience (ie, social support) contributed to explaining variance in the response variables of university cumulative grade point average (GPA) and sense of belonging in addition to the variance explained by aptitude (ie, ACT/SAT [American College Testing/Scholastic Aptitude Test]), achievement (ie, high school GPA), work hours, and extracurricular hours. The hierarchical (or sequential) regression analysis entered variables known to relate to academic persistence and then the research variables. Two-way interactions were tested, nonsignificant interactions were removed sequentially, and the reduced model was reported. Mental health and credits completed were entered as possible moderators. The research hypotheses were (1) the inter- and intrapersonal resilience variables would positively contribute to explaining variance in the response variables (ie, the resilience variables would be associated with higher cumulative GPAs and sense of belonging); and (2) some of these variables would be useful moderators for interpreting variance in the response variables, including the hypothesis that mental health and credits completed would moderate the relationship between resilience and the response variables (ie, the resilience variables would be more important for students with lower mental health scores and fewer credits completed).

METHODS

After receiving approval from the institutional review boards of 2 land-grant midwestern universities, e-mails were sent to a convenience sample of 20 instructors at each university who taught a range of undergraduate courses asking permission to announce the study. The 22% of instructors who agreed were in psychology, counseling, journalism, and education departments. The paper-based surveys were distributed at the end of class to interested students during the first week of the Fall 2007 semester. As a result, these courses provided a potential sample of 1,021 undergraduate students, of which 605 participated, for a response rate of 59%.

Sample

The participants were (427 [70.6%] women, 178 [29.4%] men), with a mean age of 21.03 years ($SD = 2.83$) and cumulative GPA of 3.23 ($SD = 0.39$) (Table 1). Five hundred sixty-two (92.7%) participants identified themselves as Caucasian, 10 (1.7%) as Latino, 17 (2.8%) as Asian American, 7 (1.2%) as African American, and 8 (1.3%) as of another race/ethnicity. Participants' majors primarily were in the Arts and Sciences—Psychology, Biology, English, Education, Journalism, and Communication Studies. Based on known university population statistics, the sample was overrepresentative of female students. Consistent with known university population data, 1 university's participants had higher ACT scores ($F = 10.797$; $df = 1, 602$; $p = .001$) and higher high school GPA ($F = 12.612$; $df = 1, 593$; $p = .000$). In addition, based on the participants' credits completed ($M = 70.63$; $SD = 29.53$), the sample was a cross-section of undergraduates. Overall, the demographic information was representative of the universities, except for the disproportionate percentage of female students.

TABLE 1. Participant Demographic Information ($N = 605$)

Variables	Mean	SD	Range
University GPA	3.23	0.39	1.95–4.10
High school GPA	3.61	0.38	1.7–4.3
ACT/SAT score	25.53	3.22	16–35
Hours employed/week	11.51	10.83	0–60
Hours in extracurricular/week	5.58	7.55	0–50
CD-RISC-total score	75.72	11.91	6–100
Factor 1 (Tenacity)	25.25	4.25	1–32
Factor 2 (Tolerance)	19.79	3.65	1–28
Factor 3 (Acceptance)	15.77	2.78	2–20
Factor 4 (Control)	9.42	1.89	0–12
Factor 5 (Spirituality)	5.46	2.09	0–8
SSQ-6	32.40	5.08	6–36
MHI-5	73.15	13.01	25–100
College credits completed	70.63	29.53	0–150

Category	Number	Percentage
Gender		
Male	178	29.4
Female	427	70.6
Race		
Caucasian	561	92.7
Asian American	17	2.8
Latino	10	1.7
African American	7	1.2
Biracial or other	8	1.3

Note. GPA = grade point average; ACT/SAT = American College Testing/Scholastic Aptitude Test; CD-RISC = Connor-Davidson Resilience Scale; SSQ-6 = Social Support Questionnaire; MHI-5 = Mental Health Inventory-5.

Measures

Variables Related to Academic Persistence and Demographics

A questionnaire requested the following information: (a) cumulative university GPA; (b) high school GPA; (c) ACT or

SAT score; (d) if employed, number of hours per week; (e) if involved in extracurricular activities, number of hours per week; (f) number of credits completed; (g) sex; (h) race; and (i) age. Self-report of variables was chosen for feasibility, low cost, and the benefit of allowing participants to respond privately and anonymously.[39]

Sense of Belonging

The Sense of Belonging (SOB) subscale of the Perceived Cohesion Scale is a 3-item scale that measures "an individual's sense of belonging to a particular group."[40(p482)] The reliability of the scale is satisfactory with Chronbach's alphas of .90[41] and .95.[42] In this study, Chronbach's alpha was .97. The SOB is associated with students socializing and participating in student organizations.[43]

Intrapersonal Resilience

The Connor-Davidson Resilience Scale (CD-RISC) is a 25-item scale that measures the ability to "thrive in the face of adversity."[44(p76)] Participants rated items on a 5-point Likert scale from 0 (not at all true) to 4 (true nearly all of the time). Chronbach's alpha for the full scale was reported as .89, item-total correlations ranged from .30 to .70, and the test–retest reliability intraclass correlation coefficient was .87.[44] In this study, Chronbach's alpha for the full scale was .92 and confirmatory factor analysis supported the original 5-factor structure (root mean square error of approximation [RMSEA] = .068; 90% confidence interval [CI] = .064–.072; comparative fit ındex [CFI] = .912; Tucker-Lewis *Index* [TLI] = .900). Based on an a priori decision, the 5 factors were entered simultaneously as (a) tenacity, (b) tolerance of stress and negative emotion, (c) positive acceptance of change, (d) control, and (e) spirituality.[44]

Interpersonal Resilience

The Social Support Questionnaire (SSQ-6) is a 6-item scale that measures degree of satisfaction with available social supports.[45,46] Participants rated satisfaction on a 6-point Likert scale from 6 (very satisfied) to 1 (very dissatisfied). Chronbach's alpha was reported as .93[47] and several studies have found correlations with indexes of well being.[45–47] Chronbach's alpha in the present study was .94.

Mental Health

The Mental Health Inventory-5 (MHI-5) is a 5-item scale that measures current perceptions of mental health.[48,49] Participants rated items on a 5-point scale from 1 (all of the time) to 5 (none of the time). The raw scores were standardized by linear transformations to a scale ranging between 0 and 100, with high scores indicating better mental health. The MHI-5 has reliability and validity statistics similar to the full 38-item MHI.[48–51] Chronbach's alpha in the present study was .76.

Data Analysis

The method of data analysis was hierarchical (or sequential) regression analysis designed to examine how much variance in the outcome variables was explained by adding variables in a sequential fashion.[52] The a priori decision was 2 hierarchical (or sequential) regression analyses examining Tinto's[22–25] concepts of academic and social integration separately. One analysis examined the variance in cumulative university GPA and the other examined the variance in university sense of belonging. A listwise comparison was used. The a priori alpha was .05. Prior to the analysis, to check for multicollinearity, the bivariate, zero-order correlations were examined for correlations of about .80 or larger (Table 2).[53] Further, variance inflation factors were examined for scores of 10 or greater.[53] There was no evidence of multicollinearity.

RESULTS

The first outcome variable was university sense of belonging. Using a listwise comparison, the sample was reduced to 499 participants. Comparisons of the studentized residual plots for sense of belonging indicated concerns about homoscedasticity and normality assumptions. Linear transformations were not helpful in normalizing the distribution. The regression analysis was performed with an understanding of this concern. The result of the regression analysis found the sequential steps did not statistically contribute to explaining variance in sense of belonging.

The second outcome variable was cumulative GPA (Table 3). Using a listwise comparison, the sample was reduced to 493 participants. All tolerance statistics were well within the normal range. First, the dummy variable accounting for the 2 universities was nonsignificant. Second, the variables known to relate to academic persistence accounted for 15.3% of the variance in cumulative GPA ($F[4, 488] = 22.086, p = .000$). Third, after removing nonsignificant interactions, the inter- and intrapersonal resilience research variables resulted in a statistically significant R^2 change equal to .037 ($F[6, 482] = 3.661, p = .001$). The inter- and intrapersonal resilience factors accounted for 3.7% of the variance in cumulative GPA in addition to the 15.3% accounted for by the variables entered in the previous sequential steps. Fourth, after removing nonsignificant interactions, mental health as a main effect resulted in a nonsignificant R^2 change of .004 ($F[1, 481] = 2.319, p = .128$). Finally, in the fifth step, one significant interaction was found and entered in addition to number of credits completed that resulted in a nonsignificant R^2 change of .008 ($F[2, 479] = 2.417, p = .090$). In the final regression model, the standardized regression coefficients (β) were used to identify which variables explained variance in cumulative GPA. Overall high school GPA ($\beta = .249$) and ACT score ($\beta = .201$) had positive relationships with university cumulative GPA. In contrast, work hours had a negative relationship ($\beta = -.129$). In terms of the research variables, CD-RISC Factor 1 (ie, Tenacity) ($\beta = .272$) had a positive relationship, and Factor 2 (ie, Tolerance of Stress) ($\beta = -.205$) and Factor 5 (ie, Spirituality) ($\beta = -.289$) had negative relationships with university cumulative GPA. There was a significant interaction between CD-RISC Factor 5 (ie, Spirituality) and number of credits completed ($\beta = .354$), indicating that as more credits were completed, the relationship

TABLE 2. Listwise Correlations Among Variables Used in the Hierarchical Regression Analysis ($N = 493$)

Variables	High school GPA	ACT score	Work hours	Extracurricular hours	CD-RISC Factor 1: Tenacity	CD-RISC Factor 2: Tolerance	CD-RISC Factor 3: Acceptance	CD-RISC Factor 4: Control	CD-RISC Factor 5: Spirituality	Social support (SSQ-6)	Mental health (MHI-5)	Credits hours	University cumulative GPA	University sense of belonging (SOB)
High school GPA	1.0													
ACT score	0.387**	1.0												
Work hours	−0.074	−0.019	1.0											
Extracurricular hours	0.019	−0.010	−0.078	1.0										
CD-RISC Factor 1: Tenacity	0.097*	0.007	0.043	1.164**	1.0									
CD-RISC Factor 2: Tolerance	0.029	0.050	0.064	0.113*	0.716**	1.0								
CD-RISC Factor 3: Acceptance	0.061	−0.007	0.029	0.132**	0.725**	0.655**	1.0							
CD-RISC Factor 4: Control	0.028	−0.116**	0.018	0.085	0.749**	0.608**	0.636**	1.0						
CD-RISC Factor 5: Spirituality	0.049	−0.083	−0.057	0.053	0.332**	0.256**	0.326**	0.331**	1.0					
Social support (SSQ-6)	0.040	−0.074	0.093*	−0.007	0.191**	0.114**	0.242**	0.312**	0.179**	1.0				
Mental health (MHI-5)	0.030	0.049	−0.029	−0.012	0.363**	0.278**	0.431**	0.431**	0.190**	0.170**	1.0			
Credits completed	0.111*	0.106*	0.205**	0.005	0.149**	0.125**	0.099*	0.084	0.002	0.039	0.162**	1.0		
University cumulative GPA	0.341**	0.271**	−0.132**	−0.031	0.085	−0.048	0.009	0.025	−0.024	0.049	−0.019	0.018	1.0	
University sense of belonging (SOB)	0.023	0.069	0.069	−0.010	0.022	0.026	0.036	−0.012	0.049	−0.084	0.021	0.019	−0.055	1.0

Note. GPA = grade point average; ACT = American College Testing; CD-RISC = Connor-Davidson Resilience Scale; SSQ-6 = Social Support Questionnaire; MHI-5 = Mental Health Inventory-5; SOB = Sense of Belonging. Upper diagonal is the same as lower diagonal.
**$p \leq .01$; *$p \leq .05$.

TABLE 3. University GPA Hierarchical Regression Analysis ($N = 493$)

	R^2	R^2 change	F change	p	β	p
Step 1						
University	.002	.002	1.000	.318	.045	.318
Step 2	.155	.153	22.086	.000**		
University					−.052	.228
High school GPA					.276	.000**
ACT score					.171	.000**
Extracurricular hours					−.045	.282
Work hours					−.120	.005**
Step 3	.192	.037	3.661	.001**		
University					−.055	.196
High school GPA					.253	.000**
ACT score					.188	.000**
Extracurricular hours					−.055	.192
Work hours					−.129	.002**
Factor 1 (Tenacity)					.275	.000**
Factor 2 (Tolerance)					−.189	.003**
Factor 3 (Acceptance)					−.087	.175
Factor 4 (Control)					.006	.933
Factor 5 (Spirituality)					−.053	.238
Social support (SSQ-6)					.064	.148
Step 4	.196	.004	2.319	.128		
University					−.056	.191
High school GPA					.250	.000**
ACT score					.196	.000**
Extracurricular hours					−.059	.156
Work hours					−.132	.002**
Factor 1 (Tenacity)					.273	.000**
Factor 2 (Tolerance)					−.197	.002**
Factor 3 (Acceptance)					−.064	.328
Factor 4 (Control)					.029	.676
Factor 5 (Spirituality)					−.052	.249
Social support (SSQ-6)					.066	.139
Mental health (MHI-5)					−.072	.128
Step 5	.204	.008	2.417	.090		
University					−.045	.289
High school GPA					.249	.000**
ACT score					.201	.000**
Extracurricular hours					−.059	.155
Work hours					−.129	.003**
Factor 1 (Tenacity)					.272	.000**
Factor 2 (Tolerance)					−.205	.001**
Factor 3 (Acceptance)					−.057	.388
Factor 4 (Control)					.035	.611
Factor 5 (Spirituality)					−.289	.014*
Social support (SSQ-6)					.078	.079
Mental health (MHI-5)					−.076	.111
Credits completed					−.255	.035*
Credits × Factor 5 (Spirituality)					.354	.029*

Note. GPA = grade point average; ACT = American College Testing; SSQ-6 = Social Support Questionnaire; MHI-5 = Mental Health Inventory-5.
**$p \leq .01$; *$p \leq .05$.

between spirituality and GPA leveled out. The measures of interpersonal resilience (eg, social support) ($\beta = .078$) and mental health ($\beta = -.076$) only marginally accounted for variance in cumulative GPA. All the resilience and mental health measures were correlated with one another (see Table 2), even though the interaction terms were nonsignificant. When comparing the regression coefficients across credits completed using a cutoff score of 60, ie, half the number of credits needed to graduate, the regression coefficients were consistent in direction and magnitude (Table 4). In contrast, when the sample was divided by a MHI-5 score of 70, ie, a cutoff score indicative of symptoms of anxiety and/or depression[50,51] (Table 5), the CD-RISC Factor 3 (ie, Acceptance of Change), CD-RISC Factor 5 (ie, Spirituality), and the SSQ-6 (ie, Social Support) regression coefficients changed direction and magnitude. Overall, regression coefficients in the high

TABLE 4. University Cumulative GPA Regression Analysis by Credit Hours

	Credits ≤ 60 $R^2 = .235$; $F = 4.866$; $p = .000$; $n = 185$		Credits > 60 $R^2 = .175$; $F = 5.702$; $p = .000$; $n = 307$	
	β	p	β	p
University	−.104	.139	−.025	.651
High school GPA	.276	.004**	.223	.000**
ACT score	.227	.003**	.179	.003**
Extracurricular hours	−.069	.310	−.059	.291
Work hours	−.078	.259	−.141	.010*
Factor 1 (Tenacity)	.260	.031*	.277	.007**
Factor 2 (Tolerance)	−.237	.016*	−.179	.031*
Factor 3 (Acceptance)	−.095	.375	−.035	.686
Factor 4 (Control)	.122	.273	−.013	.885
Factor 5 (Spirituality)	−.097	.201	−.028	.631
Social support (SSQ-6)	.092	.212	.045	.427
Mental health (MHI-5)	−.104	.179	−.060	.331

Note. GPA = grade point average; ACT = American College Testing; SSQ-6 = Social Support Questionnaire; MHI-5 = Mental Health Inventory-5.
**$p \leq .01$; *$p \leq .05$.

TABLE 5. University Cumulative GPA Regression Analysis by Mental Health

	MHI-5 score ≤ 70 $R^2 = .157$; $F = 2.665$; $p = .003$; $n = 184$		MHI-5 score > 70 $R^2 = .266$; $F = 8.922$; $p = .000$; $n = 308$	
	β	p	β	p
University	−.095	.122	−.007	.887
High school GPA	.260	.001**	.232	.000**
ACT score	.095	.209	.256	.000**
Extracurricular hours	−.074	.312	−.041	.442
Work hours	−.076	.324	−.138	.008**
Factor 1 (Tenacity)	.367	.014**	.189	.023*
Factor 2 (Tolerance)	−.202	.067	−.213	.004**
Factor 3 (Acceptance)	−.212	.066	.016	.820
Factor 4 (Control)	.055	.661	.043	.551
Factor 5 (Spirituality)	.113	.592	−.494	.001**
Social support (SSQ-6)	−.071	.379	.135	.010**
Credits completed	.073	.704	−.488	.002**
Credits × Factor 5	−.161	.539	.679	.001**

Note. GPA = grade point average; ACT = American College Testing; SSQ-6 = Social Support Questionnaire; MHI-5 = Mental Health Inventory-5.
**$p \leq .01$; *$p \leq .05$.

mental health group were similar in direction and magnitude to the full sample (Table 3). However, there were differences in the low mental health group (Table 5): First, CD-RISC Factor 1 (ie, Tenacity) ($\beta = .367$) and CD-RISC Factor 3 (ie, Acceptance) ($\beta = -.212$) were noticeably larger in magnitude compared to the high mental health group and full sample. Second, CD-RISC Factor 5 (ie, Spirituality) ($\beta = .113$), SSQ-6 (ie, Social Support) ($\beta = -.071$), and Credits Completed ($\beta = -.071$) were smaller in magnitude and changed direction compared to the high mental health group and full sample.

COMMENT

This study adds evidence that intrapersonal resilience factors can contribute to our understanding of how undergraduate students negotiate an increasingly stressful college environment.[9–12] In terms of research hypothesis 1, CD-RISC Factor 1 (ie, Tenacity), Factor 2 (ie, Tolerance of Stress), and Factor 5 (ie, Spirituality) contributed to explaining variance in university cumulative GPA. Of note, the regression coefficients for CD-RISC Factor 1 (ie, Tenacity) containing items such as "you work to attain your goals," "best effort no matter what," and "even when things look hopeless, don't give up"[44] were consistent in terms of direction and magnitude across credits completed (see Table 4) and mental health (see Table 5). The positive relationship was not surprising—students committed to the challenges of academics had higher cumulative GPAs. Unexpectedly, the regression coefficients for Factor 2 (ie, Tolerance of Stress) containing items such as "can handle unpleasant feelings," "coping with stress strengthens," and "under pressure can think and focus clearly"[44] were negative, indicating that participants who reported being able to tolerate stress had lower cumulative GPAs. The CD-RISC Factor 2 (ie, Tolerance of Stress) regression coefficients were consistent across credits completed (see Table 4) and mental health (see Table 5). It is difficult to interpret the negative relationship without additional information regarding adversity experienced in childhood and college. It is possible that being able to tolerate stress is a resilience factor only for students who have experienced significant adversity. For students who have not experienced significant adversity, tolerating stress, such as receiving poor grades, may be associated with less motivation for academics. More research is needed to further examine the relationships between tolerating stress, mental health, and academic persistence. Finally, the relationship between CD-RISC Factor 5 (ie, Spirituality) containing items such as "things happen for a reason" and "sometimes fate or God can help"[44] and cumulative GPA leveled out as students completed more credits, signifying that as students approached the uncertainty of graduation, the belief that things will work out was less associated with cumulative GPA. More research is needed to interpret why spirituality was nonsignificant for participants with low mental health (see Table 5).

Surprisingly, regarding research hypothesis 2, the only significant interaction was between CD-RISC Factor 5 (ie, Spirituality) and credits completed. An especially unexpected finding was the lack of a significant interaction between the inter- and intrapersonal resilience factors. A possible

explanation is that overall the participants were very satisfied with social support as measured by the SSQ-6 (see Table 1), and there may not have been enough variance in the SSQ-6 to detect a significant interaction. Equally intriguing was that mental health did not significantly interact with resilience in the regression analysis; however, when dividing the sample into high and low mental health, several regression coefficients changed direction, magnitude, and significance (see Table 5), suggesting a need for more research on the relationships between resilience and cumulative GPA for students with low mental health. Specifically, the results indicated that the intrapersonal resilience factors of CD-RISC Factor 3 (ie, Acceptance of Change) and CD-RISC Factor 5 (ie, Spirituality) and the interpersonal resilience factor of SSQ-6 (ie, Social Support) operated differently for students with low mental health. More research is needed to interpret the cause of these differences. The sample in this study was cross-sectional and collected at one point in time. There was no way to test how the resilience factors affected mental health and cumulative GPA over time.

Future Research

Research has documented college stress[9–12] and the increasing number of students requesting psychological assistance.[54–56] With respect to promoting college health,[57] it may be more practical to increase resilience than to eliminate risk.[1–3] Future research can explore the complex relationships across inter- and intrapersonal resilience factors. Research on Tinto's theory has revealed that college success is not the result of intrapersonal factors alone, but rather the reciprocal interaction between the student and institution.[22–25] For instance, previous research exposed the connection between hardiness and social support[35,36]; however, students may be equally satisfied with friends who excessively binge drink as with friends who attend class and study, suggesting a need to tease out the moderating effect of peer group norms. Further, the ability to tolerate stress may be associated with less studying unless the student is tenacious and committed to getting good grades. These examples illustrate the need to consider the relationships across inter- and intrapersonal resilience factors, including moderator effects. In additional to the CD-RISC,[44] more resilience instruments[4] are needed to examine these relationships across time. Further, rather than waiting for students to learn to cope with stress on their own, research needs to examine the impact of resilience interventions. For example, each year thousands of first-year students are placed in academic seminars and living-learning communities.[58,59] As part of the first-year experience, holistic transition curriculum[60] can be used to assist students to develop coping resources. Previous research has validated the effectiveness of stress management programs.[61,62] Building upon these studies, college health researchers validated a resilience intervention program.[27] Research can examine the effect of such programs on students' mental health over time.

Limitations

There were limitations, which restrict the interpretation, but do not negate the findings. First, the convenience sampling introduced 2 types of sampling error: (a) sampling bias and (b) sampling variance.[63] Not all undergraduate students had an equal chance to participate in this study, and there is a chance that the sample statistics do not reflect the true population. Second, researchers have demonstrated that self-report cannot distinguish between an individual's genuine mental health and his/her illusion of mental health[64] and there was no way to evaluate the accuracy of the participants' self-reported responses. Third, this study assumed that resilience affected university cumulative GPA; however, the sample was cross-sectional, and it is possible that university cumulative GPA caused students to evaluate themselves as more or less resilient. Finally, there is the limitation of self-reported high school GPA, ACT score, and university cumulative GPA.

Conclusions

The results of this study are significant in terms of further exposing the relationships between resilience, mental health, and academic persistence. The intrapersonal resilience factors of tenacity, tolerance of stress, and spirituality accounted for variance in cumulative university GPA, and all of the resilience factors were related to one another. This study adds evidence that inter- and intrapersonal resilience factors are important to academic persistence and health promotion in higher education.[57] The demands in college are significant and there is a need for more research on the concept of resilience as it relates to college health and academic persistence.

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NOTE

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