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Journal of College Student Development, Volume 57, Number 8, November 2016, pp. 973-989 (Article)

Published by Johns Hopkins University Press

DOI: <https://doi.org/10.1353/csd.2016.0094>



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Competition, Anxiety, and Depression in the College Classroom: Variations by Student Identity and Field of Study

Julie R. Posselt Sarah Ketchen Lipson

In light of rising academic stress and an increase in diagnosed mental illnesses among adolescents and young adults, this article offers the first comprehensive analysis of relationships between perceived competition and depression/anxiety among college students. Analyses were conducted by using clinically validated instruments for depression and anxiety and a diverse, national sample of 40,350 undergraduates from 70 institutions. Multivariate logistic regressions reveal that high levels of perceived competition in one's classes are associated with increased risks of depression and anxiety, especially among queer, first-generation, Black, and Latinola students. Discrimination and peer support moderate these relationships, suggesting avenues for future research and educational interventions.

Data from the National Alliance on Mental Illness (NAMI) indicate that 25% of college students have been diagnosed with or were treated for mental illness in 2015 (NAMI, 2015). Mental health is increasingly recognized as a predictor of academic achievement in college as well. Students who screen positive for anxiety or depression have lower grade point averages (GPAs) than do students who screen negative, and those who screen positive for depression have twice the odds of dropping out, even after controlling for personal background and prior academic performance (Eisenberg, Golberstein, & Hunt, 2009).

In explaining why some students appear more likely to struggle with depression and anxiety or less likely to seek help for these conditions, theorists note the interplay of individual, social, cultural, and political conditions (Han & Pong, 2015; Shaw, 1995). For example, racism on campus can be psychologically damaging for students (e.g., Johnson & Arbona, 2006; Lett & Wright, 2003; Lopez, 2005), and racism-related stress weakens Black and Latino/a students' motivation (Reynolds, Sneva, & Beehler, 2010). Relatedly, a strong link between social support and mental health (Li, Albert, & Dwelle, 2014) may help explain why students who identify with underrepresented groups on campus are less likely to report sufficient social support and more likely to screen positive for mental illnesses (Hefner & Eisenberg, 2009).

Competitiveness is another condition within learning environments that may be related to student well-being. Abouserie (1994) found that college students' greatest source of academic stress was competition for grades. Today, authors in popular media outlets frequently point to status competition in reporting on the rising tide of anxiety on campus (e.g., Houshmand, 2015; Slaughter, 2015; Wilkinson & Pickett, 2014). However, few studies have formally measured the relationships of academic competition with anxiety and depression. With the use of a

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diverse national sample of undergraduates and validated screening instruments to assess mental health symptoms, we offer the first comprehensive analysis of whether perceptions of intense competitiveness in one's classes are associated with depression and anxiety.

LITERATURE REVIEW

For college students, competition can be a double-edged sword. It can drive them to high levels of effort, but it can also create unhealthy levels of stress and discourage persistence. Most recent research on competition in the college context has focused on the issue of persistence, but a 1981 meta-analysis also found that classroom activities that emphasize competition are less effective for student learning than are those that emphasize cooperation (Johnson, Maruyama, Johnson, Nelson, & Skon, 1981). Most recently, a review by Shapiro and Sax (2011) concluded that (a) common pedagogies in introductory-level courses privilege individual performance and discourage student collaboration and (b) these instructional modalities help explain women's disproportionate attrition from science/technology/engineering/mathematics (STEM) majors (Shapiro & Sax, 2011). Faculty instructional decisions help shape whether collaboration, support, and/or competition characterizes classroom interactions (Colbeck, Cabrera, & Terenzini, 2001; Seymour & Hewitt, 1997; Strenta, Elliott, Adair, Matier, & Scott, 1994). In one study, perceived competition moderated the relationship between the percentage of female students in a STEM major and their probability of persistence (Sax, 1996). A culture of competition and longstanding structural inequalities may thus be intertwined in some fields.

What mechanisms link pedagogies that encourage competition with student attrition? Research into the practice of normalizing

the distribution of grades (i.e., grading on a curve) suggests that it engenders social comparisons (Fines, 1996) that can lead students, particularly those who are already underrepresented, to question their potential or belonging (e.g., Baldwin, 2009; Seymour, 2002; Seymour & Hewitt, 1997; Washburn & Miller, 2004). In contrast, interactions with faculty and peers that students find supportive (e.g., role modeling, information exchange, and study groups) encourage a sense of belonging (Hurtado et al., 2011; Hyde & Gess-Newsome, 2000; Kahveci, Southerland, & Gilmer, 2008), which has a positive relationship with intentions to persist within one's degree program (Hausmann, Schofield, & Woods, 2007).

The few scholars who have assessed competition in relation to student well-being have focused on specific sectors of professional education (DeVries & Gross, 2009; Hess, 2002). Fang et al. (2010) found a higher prevalence of mental illness among medical students from underrepresented populations, and Sassen (1980) theorized that women's apparent "success anxiety" was primarily an outgrowth of competitive learning environments. Our research is the first to systematically measure competitiveness and specific mental health conditions across multiple student identities and academic disciplines. We use national data to begin filling a notable void in the literature by answering four key questions: Are competitive postsecondary learning environments associated with depression and anxiety? How does this relationship vary across these two mental health conditions? How does the relationship between perceived competition and depression/anxiety vary across academic disciplines and student identities? And do experiences with discrimination or peer support moderate the relationship of depression/anxiety and competition for students from marginalized backgrounds?

Conceptual Framework

We conceptualize the relationship between perceived competition and anxiety and depression in terms of macro-level generational norms that have pervaded micro-level student goals and learning orientations. Then, we propose that role strain theory helps explain why students who identify with historically marginalized groups have higher mental illness risks in very competitive classes.

Generational Norms and Student Orientations Toward Education

Structural factors explain rising competition for college admission (Collins, 2002; Frank & Cook, 1995), but scholars have also observed a generational, cultural shift in which students increasingly take an instrumental view of education. Extrinsic, self-centered values like materialism and educational/professional status (Putnam, 2000) have superseded intrinsic values such as community and developing a “meaningful philosophy of life” (Pryor, Hurtado, Saenz, Santos, & Korn, 2007, p. 52). Twenge et al. (2010) concluded that rising rates of psychopathology among young Americans likely stem from status pressures that accompany these extrinsic values. As stated by de Botton (2005), “Anxiety is the handmaiden of contemporary ambition” (p. 85).

Perceptions of competition at the student and classroom levels also produce an extrinsic, performance orientation to learning (Dweck, 2000) linked to weakened motivation, increased procrastination, and increased incidence of academic dishonesty (Eccles & Wigfield, 2002; Senko, Durik, & Harackiewicz, 2008). In this way, perceived competition in college may also be related to depression and anxiety as a function of social comparisons about academic performance.

Social Status Hierarchies and Role Strain Theory

We conceptualize each student uniquely positioned in multiple status hierarchies tied to his or her social identities and that represent enduring patterns of power that play out at multiple levels: “structural, institutional, interpersonal, and intrapsychic” (Fine, 2006, p. 85). Racial, gender, and sexual hierarchies, for example, are institutionalized through formal policy, informal practice within organizations, and individual interactions. Harrell (2000) proposed that we interpret significant relationships between race/ethnicity and stress not as a product of racial group membership but rather as a result of accumulated experiences with racism in various interactions and environments. The dynamics of oppression and discrimination

TABLE 1.
Conceptual Framework

Causal Factors and Outcomes	Risks for Psychosocial Strain	
	Conceptual	Observed/Operationalization
External (Social)	Environmental risk factors	Perceived competition among students in classes
Internal (Psychological)	Personal vulnerabilities	Identification with marginalized population Experiences with discrimination Experiences with peer support
Outcomes	Psychopathologies	Probability of positive screen for anxiety and/or depression

vary by social identity, but exposure to these forces may similarly (i.e., negatively) affect well-being, regardless of the identities for which one is targeted.

Specifically, role strain theory explains why the relationship between competition and well-being may be stronger among college students from historically marginalized populations. This theory asserts that systemic, role-related inequalities elevate stress more than isolated, short-term incidents (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). Bowman's (2013) psychosocial strain hypothesis proposed that "chronic environmental risk factors increase personal vulnerabilities, which, in turn, reduce psychological wellbeing" (p. 301). Competition in one's learning environment may be one such environmental risk factor that amplifies mental health risks already faced by college students from marginalized backgrounds. Table 1 outlines our conceptual framework and correspondence of key ideas to specific measures.

However, we should not assume that traditional status hierarchies will neatly explain patterns in the probabilities of depression and anxiety. Recent studies of mental health and intersectionality revealed that Black women exhibited the best mental health, despite their apparent "double jeopardy" (Breslau, Kendler, Su, Gaxiola-Aguilar, & Kessler, 2005; Breslau et al., 2006). In a sample of men with low levels of education, Black participants exhibited depression at a lower rate than did Whites (Roxborough, 2009). Resilience, self-esteem, and racial/ethnic identity salience and centrality have been identified as protective factors among Black individuals that may explain such apparently paradoxical relationships (Bowman, 2006; Burt & Paysnick, 2014; Hope, Chavous, Jagers, & Sellers, 2013).

Variations in exposure to discrimination and peer support may also affect mental health

among people with historically marginalized identities (Seng, Lopez, Sperlich, Hamama, & Meldrum, 2012). Role strain is more likely when an individual worries about meeting the numerous expectations associated with multiple roles or identities; supportive relationships can mitigate this risk by providing clarity about the appropriate performance of role expectations (Edwards, 2014; Goode, 1960). We share recent scholars' interest in intersectional social identities and the meanings they take on in specific combinations within specific social environments (Edwards, 2014; McDermott & Lopez, 2013; Takagi, Kondo, & Kawachi, 2013). Given the previous literature and the tenets of role strain theory, we hypothesize the following:

- H1a: Perceived competition will be associated with increased probability of screening positive for anxiety and depression.
- H1b: Perceived competition will have a stronger relationship with anxiety than with depression.
- H2a: Relationships of competition with depression/anxiety will be stronger for students who identify with groups that are underrepresented or marginalized in higher education.
- H2b: Relationships of competition with depression/anxiety will vary by field of study.
- H3: Relationships between competition and depression/anxiety will be stronger for undergraduates who report experiences of discrimination and/or weak peer support.
- H4: The students for whom competition predicts depression or anxiety and who identify with groups underrepresented in their field will have highest risks of depression and anxiety.

METHODS

Data come from the 2007–2013 administrations of the Healthy Minds Study (HMS), an annual online survey of mental health and related issues as well as service utilization among college students. The sample is composed of 40,350 undergraduates at 70 colleges and universities, with 56.1% identifying as female, 92.2% as heterosexual, 74.3% as White, 38.2% as a first-generation student, and 3.5% as an international student. A full table of descriptive statistics about the sample is available from the authors.

At each institution with more than 4,000 students, we recruited a random sample of 4,000 from the full student population; on campuses with fewer than 4,000 students, we recruited all students. In 2007 and 2009 ($N = 12$ schools), students were invited via postal mail (with a \$2 incentive) followed by email reminders. Since 2010, we have conducted recruitment entirely via email. To incentivize participation, prospective respondents were informed that they had been entered into a drawing for a cash prize of \$100 to \$500 regardless of their participation. To engage nonresponders, we sent up to three reminders during the month-long data collection period.

We constructed sample probability weights to adjust for potential differences between survey responders and nonresponders. For students in the random samples, we obtained administrative data from participating institutions, including gender, academic level, race/ethnicity, and GPA. We then constructed response weights, equal to 1 divided by the predicted probability of survey response, by using a logistic regression to estimate the predicted probability of response based on these variables. Thus, weights are larger for respondents with underrepresented characteristics, ensuring that all estimates are

representative of the full population in terms of basic demographics and other characteristics.

Dependent Variables (Depression and Anxiety)

We measured symptoms of depression in the past 2 weeks with the Patient Health Questionnaire–9 (PHQ–9), a validated screening instrument based on the core symptoms of a major depressive episode (Spitzer, Kroeke, Williams, & Patient Health Questionnaire Primary Care Study Group, 1999). We created a binary measure (positive/negative screen) by using the instrument's standard algorithm.

We also used the PHQ to measure anxiety (symptoms of panic disorder and generalized anxiety disorder). The PHQ anxiety module measures symptoms during the past 4 weeks and has been validated in diverse populations (Spitzer et al., 1999). We used the standard algorithm to create a binary measure, categorizing students as screening positive or negative for any anxiety. In 2013, HMS switched the anxiety screen; for consistency, we therefore limit our analyses of anxiety to the 2007–2012 sample.

Independent Variables

Independent variables and covariates, their operationalizations, and rationales for inclusion in our model are outlined in Table 2. The key independent variable, perceived competition, is derived from the HMS survey item: "How would you rate the overall competitiveness between students in your classes?" Students responded "very competitive," "competitive," "somewhat competitive," "not competitive," "very uncompetitive," or "not sure/don't know/not applicable." In a series of sensitivity analyses, we learned that bivariate associations with mental health conditions were significantly higher for students who responded "very competitive" than for students who reported all lower levels

of competition. This is consistent with the notion that competition may have curvilinear effects, with some competition beneficial or neutral and high levels of competition a risk for student well-being and achievement. We therefore recoded the final category as missing and created a binary measure: 1 (*very competitive*)—13.9% of the sample—and 0 (*other responses*).

Interpersonal Experiences. Following Seng et al. (2012) and Blanco et al. (2008), we measured discrimination and peer support as interpersonal factors that may shape mental health outcomes and moderate the relationship of competition and mental health. Racial/ethnic discrimination may have an additive or a multiplicative effect with competition for those who experience it, whereas peer support may either facilitate benefits of competition or serve a protective function in environments that students experience as highly competitive. In contrast, an absence of peer support may compound the mental health risks of competition.

We measured discrimination with the following HMS survey item: “In the past year, how many times have you been treated unfairly because of your race, ethnicity, or cultural background?” Based on frequency and bivariate analyses with the dependent variables, we coded discrimination as 1 (*once in a while, sometimes, a lot, most of the time, or almost all of the time*) and 0 (*never*). Peer support is measured by the survey item: “My friends really try to help me” (coded as 1 [*strongly disagree, somewhat disagree, neutral, or somewhat agree*] and 0 [*strongly agree*]).

Individual Characteristics. Our models include covariates for individual characteristics that have documented relationships with competition and/or mental health: gender (male/female), age, race [binary variables for White (reference category), Black, Asian, American Indian/Alaskan native, Latino/a,

Arab, Pacific Islander, other race], citizenship (U.S./international student), sexual orientation (heterosexual/queer), and parental education.

Fields of study included in the model are humanities (reference category), social sciences, natural sciences, art and design, engineering, business, law, social work, public health, nursing, medicine, other field, and undecided.

Data Analyses

Both of our dependent variables—depression and anxiety—are binary. Therefore, to assess probabilities that perceived competition is associated with anxiety and/or depression (Hypotheses 1a and 1b), we estimated separate logistic regressions, controlling for the student characteristics, academic disciplines, and interpersonal experiences described above. To reduce bias in our estimate of the relationship between competition and mental health across survey years and universities in the sample, models included campus-level fixed effects (i.e., a dummy variable for each school). Individual student observations are nested within both survey cohorts and postsecondary institutions. The fixed-effects estimator controls for effects of possible between-cohort and between-institution differences (i.e., institutional characteristics) on variance in our outcomes.

Then, to examine potential heterogeneous relationships of perceived competition and depression/anxiety across student identities, academic disciplines, and interpersonal experiences (Hypotheses 2 and 3), we tested for interaction effects by using the parameters described here earlier. Finally, our fourth hypothesis considers intersectionality of individual characteristics by underrepresentation in one’s discipline. To investigate this with respect to competition and depression/anxiety, we identified subpopulations of students who met two criteria: (a) competition predicted a significant increased probability of depression and/or anxiety for the group, on

TABLE 2.
Independent Variables and Covariates

Variable	HMS Item	Operationalization	Rationale for Inclusion
Competition	How would you rate the overall competitiveness between students in your classes?	1 (very competitive), 0 (other categories of competitiveness)	Stress induced by perceived competition may be associated with higher risk of anxiety and/or depression (Wilkinson & Pickett, 2009)
Discrimination	In the past year, how many times have you been treated unfairly because of your race, ethnicity, or cultural background?	1 (once in a while and categories with higher frequency), 0 (never)	Experiences with racial discrimination are associated with negative mental and physiological health (Pieterse et al., 2012)
Peer Support	My friends really try to help me.	1 (somewhat agree and categories with lower levels of agreement), 0 (strongly agree)	Weak social support is associated with student depression and anxiety (Blanco et al., 2008)
Gender	What gender are you?	Male/female	Female college students have higher risks of depression & anxiety (Hefner & Eisenberg, 2009) and report higher academic stress (Abouserie, 1994).
Age	How old are you?	Continuous to age 23, then categories for 3-to-5-year spans	Older students may be better adapted to competition in classes.
Race	How do you usually describe your race and/or ethnicity? Select all that apply.	Binary variables for White (reference); African American; Asian; Arab American; American Indian / Alaskan Native; Latino/a; Pacific Islander / Native Hawaiian; Other	Students of color on predominantly White campuses report more experiences with discrimination and prejudice and a more unwelcoming climate, of which perceived competition may be part.
International	Are you a US citizen or permanent resident?	US citizen/international student	International students experience social isolation that may compromise their mental health
Sexuality	How would you describe your sexual orientation?	1 (lesbian/gay/bisexual/queer, questioning) 0 (heterosexual)	Social comparisons are a precursor of suicidal behavior among queer students (Van Heeringen & Vincke, 2000)
Parental Education	What is the highest level of education completed by your mother/father?	1 (at least one parent has a bachelor's degree) 0 (neither parent has a bachelor's degree)	Students with lower socioeconomic status are more likely to struggle with mental health (Hefner & Eisenberg, 2009)
Field of Study	What is your field of study?	Binary variables for humanities (reference); social sciences; natural sciences; art/design; engineering; business; law; social work; public health; nursing; medicine; other; undecided	Some fields of study may have more competitive cultures than others; students in fields with low competition may be more negatively affected by competition when it is perceived.

average, and (b) students from the group are underrepresented in their academic discipline. Three groups met these criteria: female students in engineering, Black students in engineering, and queer students in nursing. We stratified the analytic sample accordingly and reestimated the full model to test for interaction effects for gender \times engineering, Black \times engineering, and sexuality \times engineering. For clarity, we report most multivariate findings as marginal effects, which represent the difference in the probability of the outcome when perceived competition changes from 0 to 1 and other variables are held at the sample mean.

Sensitivity Tests

Recognizing that perceived competition might differently relate to depression/anxiety among higher-ability or academically high-performing students, we wanted to include a covariate for this within our model. The only available data were self-reported measures of GPA for respondents in the 2012 and 2013 samples. We therefore conducted goodness-of-fit tests by reestimating each of the models described here earlier with data from 2012 and 2013 and comparing the results with those from similar models that also controlled for GPA. The main results remained the same in direction and magnitude, and the goodness-of-fit test results (*F*-adjusted test statistics and *p* values) provided little evidence that incorporation of the GPA control improved model fit. We therefore opted to include in this report the results of the more parsimonious model and larger sample. (Contact the authors for full results of this analysis.)

RESULTS

We found clear support for a positive relationship between high levels of perceived competition in classes and both depression and anxiety (Hypothesis 1). Frequency analyses

revealed that 18.1% of the sample screened positive for depression and 10.1% screened positive for anxiety. Among students who perceive their classroom environments to be very competitive, however, these rates are significantly higher: 21.6% for depression and 14.1% for anxiety. We also found support for the hypothesis that competition has a stronger relationship with anxiety than with depression. Controlling for other covariates, students who perceive their classroom environments to be very competitive have 37% higher odds of screening positive for depression and 69% higher odds of screening positive for anxiety. A full table of logistic regression estimates is available from the authors.

Hypothesis 2: Heterogeneity Across Social Identities and Fields of Study

A major finding of this study is that perceived competition has a stronger association with depression and anxiety among students from backgrounds that have been historically underrepresented and/or marginalized in higher education (see Table 3). For example, female students who perceive their classroom environments to be very competitive have a 6.2-percentage point higher probability of screening positive for anxiety and 5.2-percentage point higher probability of screening positive for depression relative to female students who do not perceive high competition. This pattern is compared with a 3.8-percentage point increase in anxiety and a 3.6-percentage point increase in depression for male students who perceive their classroom environments to be very competitive relative to male students who do not perceive high competition.

In an examination of patterns by race/ethnicity, the probabilities of depression and/or anxiety increase significantly with perceived competition for all groups except Arab Americans and Pacific Islanders. However, given the small sample sizes for these two

groups, nonsignificant findings could be Type 2 errors. Among Black students, perceived competition is associated with an 8.0-percentage point increase in the probability of screening positive for anxiety and a 6.7-percentage

point increase in the probability of screening positive for depression. For Latino/a students, perceived competition is associated with 4.4- and 8.6-percentage point increases in the probability of screening positive for anxiety and

TABLE 3.
Marginal Effects (dy/dx) of Competition for Specific Subpopulations

	Anxiety		Depression	
	dy/dx	SE	dy/dx	SE
Discrimination	4.05***	0.02	5.02***	0.02
Weak Peer Support	6.28****	0.01	5.29****	0.01
Female	6.21****	0.01	5.16****	0.01
Queer	12.68***	0.04	12.51****	0.04
African American	7.99**	0.03	6.74*	0.04
Latino/a	4.44**	0.02	8.57***	0.03
Asian	3.30*	0.02	6.31***	0.02
Arab	1.08	0.06	7.99	0.06
American Indian / Alaskan Native	5.42	0.05	11.62*	0.06
Pacific Islander / Native Hawaiian	7.45	0.06	3.41	0.06
Other Race/Ethnicity	5.01	0.04	12.34**	0.05
International Student	1.37	0.03	11.29**	0.05
First-Generation	5.90****	0.01	7.24****	0.01
Social Sciences	5.62****	0.02	6.05****	0.02
Natural Sciences	3.76**	0.02	3.50**	0.02
Art	2.99	0.02	2.50	0.03
Engineering	6.73*	0.04	7.52****	(0.02
Business	4.68**	0.02	3.10*	0.02
Law	12.39*	0.06	11.24	0.08
Social Work	16.12***	0.06	14.76**	0.07
Public Health	3.36	0.03	3.57	0.04
Nursing	3.13	0.03	3.68	0.03
Medicine	3.82	0.04	5.99**	0.03
Other Discipline	4.98***	0.02	3.33**	0.02
Undecided	8.93	0.07	11.65*	0.06

Notes. SE = standard error. White and Humanities excluded as reference categories; dy/dx values represent the difference in probability of the outcome for a student who perceives very competitive classrooms compared to less competitive classrooms; models control for age, gender, sexuality, race/ethnicity, citizenship, parental education, and academic discipline. All models also include campus fixed effects.

*p < .1. **p < .05. ***p < .01. ****p < .001.

depression, respectively. Similarly, among Asian American students, competition is associated with 3.3- and 6.3-percentage point increases in the probability of screening for anxiety and depression, respectively.

For first-generation students, perceived competition is associated with a 5.9-percentage point increase in the probability of screening positive for anxiety and a 7.2-percentage point increase in the probability of screening positive for depression. Last, we found that perceived competition has an especially strong and negative relationship with queer student well-being. Relative to queer students who perceive less competition, those who perceive their classroom environments to be very competitive have 12.7- and 12.5-percentage point higher probabilities of screening positive for anxiety and depression, respectively. Of all student subpopulations analyzed, queer students, on average, have especially high increases in risk of depression/anxiety in competitive learning environments.

The relationships of competition and depression/anxiety vary by discipline. Competition is associated with significantly higher probabilities of anxiety for students in the social sciences, natural sciences, engineering, business, law, social work, and “other disciplines” than for students majoring in humanities. For example, students in the social sciences who perceive classes to be very competitive have a 5.6-percentage point higher probability of screening positive for anxiety. The probability of depression rises with competition for students undecided about their major, as well as those in the social sciences, natural sciences, engineering, business, social work, medicine, and “other disciplines.” For example, engineering students have a 7.5-percentage point higher probability of screening positive for depression when they view their classes as very competitive. Intriguingly, the greatest increased probabilities

of anxiety and depression under conditions of competition are in social work, a field that has received no prior attention in research on competition in higher education.

Hypothesis 3: Heterogeneity by Experiences of Discrimination and Peer Support

We observe main effects for experiences with discrimination and weak peer support with both depression and anxiety. Students who experience discrimination have 28% higher odds of screening positive for depression and 43% higher odds of screening for anxiety. For those reporting weak peer support, odds of depression and anxiety increase by 43% and 51%, respectively. Consistent with Hypothesis 3, we also find significant interaction effects for discrimination and weak peer support as moderators of the competition and depression/anxiety relationships. In our sample, both of these adverse social experiences strengthen the negative relationship between perceived competition and depression/anxiety. For students who have experienced discrimination, perceived competition is associated with 4.1– and 5.0–percentage point increases in the probabilities of screening positive for anxiety and depression, respectively. For students with weak peer support, perceived competition is associated with 6.3– and 5.3–percentage point increases in the probabilities of screening positive for anxiety and depression, respectively. Put another way, perceived competition with discrimination and/or weak peer support is associated with increased risk of depression and anxiety, above and beyond competition.

Hypothesis 4: Competition and Depression/Anxiety for Underrepresented Students

To test our fourth hypothesis, we identified groups of students who both had a significant relationship of competition with depression/

anxiety and were underrepresented in their fields: female students in engineering, Black students in engineering, and queer students in nursing. We find significant interaction effects only for female students in engineering. For female students overall (which represented 56.1% of the sample), perceiving a high level of competition was associated with 6.2- and 5.2-percentage point higher probabilities of screening positive for anxiety and depression, respectively. However, probabilities of screening positive for anxiety and depression were more than three times higher among female students in engineering. Females represent 18–20% of the national population of engineering majors (American Society of Mechanical Engineers, 2012) and 17.9% of engineers in our sample. For female students in engineering, high competition was associated with a 19.3-percentage point higher probability of anxiety and a 16.2 percentage point higher probability of depression.

DISCUSSION

Competition may be increasingly engrained in the culture of American education, but we find this is not a neutral trend from the perspectives of equity and mental health. Our results were consistent with our first two hypotheses: when perceived competition in one's classes is high, so is the risk for anxiety and depression. Intense competition is associated with higher odds of screening positive for anxiety than for depression. In multivariate models, perceptions of competition within the academic environment increase the odds of screening positive for anxiety by 70.0% and for depression by 40.0%.

High levels of competition have a positive relationship with depression and anxiety across every subpopulation of students we studied; this relationship is not always significant, but we identified no group of students for whom

a high level of competition was associated with lower probabilities of depression or anxiety. Yet the magnitude of increased risk in highly competitive learning environments varies by students' social identities, academic disciplines, and experiences with discrimination and peer support. College students from underrepresented or marginalized backgrounds who perceive their classroom environments to be very competitive are particularly vulnerable to depression and anxiety. Given our large sample size, we take note of groups whose heightened probabilities of depression and anxiety in very competitive learning environments are significant at the $p = .0001$ level: female, queer, and first-generation college students. Perhaps most notably, queer students have a nearly 13.0-percentage point higher probability of both anxiety and depression when they perceive their classes as very competitive compared with when they view classes as less competitive. Our results add to mixed findings in previous research about race/ethnicity and mental health. However, on average, students who identify as Black, Latino/a, or Asian and who perceived classes as very competitive have significantly higher probabilities of anxiety and depression than do students from those same groups who view their classes as less competitive.

Relationships of competition and depression/anxiety vary by field of study. Intense competition is associated with a positive screen for anxiety in the social sciences, for example, and with depression in engineering. This finding is consistent with a recent study of disciplinary differences in mental health, in general (Lipson, Wagner, Zhou, & Eisenberg, 2015). Given prior research that has documented variation in disciplinary cultures (e.g., Becher & Trowler, 2001; Posselt, 2015), we propose that disciplinary patterns in our data could be due to varied levels of competition in disciplines, to unique cultures of competition, and/or to

differences in characteristics of students who self-select into certain fields.

Limitations

There are limitations to consider when interpreting these results. First, the data and analyses prohibit causal arguments. We used multivariate modeling to estimate conditional correlations and the marginal effect of competition for various groups of students. Our findings conform to role strain theory, but data are cross-sectional, simultaneously assessing perceptions of competitiveness and screening for depression and anxiety. Respondents with these conditions may be more inclined to report their learning environments as very competitive. As authors, we see a fundamental implication of this research being the need for experimental or quasi-experimental research in the relationships we have analyzed. There could also be bidirectional relationships between key variables and unobserved confounders. In addition to missing control variables like self-esteem and identity centrality, our data did not permit including precollege factors that may affect student mental health or the perceived difficulty of one's courses, which Polychronopoulou and Divaris (2005) found to be associated with stress among dental students. Also, the sample of institutions for which there are HMS data is not random, although it is quite diverse. Finally, we note the potential of survey nonresponse bias. We adjusted estimates with nonresponse weights, but there may be differences between responders and nonresponders in mental health that were unknown for the full recruitment sample.

IMPLICATIONS AND FUTURE RESEARCH

This article describes the first major study of competition in college classes, depression, and anxiety, using a large, diverse sample

and widely validated screening measures for depression and anxiety. Scholars have argued that the best way to address stress is by simultaneously changing the meaning that individuals attribute to stressful events and by changing the environment (Lazarus & Folkman, 1984). To that end, our findings have important implications for educators, student affairs educators, and other campus stakeholders. There is a need to (a) develop resilience and coping strategies in college students so they interpret competitive learning environments differently, (b) intervene in the instruction and interactions present in highly competitive learning environments, and (c) encourage students to think critically about generational norms that lead to unhealthy social comparisons. We discuss each of these implications before proposing promising avenues for future research.

Strategies for Coping and Resilience. Our findings underscore the value of providing college students with strategies for resilience and coping that better prepare them for the stress and competition that higher education often entails. Resilience, defined as “the process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances” (Masten, Best, & Garmezy, 1990, p. 426), is a key determinant of mental health and academic performance (Leary & DeRosier, 2012). As such, fostering resilience, particularly among students in fields with high rates of competition and depression or anxiety, could improve mental health and academic performance; this is especially important given the relationship of mental health to academic success. A program for first- and second-year students, for example, could involve administrator- and/or peer-led workshops on handling academic stress and disappointment.

Similarly, a mentorship program could match first-year students with experienced peer mentors who are trained to promote resilience

in the context of their specific disciplinary culture. That students who reported strong peer support had significantly lower odds of depression and anxiety suggests that encouraging peer support in academic settings, such as through peer mentoring, may serve as a protective factor for mental well-being. First-year experience programs, including summer orientations, seminars, support groups, and targeted advising, may be another channel for promoting resilience. First-year experience programs have primarily focused on practical and academic (e.g., course scheduling) aspects of college life (Hunter, 2006; Padgett & Keup, 2011), with minimal emphasis on stress, coping, or resilience (Leary & DeRosier, 2012). We view this as a missed opportunity.

Designing and implementing programs to equip students with resilience and coping skills will likely require collaboration across campus and could benefit from collaborative networks of colleges and universities in a metropolitan or geographic region. In particular, academic departments and counseling centers need to work together. Academic departments understand the unique needs of their student populations, while counseling centers understand best practices in wellness and mental health. Similar logic could be applied to developing systems to support students whose combinations of social identities appear to be especially vulnerable to the negative effects of competition. Centers attuned to the needs of specific student populations (e.g., lesbian/gay/bisexual/transgender/queer or questioning [LGBTQ] resource centers) could partner with student life/counseling centers to deliver tailored, evidence-based information and skills.

Intervening in Educational Environments. In addition to fostering resilience, existing campus support systems such as LGBTQ centers, summer bridge and advising programs, and professional associations for underrepresented populations in STEM may be leveraged to

increase peer support and perhaps to help students reframe competition, discrimination, stress, and/or their effects on well-being. For educators concerned with developing inclusive learning environments, our results highlight the need for pedagogies and interactions that challenge tendencies toward intense competition and conventional status hierarchies based on social identities. Statistically significant interaction effects by social identity in our models also suggest that those who work directly with students (especially practitioners who hold privileged social identities) may benefit from training that builds multicultural competency. Such training should raise professionals' consciousness about the dynamics of privilege and oppression and their skill in recognizing the multiple manifestations of racism, sexism, and heteronormativity. Practitioners must also recognize that each student will have a unique interpretation and experience of the climate within classrooms, residence halls, and other campus spaces—both physical and organizational.

As mentioned in the methodology, we found that only high levels of perceived competition were significantly associated with increased odds of depression and anxiety. This suggests that we do not need to erase competition from education altogether. Rather, we need to address “the kind that spurs more anxiety than it does motivation” (Houshmand, 2015, para. 1) and intervene where there are high levels of competition and/or correlations between competition and depression/anxiety. Shifting student perceptions may be one approach: promising research shows that effects of stress on health and performance are conditional on whether one views stress as enhancing or damaging (Crum, Salovey, & Achor, 2013). Research could examine whether there may be similar mindsets toward competition. Reframing competition to focus on its effort-inducing

dimensions may mitigate its associations with anxiety and depression.

Rethinking Contemporary Norms. Reading our implications thus far, a critical perspective might question whether the problem is really with student resilience or the design of learning environments. Perhaps the problem is more systemic; many young adults today are raised in a culture of competition that leads them to approach education with instrumental motivations and to think of their peers as a source of social comparison rather than of support (Twenge et al., 2010). Here, the self-authorship literature is instructive. Student affairs educators and other faculty can refocus students on their own development and future (Creamer & Laughlin, 2005), apart from their peers' aspirations or broader cultural norms about what it means to be successful (Pope, 2001). Relatedly, colleges and universities can help to normalize "failure" as part of the college experience. An interesting example of this is Harvard University's "Success-Failure Project," which documents personal narratives from Harvard faculty, students, and alumni about experiencing, understanding, and bouncing back from failures.

FUTURE RESEARCH

This article lays a strong empirical foundation for continued research into relationships among college students' interpersonal experiences, competition, and mental health. Although our analyses do not allow for causal inferences, the relationships we found are consistent with those predicted by role strain and adaptation theory (Bowman, 2013). Competition among peers may operate as an environmental risk factor that increases psychosocial vulnerabilities, especially for those who also experience the effects of racism, sexism, and heterosexism. However, peer support mitigates these risks.

Future research should examine these relationships more closely by using longitudinal data and/or experimental methods. For more precise estimates of relationships among perceived competition, race/ethnicity, and mental health, future research should also control for resilience and racial/ethnic identity salience, which may buffer stress and role strain (Bowman, 2013; Burt & Paysnick, 2014; Hope et al., 2013). Research is also needed to test alternative measures of competition and underlying mechanisms.

CONCLUSIONS

The prevalence of mental illness in college students appears to be rising (Cook, 2007), and today's undergraduates identify stress, anxiety, and depression among the top factors impairing their academic performance (American College Health Association, 2013). This trend warrants greater attention by education stakeholders, for mental illness has significant implications for learning and retention (Arria et al., 2013; Eisenberg et al., 2009), even at mild to moderate levels of distress (Stallman, 2010). Previous to our work, just one study had empirically documented academic competition as a factor in college student stress (Abouserie, 1994). Our analyses corroborate those of Abouserie and reveal important variations in the relationships of competition with depression and anxiety across student identities and academic disciplines. Further, we find that experiences with discrimination and weak peer support increase the already significant risk of mental illness that accompanies perceptions of intense competition. Amid the attention that education scholars, practitioners, and policymakers rightly give to the benefits of access to higher education, this research affirms how important it is that we not lose sight of the impacts that postsecondary learning environments have on the well-being of those who do enroll.

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