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Focusing resources to promote student well-being: associations of malleable psychosocial factors with college academic performance and distress and suicidality

Chris Brownson[1,2] · Brittany P. Boyer[1] · Chris Runyon[2,3] · Ashley E. Boynton[2,4] · Erika Jonietz[2,5] · Ben I. Spear[2,6] · Stuart A. Irvin[2,6] · Sarah K. Christman[2,7] · Michael J. Balsan[1,2,6] · David J. Drum[2]

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Abstract
College students' mental health concerns have dramatically increased in prevalence and severity over the past decade, overwhelming the capacity of counseling centers to meet demand for services. In response, institutions of higher education (IHEs) increasingly emphasize prevention, education, and outreach efforts aimed at improving well-being. Although this focus has prompted an increase in research on student well-being, few studies have investigated the unique contributions of malleable psychosocial factors on student outcomes. This study aims to address this gap in the literature by examining the relative impact of an array of psychosocial factors—adaptive and maladaptive perfectionism, coping self-efficacy, social connectedness, perceived burdensomeness, grit, resilience, and meaning in life—on academic performance and distress and suicidality in a sample of 7505 students from 15 U.S. IHEs. Controlling for institutional selectivity and non-malleable aspects of students' identities and pre-college experiences, facets of perfectionism, grit, and emotion-focused coping self-efficacy were the psychosocial factors most strongly associated with GPA, and perceived burdensomeness, social connectedness, emotion-focused coping self-efficacy, and resilience were most strongly associated with distress and suicidality. Among non-malleable factors, race/ethnicity explained the most variance in GPA and gender identity explained the most variance in distress and suicidality. Results are discussed in light of persistent, identity-based disparities in academic achievement and suicide risk and the potential of psychosocial factors as intervention targets to improve academic performance and reduce suicide risk.

Keywords Academic performance · Distress · Suicidality · Psychosocial factors

Demand for mental health services at institutions of higher education (IHEs) has dramatically increased over the past 10 years (Center for Collegiate Mental Health, 2023). Past year treatment and lifetime mental health diagnoses grew from ~ 20% to over one-third of students from 2007 to 2017 (Lipson et al., 2019), and severe concerns (e.g., history of self-harm, trauma, suicidal ideation, suicide attempt) have increased over the past decade

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(Center for Collegiate Mental Health, 2023). These trends were magnified by the COVID-19 pandemic, which has contributed to worsening depression, anxiety, and academic challenges among college students (Fruehwirth et al., 2021). Mental health problems during college undermine degree completion and economic attainment (Eisenberg et al., 2009; Mojtabai et al., 2015), and suicide is the third leading cause of death among adolescents and young adults (ages 15–24; CDC, 2020).

Accelerating demand has led to a situation in which college counseling centers' core individual and group offerings cannot keep pace (Xiao et al., 2017), and systems of care are further strained by mental health impacts of the pandemic (American Association Association [APA], 2022). IHEs have responded by investing in campuswide efforts to promote well-being, a construct comprised of happiness, life satisfaction, and positive functioning (Diener et al., 2018) associated with lower rates of suicidal behavior and mental health-related academic impairment (Keyes et al., 2012). Researchers have responded by aiming to identify "modifiable well-being promoting mechanisms" (Lent et al., 2005, p. 430)—specific social, cognitive, and behavioral (i.e., psychosocial) factors to target for intervention. Ideal target factors will yield positive mental health and academic impacts to align with the charge of IHEs to prepare students for success during and after college.

Malleable psychosocial factors

According to Tinto, (1975), students' backgrounds and pre-college experiences (e.g., socioeconomic status, high school performance) interact with institutional factors to shape students' academic and social integration into postsecondary environments and, in turn, their decisions to leave or remain in college. Others have built upon this framework by incorporating psychosocial factors as predictors of college adjustment and academic performance. Specifically, self-attributions and self-efficacy, coping and stress reduction strategies, perseverance and motivation, and social support and sense of belonging have been posited as key domains (Bean & Eaton, 2001; Eccles & Wigfield, 2002; Farrington et al., 2012; Petersen et al., 2009). In line with our aim to identify factors with the potential to improve academic performance and mental health, we selected psychosocial factors that overlap conceptually with key domains listed above and have demonstrated associations with both academic and mental health outcomes.

We selected perfectionism due to concerning increases among college students in recent decades (Curran & Hill, 2019) and evidence that perfectionistic self-attributions represent a potential "core vulnerability factor" for a variety of mental health, interpersonal, and performance problems (Smith et al., 2022, p. 18). However, adaptive (i.e., high standards) perfectionism may actually promote better academic management, motivation, and psychological adjustment, whereas maladaptive (i.e., self-critical) perfectionism tends to be associated with depression and suicidal ideation (Rice et al., 2014; Smith et al., 2018). Coping has long been a central focus of college adjustment research due to the multitude of stressors students encounter (Bean & Eaton, 2001). Coping self-efficacy increases the likelihood of using coping strategies to manage stress. For example, students who are more confident in their problem-solving skills are more likely to employ problem-solving strategies when stressed (Lazarus & Folkman, 1984). Coping skills are most effective when they match stressor demands; whereas problem-focused techniques are more helpful for academic stressors (Britt-Lutter et al., 2017), emotion-focused strategies are better suited for reducing distress (Stanley et al., 2021).

Grit and resilience—distinct, but related concepts—have also been posited as important for college success as indicated by their growing research and press coverage (Stoffel & Cain, 2018). Whereas grit describes diligence and motivation (perseverance of effort; Grit-PE) and long-term goal orientation (consistency of interests; Grit-CI; Duckworth & Quinn, 2009), resilience specifically focuses on recovery from adversity. Grit, especially PE, and resilience have shown positive associations with academic performance (Johnson et al., 2014; Muenks et al., 2016), and resilience may be particularly important for students at risk for dropout (Caporale-Berkowitz et al., 2022). Grit and resilience have shown positive associations with psychological adjustment (Jin & Kim, 2017; Sher, 2019).

Finally, social integration and sense of belonging and purpose are central contributors to college adjustment (Steger et al., 2006; Tinto, 1997). Academically oriented social connections (e.g., classmates, study partners) are associated with higher grades (Stadtfeld et al., 2019). Engagement in non-academic social activities and sense of belonging on campus promote persistence and lower distress (Tinto, 1997; Walton & Cohen, 2011). Having a sense of life purpose protects against depression and suicidal ideation (Lamis & Lester, 2012) and may confer academic benefits via feeling "called to" a career (Mason, 2017). Feeling disconnected and like one is burdening others, however, heightens depression and suicide risk (Van Orden et al., 2012).

Non-malleable factors

Non-malleable aspects of students' identities and past experiences are also consequential for college success. Black, Hispanic, and multiracial students lag behind white and Asian students in enrollment, GPA, graduation rates, and time to degree (Musu-Gillette et al., 2016). Evidence for racial/ethnic differences in college student suicidality is mixed. One study ($n = 75{,}000+$) found no differences in suicidal ideation among non-Hispanic white (NHW) versus racial/ethnic minority (REM) students (DeLuca et al., 2014), whereas another ($n = 300{,}000+$) found significantly higher rates among all REM groups (Sa et al., 2020).

On average, women outperform men academically (De Brey et al., 2021; Richardson et al., 2012). Although women have higher rates of depression and suicide attempts (ACHA, 2019), men are more likely to die by suicide (WHO, 2018). Among sexual and gender minority students, marginalization and physical violence undermine academic engagement and performance and increase suicide risk (Busby et al., 2020; Silva et al., 2015).

First-generation, transfer, and low-income students face additional stressors (e.g., less familiarity with IHE systems, multiple transitions, student loans) that increase the risk for poor grades, degree non-completion, discontinuous enrollment, and depression (Covarrubias et al., 2015; Diaz, 1992; Ishitani, 2006; Robb, 2017). At least half of U.S. college students report one or more adverse childhood experiences (ACEs), including abuse, neglect, or trauma (Windle et al., 2018). ACEs increase depression and suicide risk (Anda et al., 2006) and may undermine academic performance through poor mental health (Hinojosa et al., 2019).

The current study

Mounting evidence supports the idea that psychosocial factors promote academic performance (Richardson et al., 2012) and reduce suicide risk (Sher, 2019). However, most research on college success has emphasized non-malleable factors (e.g., demographics,

standardized tests, high school grades; Hezlett et al., 2001), and few studies evaluate the *relative* impact of malleable factors on both academic and mental health outcomes to identify promising intervention targets. We address these gaps by examining unique associations of modifiable psychosocial factors (i.e., *how* students interact with the world) with academic performance and distress and suicidality while controlling for non-malleable factors (i.e., *who* students are) in a large, diverse undergraduate sample.

Methods

Participants

Participants were drawn from 18 four-year U.S. IHEs participating in a prospective investigation involving a spring 2016 survey and academic data collection for six subsequent academic years. One-third of the 40,000 students invited completed at least part of the survey ($n = 13{,}542$) and 15 IHEs provided fall 2016 academic data ($n = 11{,}280$, 83.3% of survey respondents). Appendix A summarizes IHE characteristics and response rates. Due to the unique developmental challenges of emerging adulthood, we restricted our sample to undergraduates ages 18–30 (Arnett et al., 2014). Analyses include 7,505 students (mean age = 19.7, $SD = 1.8$): 4,181 first-year (55.3%), 1,175 second-year (15.6%), 1,133 third-year (15.0%), 781 fourth-year (10.3%), and 235 fifth-year (3.1%). Compared to national data (Table 1), the sample contained higher proportions of Asian/Pacific Islander ("Asian"), multiracial, female-identified, heterosexual, and questioning students, lower proportions of Hispanic/Latinx ("Hispanic"), Black/African American ("Black"), non-cisgender, gay/lesbian, "other" sexual minority, and transfer students, and similar proportions of first-generation and white students. Approximately 20% reported "some" or "significant" financial concerns.

Procedure

We distributed surveys via Qualtrics to random samples proportionate to IHE populations, oversampling first-year students in line with longitudinal study aims (sampling frames shown in Appendix B). The first page of the survey was a web-based consent form describing the survey and subsequent academic data collection. Surveys assessed demographics, psychosocial factors, and distress and suicidality. We sent four reminder emails during the 9-week data collection period (March–May 2016). Participants were entered into a drawing for one of ten $500 Amazon gift cards. In January 2017, we requested academic data from registrars, including enrollment, graduation status, academic sanctions, and fall 2016 cumulative GPA. Procedures were approved by the [The University of Texas at Austin] institutional review board.

Measures

Perfectionism

The Short Form of the Revised Almost Perfect Scale (SAPS; Rice et al., 2014) was used to measure high standards (e.g., *I have a strong need to strive for excellence*) and

Table 1 Characteristics of study sample vs. national reference groups

	2015–2016 reference group	Sample		Goodness-of-fit	
		n	%	χ^2	*p*-value
Race/ethnicity[a]					
White/Caucasian	60.4%	4,603	61.4%	3.34	.068
Hispanic/Latinx[b]	15.1%	832	11.1%	92.95	< .001
Black/African American	13.5%	532	7.1%	255.63	< .001
Asian/Pacific Islander	7.3%	844	11.3%	173.50	< .001
Multiracial[c]	3.7%	461	6.2%	125.86	< .001
Middle Eastern/East Indian[d]	–	183	2.4%	–	–
Other race[d]	–	37	0.5%	–	–
Gender identity					
Female[a]	55.6%	4,604	61.3%	100.95	< .001
Male[a]	44.4%	2,777	37.0%	165.36	< .001
Non-cisgender[e]	3.2%	124	1.7%	57.47	< .001
Sexual orientation					
Heterosexual	80.1%	6,565	87.9%	282.71	< .001
Gay/lesbian	2.9%	179	2.4%	6.56	.010
Bisexual	5.6%	429	5.7%	.26	.611
Questioning	1.7%	159	2.1%	7.94	.005
Other	9.8%	139	1.9%	531.86	< .001
Financial concerns	–	1,561	20.1%	–	–
Academic status					
First-generation[f]	24.0%	1,834	24.4%	1.33	.248
Transfer[g]	38.8%	883	11.8%	–	–

Sample percentages computed with non-missing data for each variable

[a]NCES (2017)

[b]Selected < 2 race categories plus Hispanic

[c]Selected 2 + race categories

[d]No reference group data available

[e]ACHA (2016)

[f]Redford et al. (2017)

[g]Reference percentage (Shapiro et al., 2018) presented for descriptive purposes only due to conflicting definitions for transfer students in the literature

performance discrepancy (self-criticism; e.g., *My performance rarely measures up to my standards*) on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). Scales (four items each) have demonstrated reliability and convergent and discriminant validity (Rice et al., 2014), and were reliable in our sample (αs = 0.89, 0.88).

Coping self-efficacy

The Coping Self-Efficacy Scale (CSE; Chesney et al., 2006) was used to measure confidence in using problem-focused (six items; e.g., *Think about one part of the problem at a time*), emotion-focused (four items; e.g., *Take your mind off unpleasant thoughts*), and

social support-seeking (three items; e.g., *Get friends to help you with the things you need*) strategies on a 7-point scale (1 = *cannot do at all,* 7 = *certain can do*). Scales have demonstrated test–retest reliability and concurrent and predictive validity (Chesney et al., 2006), and were reliable in our sample (αs = 0.85–0.95).

Social connectedness

The Social Connectedness scale (SC; Lee & Robbins, 1995) is comprised of eight items describing social disconnection (e.g., *I don't feel I participate with anyone or any group*), with 7-point Likert scale responses (1 = *strongly disagree,* 7 = *strongly agree*) reverse-coded to indicate greater social connectedness. SC has demonstrated test–retest reliability and convergent and discriminant validity (Lee & Robbins, 1995, 2000), and was reliable in our sample (α = 0.96).

Perceived burdensomeness

The Interpersonal Needs Questionnaire perceived burdensomeness scale (PB; Van Orden et al., 2012) was used to measure feelings of being a burden on others (e.g., *These days I think the people in my life wish they could be rid of me*) using a 7-point scale (1 = *not at all true*, 7 = *very true*). PB has demonstrated convergent, discriminant, and predictive validity (Van Orden et al., 2012), and was reliable in our sample (α = 0.95).

Grit

The Short Grit Scale (Duckworth & Quinn, 2009) was used to measure consistency of interests (CI; e.g., (reversed) *I often set a goal but later choose to pursue a different one*) and perseverance of effort (PE; e.g., *I finish whatever I begin*) on a 5-point scale (1 = *not like me at all*, 5 = *very much like me*). Scales (four items each) have demonstrated test–retest reliability, convergent and predictive validity (Duckworth & Quinn, 2009), and were reliable in our sample (αs = 0.77, 0.70).

Resilience

The six-item Brief Resilience Scale (BRS; Smith et al., 2008) was used to measure the ability to recover from adversity (e.g., *It does not take me long to recover from a stressful event*) on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*). The BRS has demonstrated test–retest reliability and convergent and discriminant predictive validity (Smith et al., 2008), and was reliable in our sample (α = 0.85).

Meaning in life

The Meaning in Life Questionnaire (MLQ; Steger et al., 2006) was used to measure presence of meaning (e.g., *I understand my life's meaning*) and search for meaning (e.g., *I am seeking a purpose or mission for my life*) on a 7-point scale (1 = *absolutely untrue*, 7 = *absolutely true*). Scales (five items each) have demonstrated test–retest reliability and convergent and discriminant validity (Steger et al., 2006), and were reliable in our sample (αs = 0.90, 0.89).

Academic performance

Academic performance was defined as fall 2016 cumulative grade point average (GPA) reported by registrars' offices (0.0–4.0).

Distress and suicidality

The Distress and Suicidality Continuum (DSC; Drum et al., 2009) is comprised of seven items describing thoughts ranging from mild distress to serious suicidal intent. Students selected all statements resembling thoughts they had in the past year (1 = *This is all too much*; 2 = *I wish this would all end*; 3 = *I have to escape*; 4 = *I wish I were dead*; 5 = *I want to kill myself*; 6 = *I might kill myself*; 7 = *I will kill myself*), with distress and suicidality defined as the most severe item selected. In a large national survey of postsecondary students, DSC demonstrated concurrent and criterion validity (Boyer et al., 2019).

Demographics

Students self-reported age, gender identity, sexual orientation, race, ethnicity, year in school, parental education, and first-generation and transfer status. Due to small subgroups, we combined transgender ($n = 54$) with "other" gender identity ($n = 70$), Pacific Islander ($n = 7$) with Asian, and Native American ($n = 19$) with "other" race/ethnicity ($n = 18$). Students were classified as first-generation if the highest parent/guardian education level was an associate degree, technical certificate, or below (Redford et al., 2017) or if they were missing parental education data, but self-identified as first-generation ($n = 47$).

Financial concerns

Financial concerns were assessed with one item describing concerns about the ability to pay for college (*No concerns*; *Some concerns, but not worried about finances preventing me from graduating*; *Some concern that finances might prevent me from graduating*; *Significant concerns that finances might prevent me from graduating*). Students who selected the latter two options ($n = 1{,}162$; $n = 399$) were classified as having financial concerns.

Institutional selectivity

Selectivity was defined using the Carnegie Classification of Institutions criteria (n.d.). Two IHEs were "inclusive" ($n = 841$, 11.2%), five were "selective" ($n = 2{,}646$, 35.3%), and eight were "more selective" ($n = 4{,}018$, 53.5%).

Adverse childhood experiences (ACEs)

Traumatic childhood events were measured using the ACEs module (Centers for Disease Control and Prevention [CDC], 2009), which includes five home challenges (parental divorce, interparental violence, living with someone with a mental illness, alcohol/drug problem, or who had been incarcerated) and three types of abuse (physical, verbal, sexual). Students selected events they experienced before age 18, which were summed to create

home challenges (0–5) and abuse scales (0–3). The ACEs scale has demonstrated validity and internal consistency (Ford et al., 2014).

Analysis plan

We first examined intra-class correlations (ICCs) to assess the variance in outcomes attributed to shared characteristics of students within IHEs. ICCs ≥ 0.01 indicated a need to adjust for data clustering (Ntani et al., 2020). Next, we selected a measurement model for the 12 psychosocial factors. We compared a confirmatory factor analysis (CFA) model allowing items to load onto only one target factor to exploratory structural equation models (ESEM) allowing items to cross-load onto all factors (Marsh et al., 2010). Cross-loadings are common among psychosocial constructs given their conceptual overlap and failing to specify them in CFA models forces associations between items and non-target factors to be expressed via correlations between factors. Thus, a major advantage of ESEM is the reduction in factor intercorrelations resulting from freely estimated cross-loadings, which increases factor differentiation and discriminant validity (Tóth-Király et al., 2017). We compared one CFA model and three ESEM models with varied rotation methods (Table 2; Asparouhov & Muthén, 2009). Because rotation method does not alter model fit (Morin et al., 2013), we used fit statistics to decide between CFA and ESEM, with SRMR < 0.08, TLI/CFI > 0.95, and RMSEA < 0.06 indicating good fit (Hu & Bentler, 1999). Then, we selected the model that minimized factor intercorrelations (Morin et al., 2013).

Finally, we specified separate structural equation models for each outcome testing regressions of the outcome on non-malleable and psychosocial predictors. Regression coefficients for continuous predictors were standardized with respect to outcome and predictor (STDYX), interpreted as change in the outcome (*SD* units) associated with a + 1 *SD* change in the predictor. Categorical covariates were effect-coded, so coefficients were standardized with respect to outcome (STDY), interpreted as the difference (in outcome *SD* units) between group and sample means. For significant predictors, the percentage of outcome variance explained was computed by squaring STDYX coefficients for significant regressions.

Results

Within-institution variance explained 6.5% of variance in GPA (ICC = 0.065). Thus, we used clustered standard errors in the GPA model. Similar adjustment was not indicated for the DSC model (ICC = 0.007; Ntani et al., 2020). Due to skewed outcome distributions (see Appendix C), we accounted for missing item-level data (7.7%) using maximum likelihood robust estimation (Yuan & Bentler, 2000). We used M*plus* v8.2 for analyses (Muthén & Muthén, 2017).

For the psychosocial factor measurement model, we selected ESEM with geomin rotation (ε = 0.50; Table 2) as this solution optimized model fit and minimized factor intercorrelations. Factors remained well-defined after accounting for item-level conceptual overlap as indicated by weak cross-loading magnitudes (|λ| = 0.01–0.32, *M* = 0.04; Costello & Osborne, 2005). However, several correlations remained moderate in magnitude (see Table 3): perfectionism standards with Grit-PE, resilience with emotion-focused coping efficacy, and social connectedness with presence of meaning.

Table 2 Psychosocial factor measurement models using confirmatory factor analysis (CFA) vs. exploratory structural equation modeling (ESEM)

	Factor intercorrelations					Model fit				
	Descriptive statistics			Frequencies by magnitude						
	Range	M (*SD*)	Median	Strong (|*r*|≥.50)	Moderate (.50>|*r*|≥.30)	χ^2 (*df*)	SRMR	TLI	CFI	RMSEA (90% C.I.)
CFA	.03–.67	.35 (*.16*)	.36	12 (18.2%)	30 (45.5%)	16,041.63 (1586)**	.047	.940	.935	.035 [.035–.036]
ESEM: Target rotation[1]	.04–.65	.30 (*.15*)	.29	8 (12.1%)	25 (37.9%)	7347.49 (1069)**	.009	.974	.958	.028 [.028–.029]
ESEM: Geomin rotation($\varepsilon = .01$)[2]	.04–.59	.29 (*.14*)	.30	7 (10.6%)	26 (39.4%)					
ESEM: Geomin rotation ($\varepsilon = .50$)[2]	.01–.45	.17 (*.10*)	.16	0	8 (12.1%)					

Rotation methods do not alter fit statistics

[1]Specifies target factors with near-zero cross-loadings

[2]Minimizes cross-loadings without specific target factors. Incorporates complexity parameter (ε) to account for number of factors. ε =.01 and .50 selected per recommendations by Marsh et al., (2010)

**$p < .001$

Non-malleable student factors accounted for 14.4% of variance in GPA (Table 4). Race/ethnicity and female gender made the largest contributions. Compared to the sample mean, Black, Hispanic, first-generation, and financially concerned students and "inclusive" IHE attendees had lower GPAs, and Asian, Middle Eastern, and white students, women, and "more selective" IHE attendees had higher GPAs. Each year in school predicted slight increases and each home challenge ACE predicted slight decreases in GPA.

Psychosocial factors explained 11.1% of variance in GPA. Perfectionism standards, Grit-PE, and problem-focused coping efficacy predicted higher GPA. Perfectionism discrepancy, emotion-focused coping efficacy, social connectedness, Grit-CI, and perceived burdensomeness predicted lower GPA. Perfectionism accounted for the most variance, followed by Grit-PE, problem- and emotion-focused coping efficacy, and social connectedness.

Non-malleable factors explained 6.8% of variance in distress (Table 4). Gender, ACEs, and "other" race/ethnicity were the most robust predictors. Compared to the sample mean, male-identified, heterosexual, and first-generation students had lower distress, and "other" race/ethnicity, non-cisgender, and financially concerned students had higher distress. ACEs predicted higher distress, with abuse explaining more variance. Each year in school predicted slight increases in distress. Psychosocial factors accounted for 13.8% of variance in distress. Emotion-focused coping efficacy, resilience, social connectedness, presence of meaning, and Grit-CI predicted lower distress. Perceived burdensomeness, perfectionism discrepancy, search for meaning, and problem-focused coping efficacy predicted higher distress. Perceived burdensomeness accounted for the most variance, followed by emotion-focused coping efficacy, social connectedness, resilience, meaning in life, problem-focused coping, and perfectionism discrepancy.

Discussion

Increasing attention to college mental health has led IHEs to prioritize efforts to promote student well-being. Considering resource limitations, IHEs need guidance to focus intervention efforts on factors with the greatest potential to positively impact academic success and psychological adjustment. The current study responds to this need by examining unique associations of malleable psychosocial factors with academic performance and distress and suicidality after accounting for non-malleable student characteristics and institutional selectivity. Our findings suggest that psychosocial factors describing *how* students interact with the world—which are amenable to intervention—contribute to college adjustment to a degree comparable to non-malleable factors describing *who* students are.

Variance in GPA explained by psychosocial factors (11.1%) was comparable to non-malleable factors (14.4%) and past estimates of traditional admissions indicators (SAT (7.5%), high school GPA (20%); Zahner et al., 2014), and psychosocial factors accounted for twice the variance in distress (13.8%) as non-malleable factors (6.8%). Perfectionism, Grit-PE, and emotion-focused coping efficacy were the most robust psychosocial predictors of GPA. Perceived burdensomeness, social connectedness, emotion-focused coping efficacy, and resilience were the most robust psychosocial predictors of distress.

Factor intercorrelations in our measurement model suggest the presence of constructs underlying factors that remained moderately correlated after accounting for item cross-loadings, highlighting several constellations with high intervention potential. The first of these includes perfectionism standards and perseverance of effort (Grit-PE), factors

Table 3 Observed psychosocial scale score descriptive statistics and correlations among latent psychosocial factors

	Observed scale score descriptives		Latent factor correlations										
	M (*SD*)	Range	1	2	3	4	5	6	7	8	9	10	11
1. Perfectionism standards	5.99 (*1.05*)	1–7	–										
2. Perfectionism discrepancy	4.43 (*1.55*)	1–7	.13	–									
3. CSE: problem-focused	4.94 (*1.30*)	1–7	.14	−.17	–								
4. CSE: emotion-focused	4.28 (*1.66*)	1–7	.03	−.23	**.36**	–							
5. CSE: social support-seeking	4.80 (*1.61*)	1–7	.09	−.27	**.32**	**.40**	–						
6. Social connectedness	5.54 (*1.29*)	2–7	.03	−.24	.06	.22	**.45**	–					
7. Perceived burdensomeness	1.66 (*1.15*)	1–7	−.08	.20	−.12	−.16	−.24	−.29	–				
8. Grit: consistency of interests	3.03 (*.79*)	1–5	.09	−.22	.11	.13	.15	.16	−.09	–			
9. Grit: perseverance of effort	3.71 (*.66*)	1–5	**.38**	−.18	.27	.18	.25	.13	−.10	**.34**	–		
10. Resilience	3.33 (*.77*)	1–5	.04	−.23	.28	**.32**	.18	.15	−.14	.12	.19	–	
11. Presence of meaning	4.83 (*1.41*)	1–7	.15	−.19	.18	.25	**.31**	.22	−.18	.16	.25	.16	–
12. Search for meaning	4.99 (*1.35*)	1–7	.11	.16	*−.01*	−.08	−.05	−.08	.02*	−.09	.02	−.09	−.07

CSE coping self-efficacy

Observed scores shown for descriptive purposes only; outcome models use ESEM-derived latent factors. Correlations significant at $p < .01$ unless otherwise noted. Bold, plain, and italic text indicate moderate ($|r| \geq .30$), weak ($|r| < .30$), and nonsignificant correlations, respectively

*$p < .05$

Table 4 Standardized[1] regression estimates, scale unit change, and variance in outcomes explained by non-malleable and psychosocial factors

	Cumulative GPA[2]			Distress and suicidality[3]		
	Std. Est. (*SE*)	Grade points	Variance explained	Std. Est. (*SE*)	Scale units	Variance explained
Race/ethnicity						
Asian/Asian-American	.28 (.05)**	+.18	3.76%	−.07 (.03)*	−.13	.21%
Black/African American	−.36 (.05)**	−.26	6.45%	−.02 (.04)	–	–
Middle Eastern/East Indian	.15 (.06)*	+.09	.62%	−.10 (.05)†	–	–
Hispanic/Latinx	−.12 (.05)**	−.07	.62%	−.01 (.04)	–	–
White	.11 (.02)**	+.07	.48%	−.04 (.02)	–	–
Other race/ethnicity	.01 (.17)	–	–	.20 (.10)*	+.38	1.08%
Total			**11.94%**			**1.29%**
Gender identity						
Female	.16 (.04)**	+.10	2.50%	−.03 (.03)	–	–
Male	−.05 (.04)	–	–	−.14 (.03)**	−.28	2.07%
Transgender/another gender	−.11 (.08)	–	–	.18 (.05)**	+.35	.85%
Total			**2.50%**			**2.92%**
Sexual orientation						
Heterosexual	.01 (.05)	–	–	−.12 (.03)*	−.08	.26%
Total			–			**.26%**
Academic characteristics						
Financial concerns	−.08 (.01)*	−.05	.83%	−.02 (.01)*	+.06	.08%
Year in school	.08 (.03)**	+.05	.62%	.02 (.01)	+.08	.18%
First-generation	−.06 (.03)**	−.04	.18%	.03 (.02)*	−.04	.04%
Total			**1.63%**			**.29%**
ACEs						
ACEs: home challenges	−.05 (.02)**	−.03	.24%	.05 (.01)*	+.09	.24%
ACEs: abuse	−.03 (.02)	–	–	.14 (.01)**	+.26	1.82%
Total			**.24%**			**2.06%**

Table 4 (continued)

	Cumulative GPA[2]			Distress and suicidality[3]		
	Std. Est. (*SE*)	Grade points	Variance explained	Std. Est. (*SE*)	Scale units	Variance explained
Non-malleable student factors total			**14.44%**			**6.83%**
Institutional selectivity						
Inclusive	−.27 (.13)**	−.11	3.17%	–	–	–
More selective	.15 (.07)**	+.09	2.13%	–	–	–
Total			**5.30%**			–
Psychosocial factors						
Perfectionism standards	.19 (.02)**	+.12	3.53%	.02 (.02)	–	–
Perfectionism discrepancy	−.20 (.02)**	−.12	3.88%	.05 (.02)*	+.10	.26%
CSE: problem-focused	.04 (.02)**	+.03	.16%	.07 (.02)**	+.13	.48%
CSE: emotion-focused	−.09 (.02)**	−.06	.83%	−.19 (.02)**	−.35	3.42%
CSE: social support-seeking	.01 (.02)	–	–	−.01 (.02)	–	–
Social connectedness	−.07 (.02)**	−.04	.49%	−.18 (.02)**	−.34	3.17%
Perceived burdensomeness	−.03 (.01)**	−.02	.09%	.20 (.01)**	+.39	4.08%
Grit: consistency of interests	−.03 (.03)	–	–	−.03 (.02)*	−.06	.12%
Grit: perseverance of effort	.15 (.02)**	+.09	2.10%	.02 (.02)	–	–
Resilience	−.00 (.02)	–	–	−.13 (.02)**	−.25	1.66%
Presence of meaning	−.02 (.01)	–	–	−.06 (.01)**	−.12	.37%
Search for meaning	−.01 (.01)	–	–	.05 (.01)**	+.09	.21%
Total			**11.09%**			**13.77%**

CSE Coping Self-Efficacy, *ACEs* Adverse Childhood Experiences. All demographic and academic covariates included, but only those significantly related to 1+outcome shown in table. Only GPA model includes institutional selectivity predictor. †$p < .10$. *$p < .05$. **$p < .01$

[1]Standardized with respect to outcome (categorical predictors) or outcome and predictor (continuous predictors)

[2]RMSEA = .026, [.025–.026]; CFI = .957; TLI = .945; SRMR = .045

[3]RMSEA = .026, [.026–.027]; CFI = .955; TLI = .942; SRMR = .046

that involve achievement striving and pursuit of success. Perfectionism was the strongest psychosocial predictor of GPA, with high standards as a positive predictor and performance discrepancy as a negative predictor in line with previous findings (Hill & Curran, 2016; Lee & Anderman, 2020). Perseverance of effort (Grit-PE) was the second most robust predictor of GPA, whereas consistency of interests (Grit-CI) was unrelated, consistent with previous evidence (Caporale-Berkowitz et al., 2022; Muenks et al., 2016).

The second constellation of factors centers around social connectedness, sense of belonging, and purpose. Our results support the protective role of connectedness (Sher, 2019) and the deleterious role of perceived burdensomeness for suicidality (Van Orden et al., 2012). Social connectedness was inversely related to GPA, suggesting that students' social lives may present academic obstacles. This may be due to our omission of academically oriented relationships, which tend to be more consequential for academic performance (Stadtfeld et al., 2019) as opposed to informal social connections, which may better predict retention (Berger & Braxton, 1998). Due to high risk for loneliness among young adults—exacerbated by the COVID-19 pandemic (Bu et al., 2020)—we argue that benefits of social connection outweigh the minimal academic costs suggested by our findings. Associations of meaning in life with lower distress in our sample align with previous research (Steger et al., 2006). Although a less robust predictor than other factors, sense of purpose may operate by bolstering other important protective factors like resilience (Sher, 2019) and feelings of connectedness.

The third constellation of factors includes emotion-focused coping efficacy and resilience, constructs related to stress management, and overcoming adversity. Whereas emotion-focused coping efficacy predicted lower GPA, it was among the top protective factors against distress. Conversely, problem-focused coping efficacy was associated with slight increases in both GPA and distress, highlighting the importance of matching coping strategies with stressor demands (Lazarus & Folkman, 1984). For example, problem-focused strategies like planning and organization predict higher GPA (Britt-Lutter et al., 2017), whereas emotion-focused strategies may lead to academic avoidance behaviors like procrastination (Boyraz et al., 2019), but have demonstrated effectiveness in reducing suicidal ideation intensity (Stanley et al., 2021). Interrelations among coping efficacy and resilience are not surprising as most conceptualizations of resilience include coping as a central component (Sher, 2019; Wu et al., 2013).

Our findings also point to psychosocial factors that were less consequential for college adjustment—specifically, search for meaning in life and consistency of interests (Grit-CI). Although social support-seeking coping efficacy was not associated with either outcome, its positive associations with social connectedness, problem- and emotion-focused coping efficacy, and presence of meaning suggest that improving students' help-seeking confidence may have indirect positive impacts on academic and mental health outcomes.

These findings do not absolve institutions of the responsibility to rectify long-standing identity-based achievement gaps and disparities in suicide risk. Lower GPAs among Black, Hispanic, first-generation, and financially concerned students highlight long-term consequences of pre-college educational and socioeconomic disparities (Duncan & Brooks-Gunn, 2000), often exacerbated by challenges during college (e.g., institutional barriers, balancing academics with employment, discrimination; Lohfink & Paulsen, 2005; Robb, 2017). Although non-malleable factors explained less than half the variance in distress compared to GPA, findings highlighted the need to direct suicide prevention resources toward students with sexual and gender minority identities (ACHA, 2019) and students who experienced abuse in childhood (Anda et al., 2006).

Conclusions

According to our findings, psychosocial factors that can be the basis for institutional interventions are associated with college adjustment to a similar extent as the non-malleable factors that have been traditionally emphasized as predictors of student success. Specifically, findings highlight goal orientation and achievement striving, social connection and sense of purpose, and stress management and ability to overcome adversity as key psychosocial domains associated with mental health and academic performance. Ideally, pre-college experiences would prepare all students to set high standards, minimize self-criticism, recover from adversity, build social connections, and forge confidence in their coping abilities. In the real world, it is our institutional responsibility to invest in students' well-being in college and beyond. Importantly, results highlight a continued need to address sociodemographic disparities in college readiness by remedying systemic inequities, dismantling identity-based discrimination, and creating a welcoming campus climate for students of all identities.

Strengths, limitations, and future directions

The current study offers a unique opportunity to examine relative associations of 12 psychosocial factors with academic and mental health outcomes in a large, diverse sample of undergraduates while controlling for non-malleable factors. The large sample permitted us to use ESEM to specify psychosocial factor measurement structures that describe their conceptual interconnectedness while minimizing multicollinearity. Evaluating the relative predictive utility of these factors, along with intercorrelations among factors that "hang together" represents an initial step toward narrowing down the multitude of potential intervention targets to identify those with the greatest potential for campus population-level impact. Findings laid a foundation for future research employing clustering techniques (e.g., principal components or latent class analyses) to more rigorously test whether factor intercorrelations actually reflect common underlying constructs, and whether and how these constructs predict academic and mental health outcomes overall and for groups of students with various non-malleable characteristics.

This study also has several noteworthy limitations. First, its cross-sectional design does not permit causal inferences or examination of reciprocal relationships between psychosocial factors, academic performance, and mental health, an important focus area for future longitudinal studies. Second, although the 34% response rate is comparable to similar surveys (National Research Council, 2013), underrepresentation of Hispanic, Black, and male-identified students (NCES, 2017) and selection effects favoring students with less severe mental health or academic struggles (Porter & Whitcomb, 2005) may limit generalizability. Third, GPA offers a limited conceptualization of academic success. Future work should examine the relative utility of psychosocial factors in predicting long-term outcomes (e.g., retention, graduation rates). Fourth, data were collected before the COVID-19 pandemic, which had profound academic and psychosocial impacts on college students (Lederer et al., 2021). Future research should examine prospective associations of psychosocial factors with academic trajectories across the period before, during, and after the pandemic onset.

Finally, because all attended 4-year and most attended predominantly white institutions (PWIs), our sample does not reflect student experiences in 2-year institutions, Historically Black Colleges and Universities (HBCUs), or Hispanic- or Minority-Serving Institutions

(MSIs). For example, Black students attending HBCUs report greater academic, social, and personal growth (Flowers, 2002), greater peer and faculty support, and less discrimination (Winkle-Wagner & McCoy, 2016) than Black students attending PWIs. In addition to examining institutional characteristics as predictors of college adjustment, future work should explore ways to incorporate practices championed by MSIs (e.g., school district outreach, summer orientation programs, hands-on mentoring, commitment to diverse hiring, culturally informed pedagogy, identity development opportunities; Conrad & Gasman, 2015) to meaningfully impact minoritized student success.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10734-023-01120-x.

Data availability In line with data sharing terms and conditions agreed upon by participating institutions, datasets generated from this study are not publicly available and must be formally requested by contacting the corresponding author.

Declarations

All study procedures were agreed upon by counseling center directors and registrars at participating institutions. Formal review of study materials and protocols was conducted by The University of Texas at Austin Institutional Review Board (IRB), which served as the IRB of record, and all participants provided informed consent.

Chris Brownson, Ashley Boynton, Erika Jonietz, Ben Spear, Stuart Irvin, Sarah Christman, Michael Balsan, and David Drum contributed to study conceptualization, preparation of materials, and data collection. Brittany Boyer and Chris Runyon performed data management and analysis. Brittany Boyer and Chris Brownson wrote, revised, and edited the manuscript, with editing and revising contributions by Erika Jonietz. Chris Brownson and David Drum provided supervision from study inception to manuscript completion. All authors reviewed and approved the final manuscript. We have no conflicts of interest to disclose.

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Authors and Affiliations

Chris Brownson[1,2] · Brittany P. Boyer[1] · Chris Runyon[2,3] · Ashley E. Boynton[2,4] · Erika Jonietz[2,5] · Ben I. Spear[2,6] · Stuart A. Irvin[2,6] · Sarah K. Christman[2,7] · Michael J. Balsan[1,2,6] · David J. Drum[2]

✉ Brittany P. Boyer
bpboyer@austin.utexas.edu

1 Counseling and Mental Health Center, The University of Texas at Austin, 100 W. Dean Keeton St. A3500, Austin, TX, USA

2 Department of Educational Psychology, The University of Texas at Austin, Austin, TX, USA

3 National Board of Medical Examiners, Philadelphia, USA

4 Fort Collins, USA

5 The University of Texas Health Science Center, San Antonio, USA

6 Austin, USA

7 Portland, USA