

Behind the graduate mental health crisis in science

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Supplemental Material for *Behind the graduate mental health crisis in science*

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This document contains the following supplemental materials:

- Methods
- Methods References
- Supplementary Tables 1-17
- Copy of survey questions
- Supplementary Figure 1

Methods

Inclusion and ethics statement

This study was conducted under an approved Institutional Review Board Protocol from Arizona State University (no. 14917). All participants provided informed consent before completing the survey.

Survey design

To better understand the reciprocal relationship between graduate students' anxiety and depression and their experiences in research and teaching, we designed a survey with closed-ended items based on prior qualitative interview studies of students with anxiety and depression^{1,2}. These interview studies elicited what specific aspects of graduate research and teaching alleviated and exacerbated symptoms of anxiety and depression among science graduate students, and in turn how graduate students perceived their anxiety and depression to affect their research and teaching. The codes that emerged from these respective interview studies informed the development of the survey. To establish cognitive validity of the survey items, we conducted four think-aloud interviews with graduate students across the sciences³. The survey was iteratively revised after each think-aloud until all items were interpreted as intended. A full copy of the survey questions is included in the **Supplemental Material**.

Screening questions

The survey began by asking participants which degree type they were pursuing (e.g., thesis-based doctoral, thesis-based master's); individuals who were not pursuing a thesis-based doctoral or master's degree were sent to the end of the survey and not included in the study.

Program characteristics and experience

Participants provided their field of study in a closed-ended item (e.g., biology, chemistry), the amount of time they have been in their current graduate program, whether they had changed primary research mentors and if so, whether they perceived that change had increased or would increase the amount of time they expected to spend in the program. Participants then reported whether they had experience as a teaching assistant or an instructor of record.

Demographic characteristics

Next, the survey included a series of demographic questions asking about participant gender, race/ethnicity, parental education, financial stability, and LGBTQ+ status. To assess mental health, participants were asked whether they currently identify or previously identified as having anxiety or an anxiety disorder. If they reported that they currently or had previously struggled with anxiety or an anxiety disorder, they were asked, on average, how severe their anxiety is/was during the course of their graduate school experience with the option to select mild, moderate, severe, or that they did not experience anxiety during their graduate experience. They also completed the GAD-7, a standard, well-validated metric for assessing anxiety severity by asking how frequently an individual has experienced seven emotions or behaviors over the past two weeks⁴. Participants were also asked if they had currently or previously struggled with depression and were asked a parallel follow-up question about the severity of their depression during graduate school. Participants who had experienced depression completed the PHQ-9, a well-validated instrument commonly used to assess depression severity⁵. If participants reported

that they did not experience anxiety or depression during their graduate experience, they did not answer follow-up questions about the impact of each aspect of research or teaching on their anxiety or depression and were not included in these analyses.

Graduate research experiences

To quantify the experiences of graduate students with regard to their research, we used prior interview studies that explored the relationship between PhD students' anxiety¹ and depression² to develop a list of aspects of research experiences that science PhD students commonly reported as affecting their anxiety and/or depression (**Supplementary Table 14**). For each aspect of research, we asked all participants (any student who reported anxiety and/or depression) how often they experienced that aspect of graduate research with options including weekly, monthly, about four times a year, about two times a year, once a year, less than one a year, or I have not experienced this.

Then, for students who reported anxiety during their graduate program and who had experienced the aspect of research, we asked the extent to which experiencing that aspect impacted their anxiety on a 5-point scale from “not at all” to “extremely.” For the aspects that exacerbate anxiety or depression, participants were specifically asked to what extent experiencing the aspect worsens their anxiety on average. Similarly, participants who reported depression during their graduate program and had experienced the aspect of research were asked to what extent experiencing the aspect worsens their depression on average. For the aspects of research that have an alleviating effect on anxiety or depression, participants who had experienced the aspect and reported each condition were asked the extent to which experiencing

the aspect helps them manage their anxiety or depression, respectively, on the same 5-point scale used to assess the impact of the aspects of research that exacerbate anxiety or depression.

After reporting their experience with each aspect of research that either exacerbates or alleviates their anxiety or depression, participants with anxiety selected all of the ways in which anxiety affects their research from a provided list and participants with depression selected all of the ways in which depression affects their research from a provided list (**Supplementary Table 15**). These ways in which anxiety and depression might affect graduate research were developed from prior interview studies^{1,2}.

Graduate teaching experiences

Graduate students who had experience teaching either as a teaching assistant or instructor of record were asked similar sets of questions about aspects of graduate teaching that exacerbate or alleviate their anxiety or depression developed from prior interview studies^{1,2}

(**Supplementary Table 16**). First, participants were asked how often they experienced each aspect during terms when they taught. Then participants who reported anxiety during graduate school were asked the extent to which experiencing the aspect worsened or helped them manage their anxiety. Similarly, participants with depression during graduate school were asked the extent to which experiencing the aspect worsened or helped them manage their depression.

Next, participants reported the effect of anxiety or depression on their experience teaching. Participants who reported anxiety during graduate school selected all aspects of anxiety that impacted their teaching from a provided list; similarly, participants who reported depression during graduate school selected all aspects of depression that impacted their teaching from a

provided list (**Supplementary Table 17**). The ways in which anxiety and depression could affect teaching were adapted from prior interview studies^{1,2}.

Recruitment and distribution

To recruit graduate students across science disciplines to participate in the study, we contacted graduate program directors or coordinators to distribute the survey to the graduate students enrolled in their institution's programs. For all U.S. biology, chemistry, geoscience, and physics programs listed in U.S. News and World Report⁶, we used institution and department webpages to identify the graduate program directors or coordinators and collect their publicly available email contact information. In total, we contacted representatives from 1429 science graduate programs across 489 public and private doctoral- and master's-granting institutions. The full data set, including students who did not report mental health conditions, represented 183 institutions.

Graduate program directors or coordinators were provided with a recruitment email with the survey link embedded to forward to the students in their respective graduate program. Graduate student participation was incentivized by awarding the first 50 participants to complete the survey with a \$20 gift card and all participants were entered in a drawing for one of ten \$100 gift cards.

Data analysis

All data analysis was conducted in R version 4.2.2⁷. First, we filtered the data to only include responses from participants pursuing a thesis-based master's or doctoral programs in a field of science and who reported experiencing mild, moderate, or severe anxiety and/or

depression during their graduate program. We defined science as biology, chemistry, geosciences, physics, astronomy, and combinations thereof (e.g., biochemistry, geobiology) that participants wrote in for their field of study. Responses from individuals who reported anxiety or depression in the past but not during graduate school were not included in the data set.

The impact of research and teaching on anxiety and depression

For each aspect of research and teaching, we calculated the percent of participants with anxiety and/or depression during graduate school who had experienced the aspect at each frequency (e.g., once a year, weekly). For the graduate students with anxiety and/or depression during graduate school who had experienced each aspect, we calculated the average number of times per year that they experienced it by converting the text-based responses to their numeric counterparts – weekly (52); monthly (12); four times per year (4); two times per year (2); annually (1); less than once per year (0.5) – and dividing the sum by the total number of responses with those frequencies, excluding responses indicating that the participant had never experienced the aspect.

For each aspect of research and teaching, we also calculated the average severity of the impact on anxiety or depression across all participants who experienced it, regardless of frequency, using the numeric counterparts to the Likert scale options: not at all (0), slightly (1), somewhat (2), very (3), and extremely (4). Only participants who reported anxiety during graduate school responded to the question about how the aspect affects their anxiety and those with depression during graduate school responded with regard to depression.

To calculate the percent of participants with anxiety in graduate school who experienced each aspect, we divided the total number of participants who reported experiencing the aspect by

the total number of participants with anxiety during graduate school. We calculated an analogous percent for participants with depression experiencing each aspect.

In order to assess whether all of the aspects of research and teaching had a greater magnitude of impact on anxiety or depression, we conducted ordinal regressions with the ordinal package in R⁸. In the models, the outcome was the impact of the aspects and the predictors were condition (i.e., anxiety or depression) and severity of condition (i.e., mild, moderate, severe). We included individual as a random effect to account for multiple entries of the same participant and ran one model with all aspects that exacerbate and a second model with all aspects that alleviate anxiety or depression. To determine whether aspects of research or teaching had a greater exacerbating effect on graduate mental health, we conducted another set of ordinal regressions where the outcome was the impact of the aspects on anxiety or depression and the predictors were the context (i.e., research or teaching), severity of condition (i.e., mild, moderate, severe), and individual as a random effect. We ran one model for all aspects that exacerbate anxiety or depression and another for all aspects that alleviate anxiety or depression.

To characterize demographic differences in the extent to which each aspect affected anxiety or depression, we ran ordinal regressions using the ordinal package in R⁸. We first considered individual demographics: gender, race/ethnicity, LGBTQ+ status, financial stability, and time in the graduate program. We collapsed gender into a binary category by combining women and nonbinary individuals into one group which we compared to men. Although this does not account for the full gender diversity that exists in our dataset^{9,10}, there were too few nonbinary, genderqueer, or genderfluid participants to include a third gender category in our analyses. For race/ethnicity, we considered four groups: Asian or Asian American, Black or African American, Latin*, and white. LGBTQ+ status was a binary yes or no, and financial

stability was binary with those who are always financially stable compared to those who are never or only sometimes financially stable (“not financially stable”). We aggregated time in the graduate program to those less than three years into their program and those who were three or more years into their program. In our sample, this largely corresponded to degree type (i.e., most Master’s students in our sample had been in their program for less than three years) and whether PhD students had advanced to candidacy. We also considered the differential impact of each aspect on anxiety or depression based on program characteristics, specifically the degree type (i.e., Master’s or doctorate) and field of study (i.e., biology, chemistry, physics, geosciences, and other science (e.g., biochemistry)). For all ordinal regressions we checked that proportional odds assumptions were met. We calculated the variance inflation factor (VIF) among each set of predictors using the car package in R¹¹; the VIF values indicated no issues with multicollinearity among predictors.

Because anxiety and depression differentially affect different demographic groups (e.g., women¹²), we used mediation analyses to determine the extent to which severity of anxiety mediated the relationship between demographic characteristics and the impact of each aspect of research or teaching on anxiety. We similarly explored whether severity of depression mediated the relationship between demographic characteristics and the impact of each aspect on depression. In our models, individual demographic characteristics were the independent variable, the aspect’s impact on anxiety or depression was the dependent variable, and severity of anxiety (as measured by the GAD-7) or depression (as measured by the PHQ-9) was the mediator. We opted to use the GAD-7 and PHQ-9 scores as the measure of severity of anxiety and depression, respectively, because they are numeric values which more readily lend themselves to the linear models required in a mediation analysis compared to the self-reported severity on a four-point

Likert scale. The demographic characteristics were binary outcomes (e.g., LGBTQ+ or not LGBTQ+). Race/ethnicity was the only predictor included in our original models which was not categorized in a binary. Therefore, for the mediation analysis we considered each group individually. For example, we ran the mediation analysis where the demographic group was Asian or Asian American (0/1) and another analysis where the demographic group was Black or African American (0/1). The outcome variable (i.e., impact of each aspect of research or teaching on anxiety or depression) was an ordered factor¹³. We ran mediation analyses for any demographic characteristic that was a significant predictor of GAD-7 or PHQ-9 scores. **FigS1** provides a diagram describing the general structure of the mediation analyses.

The impact of anxiety and depression on research and teaching

We first calculated the percent of graduate students who selected each of the aspects of anxiety or depression that affect research or teaching out of the total number of participants with anxiety or depression during graduate school, respectively. To assess the extent to which demographics predict the ways in which anxiety and depression impact graduate students' experiences in research and teaching, we ran logistic regressions using the stats package in R⁹³. Similar to the regression analyses for the severity of the impact of each aspect on anxiety or depression, we ran a set of logistic regressions with individual characteristics as predictors and another set with program characteristics as predictors. The model for individual demographics was: selected the aspect (0/1) ~ gender + race/ethnicity + LGBTQ+ status + financial stability + year in graduate program. The model for program characteristics was: selected the aspect (0/1) ~ degree type + field of study. We conducted mediation analyses as described above to determine the extent to which the relationship between individual demographics and impact of anxiety or

depression on research or teaching was mediated by the severity of anxiety or depression, respectively.

To explore the extent to which anxiety and depression affect other aspects of the graduate school experience, we used binary logistic regression to assess the extent to which self-reported severity of anxiety during graduate school affected a participant's likelihood of having switched advisors or seriously considering leaving their graduate program. We ran a parallel set of regressions with severity of depression during graduate school as the predictor. For all logistic regressions we ensured there were no outliers and that there was no multicollinearity among predictors by calculating the VIF using the car package¹¹.

Reporting of results

Due to the number of hypothesis tests, we used FDR adjusted p -values using Benjamini-Hochberg corrections^{14,15} and report results as significant which passed an adjusted p -value threshold of .05. For the ordinal and logistic regressions, we corrected per predictor across each category of aspects (e.g., aspects of research that exacerbate depression). The **Supplemental Material** includes the full results from all statistical tests, including the original and corrected p -values. For the regression analyses, we use odds ratios (OR) to describe the effect size; the OR is calculated by exponentiating the beta coefficient¹⁶.

Data Availability

All raw data supporting the findings of this study can be found on a GitHub repository (<https://github.com/carlybusch/Behind-grad-mental-health-crisis>).

Code Availability

Code used for this study can be found on a GitHub repository

(<https://github.com/carlybusch/Behind-grad-mental-health-crisis>).

Methods References

1. Pigart, C. J. *et al.* Ph.D. Anxiety: The relationship between life science Ph.D. students' anxiety and their experiences in research and teaching. (under review).
2. Gin, L. E., Wiesenthal, N. J., Ferreira, I. & Cooper, K. M. PhDepression: Examining How Graduate Research and Teaching Affect Depression in Life Sciences PhD Students. *CBE—Life Sci. Educ.* **20**, ar41 (2021).
3. Trenor, J., Miller, M. & Gipson, K. Utilization of a Think-Aloud Protocol to Cognitively Validate a Survey Instrument Identifying Social Capital Resources of Engineering Undergraduates. in *2011 ASEE Annual Conference & Exposition Proceedings* 22.1656.1-22.1656.15 (ASEE Conferences, Vancouver, BC, 2011). doi:10.18260/1-2--18492.
4. Spitzer, R. L., Kroenke, K., Williams, J. B. & Löwe, B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch. Intern. Med.* **166**, 1092–1097 (2006).
5. Kroenke, K., Spitzer, R. L. & Williams, J. B. The PHQ-9: validity of a brief depression severity measure. *J. Gen. Intern. Med.* **16**, 606–613 (2001).
6. U.S. News & World Report. News, Rankings, and Analysis on Politics, Education, Healthcare and More. <https://www.usnews.com/best-graduate-schools/top-science-schools/biological-sciences-rankings> (2022).
7. R Core Team. R: A language and environment for statistical computing. (2022).
8. Christensen, R. H. B. ordinal: Regression Models for Ordinal Data. (2022).

9. Cooper, K. M. *et al.* Fourteen Recommendations to Create a More Inclusive Environment for LGBTQ+ Individuals in Academic Biology. *CBE—Life Sci. Educ.* **19**, es6 (2020).
10. Casper, A. M. A., Rebolledo, N., Lane, A. K., Jude, L. & Eddy, S. L. “It’s completely erasure”: A Qualitative Exploration of Experiences of Transgender, Nonbinary, Gender Nonconforming, and Questioning Students in Biology Courses. *CBE—Life Sci. Educ.* **21**, ar69 (2022).
11. Fox, J. & Weisberg, S. *An {R} Companion to Applied Regression*. (Sage, Thousand Oaks, CA, 2019).
12. Kessler, R. C. Epidemiology of women and depression. *J. Affect. Disord.* **74**, 5–13 (2003).
13. Liu, H., Zhang, Y. & Luo, F. Mediation Analysis for Ordinal Outcome Variables. in *Quantitative Psychology Research* (eds. Millsap, R. E., Bolt, D. M., van der Ark, L. A. & Wang, W.-C.) 429–450 (Springer International Publishing, Cham, 2015). doi:10.1007/978-3-319-07503-7_27.
14. Benjamini, Y. & Hochberg, Y. Controlling the false discovery rate: a practical and powerful approach to multiple testing. *J. R. Stat. Soc. Ser. B Methodol.* **57**, 289–300 (1995).
15. Jafari, M. & Ansari-Pour, N. Why, when and how to adjust your P values? *Cell J. Yakhteh* **20**, 604 (2019).
16. Deeks, J. When can odds ratios mislead? Odds ratios should be used only in case-control studies and logistic regression analyses. *BMJ* **317**, 1155–1156; author reply 1156-1157 (1998).

Supplementary Table 1. Participant demographic characteristics (N=2161).

Demographic		Percent (n)
Gender	Woman	61.04 (1319)
	Man	33.97 (734)
	Genderqueer or nonbinary	4.21 (91)
	Decline to state	0.79 (17)
Race/ethnicity	White	67.75 (1464)
	Asian or Asian American	15.69 (339)
	Hispanic, Latino/a, or of Spanish origin	7.96 (172)
	Black or African American	3.24 (70)
	Multiracial	1.90 (41)
	American Indian, Alaska Native, Native Hawaiian, or Pacific Islander	0.83 (18)
	Middle Eastern	0.83 (18)
	Decline to state	1.80 (39)
Financially stable	Yes	48.45 (1047)
	Sometimes	36.46 (788)
	No	14.62 (316)
	Decline to state	0.46 (10)
LGBTQ+	No	69.00 (1491)
	Yes	28.09 (607)
	Decline to state	2.92 (63)
Time in grad program	Less than one year	20.78 (449)
	One year	8.84 (191)
	Two years	22.54 (487)
	Three years	17.82 (385)
	Four years	14.72 (318)
	Five years	9.49 (205)
	Six years	4.21 (91)
	Seven years	1.16 (25)
	More than seven years	0.46 (10)
Depression	Yes, currently	51.37 (1110)
	Yes, in the past	38.92 (841)
	No, never	8.84 (191)
	Decline to state	0.88 (19)
Depression severity during graduate school*	None	3.64 (71)
	Mild	24.45 (477)
	Moderate	48.64 (949)
	Severe	23.07 (450)
	Decline to state	0.21 (4)
Anxiety	Yes, currently	61.78 (1335)
	Yes, in the past	24.34 (526)
	No, never	12.86 (278)
	Decline to state	1.02 (22)
Anxiety severity during graduate school*	None	1.02 (19)
	Mild	16.28 (303)
	Moderate	51.42 (957)
	Severe	31.27 (582)
	Decline	0.00 (0)

*Calculated based on the number of participants who reported currently or previously experiencing depression (n=1951) or anxiety (n=1861), respectively.

Supplementary Table 2. Participant program characteristics

Characteristic		Percent (n)
Field of study	Biology	44.42 (960)
	Chemistry	21.89 (473)
	Physics	15.55 (336)
	Geosciences	12.49 (270)
	Other science	5.00 (108)
	Astronomy	0.65 (14)
Degree type	Doctoral program	77.60 (1677)
	Thesis-based masters	22.40 (484)
Changed PIs	No	87.78 (1897)
	Yes	12.17 (263)
	Decline to state	0.05 (1)
Considered leaving program	No	51.64 (1116)
	Yes	48.36 (1045)
Started program	Before COVID	52.94 (1144)
	During COVID, in-person	23.23 (502)
	During COVID, online	23.83 (515)
Teaching experience	Yes	83.20 (1798)
	No	16.80 (363)

Supplementary Table 3. For each aspect of research and teaching that exacerbates or alleviates depression or anxiety, the mean and mode frequency at which graduate students experience the aspect and the mean impact on depression and anxiety.

Aspect	Mean frequency (per year)	Mean impact on depression (4-point scale)	Mean impact on anxiety (4-point scale)	Mode frequency
<i>Research – exacerbate mental health</i>				
Comparison with others	30.88	2.31	2.67	weekly
Unreasonable expectations	12.40	2.36	2.94	never
Failure	15.15	2.25	2.51	monthly
Social isolation	23.40	2.35	1.95	weekly
Negative reinforcement	7.73	2.71	3.01	never
Public presentations	5.69	0.70	1.90	four times per year
Requirements	14.66	1.67	2.62	monthly
Lack of structure	19.49	2.00	2.72	monthly
Lack of technical support	16.59	1.88	2.52	never
<i>Research – alleviate mental health</i>				
Collaboration	17.51	1.67	1.75	monthly
Emotional support	16.26	2.46	2.69	monthly
Flexibility	32.48	2.07	2.35	weekly
Passion	18.60	2.38	2.25	monthly
Progress	10.76	2.48	2.76	monthly
Completing small tasks	32.52	2.18	2.56	weekly
<i>Teaching – exacerbate mental health</i>				
Lack of training	17.19	1.19	2.12	never
Negative reinforcement	8.25	1.29	1.50	never
Pressure to teach well	31.27	0.94	1.81	weekly
Public speaking	39.50	0.54	1.43	weekly
Increased responsibility	26.35	1.61	2.48	weekly
<i>Teaching – alleviate mental health</i>				
Confidence	22.49	1.94	2.17	monthly
Welcome distraction	21.16	1.64	1.70	never
Increased structure	37.74	1.20	1.70	weekly
Passion	24.66	2.01	1.99	weekly
Positive reinforcement	16.36	2.10	2.17	monthly
Relationships with TAs	28.19	1.94	2.13	weekly

Supplementary Table 4. Results from ordinal regressions of impact on depression or anxiety on all aspects of research and teaching based on condition (i.e., anxiety or depression) and context (i.e., research or teaching). Reference groups are depression, teaching, and mild severity of condition.

Model	Predictor	Beta	SE	OR	p-value
<i>Aspects that exacerbate anxiety or depression</i>					
Impact ~ condition + severity + (1 individual)	Anxiety	0.73	0.02	2.08	<.00001
	Moderate	0.50	0.02	1.65	<.00001
	Severe	1.17	0.03	3.21	<.00001
<i>Aspects that alleviate anxiety or depression</i>					
Impact ~ condition + severity + (1 individual)	Anxiety	0.21	0.02	1.24	<.00001
	Moderate	0.04	0.02	1.04	.0732
	Severe	0.28	0.03	1.32	<.00001
<i>Aspects that exacerbate anxiety or depression</i>					
Impact ~ context + severity + (1 individual)	Research	1.07	0.02	2.93	<.00001
	Moderate	0.60	0.02	1.81	<.00001
	Severe	1.31	0.03	3.72	<.00001
<i>Aspects that alleviate anxiety or depression</i>					
Impact ~ context + severity + (1 individual)	Research	0.53	0.02	1.70	<.00001
	Moderate	0.07	0.02	1.07	.00277
	Severe	0.32	0.03	1.38	<.00001

Supplementary Table 5. Results from ordinal regressions of impact on depression or anxiety on aspects of research based on individual characteristics. Reference groups are men, white, non-LGBTQ+, always financially stable, 3+ years in program.

Aspect	Condition	Predictor	beta	SE	OR	p-value	Adjusted p-value
<i>Research - exacerbate mental health</i>							
Failure	Depression	Gender (woman/nonbinary)	0.225	0.097	1.252	0.020	0.038
		Race (Asian)	0.283	0.125	1.326	0.024	0.055
		Race (Black)	-0.135	0.267	0.874	0.615	0.692
		Race (Latin*)	0.052	0.170	1.054	0.759	0.808
		Race (other)	-0.143	0.236	0.867	0.544	0.716
		LGBTQ+ (yes)	0.427	0.102	1.532	0.000	0.000
		Financial stability (not always)	0.296	0.091	1.345	0.001	0.003
		Time in program (<3 years)	-0.292	0.091	0.747	0.001	0.006
	Anxiety	Gender (woman/nonbinary)	0.431	0.100	1.539	0.000	0.000
		Race (Asian)	0.345	0.126	1.412	0.006	0.056
		Race (Black)	0.100	0.267	1.105	0.707	0.814
		Race (Latin*)	0.060	0.170	1.062	0.726	0.817
		Race (other)	-0.023	0.249	0.978	0.927	0.997
		LGBTQ+ (yes)	0.249	0.102	1.282	0.015	0.038
		Financial stability (not always)	0.427	0.092	1.532	0.000	0.000
		Time in program (<3 years)	-0.063	0.092	0.939	0.490	0.791
Lack of structure	Depression	Gender (woman/nonbinary)	0.141	0.096	1.152	0.143	0.161
		Race (Asian)	0.293	0.123	1.341	0.017	0.050
		Race (Black)	-0.301	0.266	0.740	0.258	0.464
		Race (Latin*)	0.040	0.167	1.041	0.808	0.808
		Race (other)	0.185	0.221	1.203	0.403	0.716
		LGBTQ+ (yes)	0.332	0.100	1.394	0.001	0.003
		Financial stability (not always)	0.228	0.089	1.256	0.011	0.019
		Time in program (<3 years)	-0.264	0.090	0.768	0.003	0.010
	Anxiety	Gender (woman/nonbinary)	0.643	0.102	1.902	0.000	0.000
		Race (Asian)	-0.120	0.125	0.887	0.336	0.505
		Race (Black)	-0.515	0.276	0.597	0.062	0.238
		Race (Latin*)	-0.189	0.174	0.828	0.277	0.623
		Race (other)	0.311	0.243	1.365	0.200	0.601
		LGBTQ+ (yes)	0.341	0.102	1.406	0.001	0.007
		Financial stability (not always)	0.277	0.091	1.319	0.002	0.004
		Time in program (<3 years)	-0.051	0.092	0.951	0.582	0.791
Negative reinforcement	Depression	Gender (woman/nonbinary)	0.502	0.118	1.652	0.000	0.000
		Race (Asian)	0.232	0.147	1.262	0.113	0.145
		Race (Black)	-0.542	0.359	0.581	0.131	0.296
		Race (Latin*)	-0.173	0.210	0.841	0.411	0.739
		Race (other)	0.184	0.275	1.202	0.504	0.716

Unreasonable expectations	Anxiety	LGBTQ+ (yes)	0.393	0.123	1.481	0.001	0.003
		Financial stability (not always)	0.209	0.110	1.233	0.058	0.074
		Time in program (<3 years)	-0.203	0.112	0.816	0.070	0.111
		Gender (woman/nonbinary)	0.569	0.124	1.766	0.000	0.000
		Race (Asian)	-0.089	0.151	0.915	0.557	0.557
		Race (Black)	-0.284	0.344	0.753	0.410	0.665
		Race (Latin*)	-0.298	0.208	0.742	0.152	0.456
		Race (other)	0.205	0.302	1.227	0.499	0.997
	Depression	LGBTQ+ (yes)	0.301	0.126	1.352	0.017	0.038
		Financial stability (not always)	0.104	0.113	1.110	0.359	0.359
		Time in program (<3 years)	-0.034	0.115	0.967	0.769	0.865
		Gender (woman/nonbinary)	0.249	0.108	1.283	0.021	0.038
		Race (Asian)	0.093	0.135	1.098	0.490	0.490
		Race (Black)	-0.855	0.298	0.425	0.004	0.037
		Race (Latin*)	0.189	0.188	1.208	0.314	0.739
		Race (other)	0.418	0.251	1.519	0.096	0.302
Comparison with others	Anxiety	LGBTQ+ (yes)	0.356	0.112	1.427	0.002	0.003
		Financial stability (not always)	0.159	0.100	1.172	0.113	0.113
		Time in program (<3 years)	-0.179	0.100	0.836	0.074	0.111
		Gender (woman/nonbinary)	0.648	0.114	1.911	0.000	0.000
		Race (Asian)	-0.322	0.140	0.724	0.021	0.096
		Race (Black)	-0.923	0.315	0.397	0.003	0.031
		Race (Latin*)	-0.136	0.191	0.873	0.475	0.695
		Race (other)	-0.126	0.267	0.882	0.637	0.997
	Depression	LGBTQ+ (yes)	0.201	0.116	1.222	0.083	0.125
		Financial stability (not always)	0.171	0.104	1.187	0.099	0.111
		Time in program (<3 years)	0.016	0.104	1.017	0.875	0.875
		Gender (woman/nonbinary)	0.515	0.095	1.674	0.000	0.000
		Race (Asian)	0.224	0.122	1.251	0.068	0.122
		Race (Black)	0.143	0.270	1.154	0.595	0.692
		Race (Latin*)	0.300	0.165	1.350	0.068	0.308
		Race (other)	-0.120	0.225	0.887	0.595	0.716
	Anxiety	LGBTQ+ (yes)	0.349	0.098	1.418	0.000	0.002
		Financial stability (not always)	0.236	0.087	1.266	0.007	0.015
		Time in program (<3 years)	-0.075	0.088	0.927	0.389	0.500
		Gender (woman/nonbinary)	0.719	0.099	2.053	0.000	0.000
		Race (Asian)	0.179	0.127	1.196	0.157	0.352
		Race (Black)	0.412	0.254	1.510	0.105	0.238
		Race (Latin*)	0.262	0.168	1.300	0.118	0.456
		Race (other)	-0.001	0.246	0.999	0.997	0.997
		LGBTQ+ (yes)	0.117	0.099	1.124	0.237	0.267
		Financial stability (not always)	0.295	0.089	1.343	0.001	0.002
		Time in program (<3 years)	0.099	0.089	1.104	0.269	0.606

Lack of technical support	Depression	Gender (woman/nonbinary)	0.209	0.103	1.233	0.042	0.062
		Race (Asian)	0.220	0.129	1.246	0.089	0.133
		Race (Black)	-0.005	0.297	0.995	0.986	0.986
		Race (Latin*)	0.106	0.177	1.112	0.551	0.808
		Race (other)	0.068	0.246	1.070	0.783	0.783
		LGBTQ+ (yes)	0.219	0.108	1.244	0.043	0.055
		Financial stability (not always)	0.323	0.095	1.381	0.001	0.003
		Time in program (<3 years)	-0.324	0.096	0.723	0.001	0.006
	Anxiety	Gender (woman/nonbinary)	0.584	0.109	1.793	0.000	0.000
		Race (Asian)	-0.098	0.136	0.907	0.472	0.531
		Race (Black)	-0.101	0.285	0.904	0.724	0.814
		Race (Latin*)	0.027	0.175	1.027	0.878	0.878
		Race (other)	0.384	0.253	1.469	0.128	0.601
		LGBTQ+ (yes)	0.289	0.109	1.335	0.008	0.035
		Financial stability (not always)	0.375	0.097	1.456	0.000	0.000
		Time in program (<3 years)	-0.049	0.097	0.952	0.616	0.791
Social isolation	Depression	Gender (woman/nonbinary)	0.414	0.103	1.514	0.000	0.000
		Race (Asian)	-0.127	0.130	0.881	0.328	0.369
		Race (Black)	-0.761	0.313	0.467	0.015	0.067
		Race (Latin*)	0.076	0.184	1.079	0.680	0.808
		Race (other)	-0.402	0.245	0.669	0.101	0.302
		LGBTQ+ (yes)	0.271	0.108	1.312	0.012	0.019
		Financial stability (not always)	0.172	0.096	1.188	0.073	0.082
		Time in program (<3 years)	0.027	0.097	1.028	0.777	0.777
	Anxiety	Gender (woman/nonbinary)	0.423	0.107	1.527	0.000	0.000
		Race (Asian)	0.216	0.133	1.242	0.103	0.308
		Race (Black)	0.032	0.324	1.033	0.921	0.921
		Race (Latin*)	0.111	0.181	1.117	0.540	0.695
		Race (other)	0.052	0.262	1.054	0.841	0.997
		LGBTQ+ (yes)	-0.058	0.108	0.944	0.593	0.593
		Financial stability (not always)	0.385	0.097	1.470	0.000	0.000
		Time in program (<3 years)	0.183	0.097	1.200	0.060	0.272
Public presentations	Depression	Gender (woman/nonbinary)	0.075	0.110	1.078	0.494	0.494
		Race (Asian)	0.471	0.137	1.602	0.001	0.005
		Race (Black)	0.178	0.307	1.195	0.562	0.692
		Race (Latin*)	0.358	0.189	1.431	0.058	0.308
		Race (other)	0.559	0.249	1.749	0.025	0.225
		LGBTQ+ (yes)	-0.135	0.115	0.874	0.242	0.242
		Financial stability (not always)	0.378	0.103	1.460	0.000	0.002
		Time in program (<3 years)	0.221	0.103	1.247	0.032	0.073
	Anxiety	Gender (woman/nonbinary)	0.495	0.102	1.640	0.000	0.000
		Race (Asian)	-0.094	0.127	0.910	0.458	0.531
		Race (Black)	0.208	0.271	1.231	0.443	0.665

Requirements	Depression	Race (Latin*)	0.256	0.173	1.292	0.140	0.456	
		Race (other)	0.329	0.256	1.390	0.198	0.601	
		LGBTQ+ (yes)	0.156	0.101	1.169	0.123	0.158	
		Financial stability (not always)	0.177	0.091	1.193	0.052	0.067	
		Time in program (<3 years)	0.245	0.092	1.278	0.008	0.068	
		Gender (woman/nonbinary)	0.192	0.098	1.212	0.050	0.064	
		Race (Asian)	0.349	0.126	1.417	0.006	0.025	
		Race (Black)	0.471	0.262	1.601	0.072	0.217	
		Race (Latin*)	0.152	0.166	1.164	0.359	0.739	
		Race (other)	0.102	0.217	1.108	0.636	0.716	
	Anxiety	LGBTQ+ (yes)	0.123	0.100	1.131	0.220	0.242	
		Financial stability (not always)	0.225	0.090	1.253	0.012	0.019	
		Time in program (<3 years)	-0.039	0.090	0.962	0.669	0.753	
		Gender (woman/nonbinary)	0.583	0.103	1.791	0.000	0.000	
		Race (Asian)	-0.146	0.132	0.864	0.266	0.479	
		Race (Black)	0.452	0.279	1.571	0.106	0.238	
		Race (Latin*)	0.112	0.165	1.118	0.498	0.695	
		Race (other)	-0.002	0.231	0.998	0.994	0.997	
		LGBTQ+ (yes)	0.213	0.102	1.238	0.036	0.065	
		Financial stability (not always)	0.185	0.091	1.203	0.043	0.064	
		Time in program (<3 years)	0.136	0.092	1.145	0.140	0.420	
Research - alleviate mental health								
Completing small tasks	Depression	Gender (woman/nonbinary)	0.168	0.094	1.183	0.072	0.144	
		Race (Asian)	0.160	0.119	1.173	0.179	0.394	
		Race (Black)	0.448	0.260	1.565	0.085	0.281	
		Race (Latin*)	0.253	0.163	1.288	0.120	0.239	
		Race (other)	0.031	0.226	1.032	0.889	0.951	
		LGBTQ+ (yes)	-0.048	0.098	0.953	0.625	0.938	
		Financial stability (not always)	0.037	0.087	1.038	0.667	0.866	
		Time in program (<3 years)	0.015	0.088	1.015	0.865	0.865	
		Anxiety	Gender (woman/nonbinary)	0.390	0.098	1.477	0.000	0.000
			Race (Asian)	-0.123	0.125	0.884	0.323	0.485
	Race (Black)		0.922	0.266	2.515	0.001	0.003	
	Race (Latin*)		0.273	0.164	1.314	0.096	0.144	
	Race (other)		0.364	0.240	1.439	0.130	0.390	
	LGBTQ+ (yes)		-0.166	0.099	0.847	0.094	0.282	
	Financial stability (not always)		-0.029	0.089	0.971	0.742	0.887	
	Time in program (<3 years)		0.133	0.089	1.142	0.136	0.203	
	Depression		Gender (woman/nonbinary)	0.143	0.094	1.153	0.130	0.189
			Race (Asian)	0.112	0.120	1.119	0.351	0.421
			Race (Black)	-0.008	0.265	0.992	0.975	0.975
		Race (Latin*)	0.085	0.166	1.089	0.609	0.609	
		Race (other)	0.177	0.223	1.193	0.429	0.643	

Passion	Anxiety	LGBTQ+ (yes)	-0.052	0.099	0.950	0.604	0.938
		Financial stability (not always)	-0.028	0.088	0.973	0.751	0.866
		Time in program (<3 years)	-0.165	0.088	0.848	0.062	0.187
		Gender (woman/nonbinary)	0.246	0.098	1.279	0.012	0.018
		Race (Asian)	-0.028	0.125	0.972	0.821	0.892
		Race (Black)	0.476	0.273	1.610	0.081	0.127
		Race (Latin*)	0.318	0.167	1.374	0.057	0.115
		Race (other)	-0.019	0.235	0.982	0.937	0.937
	Depression	LGBTQ+ (yes)	-0.100	0.100	0.904	0.314	0.555
		Financial stability (not always)	-0.127	0.089	0.881	0.155	0.310
		Time in program (<3 years)	-0.083	0.090	0.920	0.355	0.409
		Gender (woman/nonbinary)	0.133	0.094	1.143	0.157	0.189
		Race (Asian)	0.072	0.122	1.075	0.552	0.552
		Race (Black)	-0.045	0.250	0.956	0.857	0.975
		Race (Latin*)	0.095	0.159	1.100	0.551	0.609
		Race (other)	0.509	0.225	1.664	0.023	0.140
Flexibility	Anxiety	LGBTQ+ (yes)	-0.051	0.098	0.950	0.602	0.938
		Financial stability (not always)	0.167	0.087	1.182	0.055	0.165
		Time in program (<3 years)	0.275	0.088	1.316	0.002	0.011
		Gender (woman/nonbinary)	0.069	0.097	1.071	0.477	0.477
		Race (Asian)	0.314	0.125	1.369	0.012	0.072
		Race (Black)	0.447	0.250	1.564	0.073	0.127
		Race (Latin*)	0.441	0.157	1.554	0.005	0.015
		Race (other)	0.548	0.248	1.729	0.027	0.163
	Depression	LGBTQ+ (yes)	-0.229	0.098	0.795	0.019	0.115
		Financial stability (not always)	0.292	0.088	1.338	0.001	0.005
		Time in program (<3 years)	0.293	0.088	1.340	0.001	0.005
		Gender (woman/nonbinary)	0.283	0.095	1.327	0.003	0.008
		Race (Asian)	0.200	0.121	1.221	0.098	0.394
		Race (Black)	0.332	0.266	1.393	0.213	0.426
		Race (Latin*)	0.541	0.167	1.718	0.001	0.007
		Race (other)	0.014	0.225	1.014	0.951	0.951
	Anxiety	LGBTQ+ (yes)	0.019	0.099	1.020	0.845	0.975
		Financial stability (not always)	0.094	0.088	1.098	0.287	0.574
		Time in program (<3 years)	0.024	0.089	1.024	0.785	0.865
		Gender (woman/nonbinary)	0.339	0.100	1.403	0.001	0.002
		Race (Asian)	0.017	0.127	1.017	0.892	0.892
		Race (Black)	0.313	0.269	1.367	0.245	0.273
		Race (Latin*)	0.515	0.171	1.673	0.003	0.015
		Race (other)	-0.103	0.248	0.902	0.677	0.813
		LGBTQ+ (yes)	0.027	0.099	1.028	0.782	0.782
		Financial stability (not always)	0.013	0.089	1.013	0.887	0.887
		Time in program (<3 years)	0.178	0.090	1.195	0.047	0.094

Emotional support	Depression	Gender (woman/nonbinary)	0.345	0.103	1.412	0.001	0.005
		Race (Asian)	0.124	0.130	1.133	0.339	0.421
		Race (Black)	-0.474	0.283	0.622	0.094	0.281
		Race (Latin*)	0.325	0.181	1.385	0.072	0.217
		Race (other)	0.310	0.253	1.364	0.221	0.522
		LGBTQ+ (yes)	-0.003	0.105	0.997	0.975	0.975
		Financial stability (not always)	0.212	0.094	1.236	0.024	0.146
		Time in program (<3 years)	0.035	0.094	1.036	0.710	0.865
	Anxiety	Gender (woman/nonbinary)	0.331	0.107	1.392	0.002	0.004
		Race (Asian)	-0.154	0.133	0.858	0.248	0.485
		Race (Black)	-0.308	0.281	0.735	0.273	0.273
		Race (Latin*)	0.243	0.179	1.275	0.176	0.212
		Race (other)	0.224	0.265	1.251	0.397	0.794
		LGBTQ+ (yes)	-0.073	0.105	0.930	0.491	0.590
		Financial stability (not always)	0.098	0.095	1.103	0.301	0.451
		Time in program (<3 years)	0.079	0.095	1.082	0.409	0.409
Collaboration	Depression	Gender (woman/nonbinary)	0.128	0.099	1.136	0.199	0.199
		Race (Asian)	0.166	0.129	1.180	0.197	0.394
		Race (Black)	0.235	0.271	1.265	0.385	0.578
		Race (Latin*)	0.121	0.177	1.128	0.495	0.609
		Race (other)	0.261	0.232	1.298	0.261	0.522
		LGBTQ+ (yes)	0.078	0.104	1.081	0.451	0.938
		Financial stability (not always)	0.016	0.092	1.016	0.866	0.866
		Time in program (<3 years)	0.094	0.093	1.099	0.309	0.617
	Anxiety	Gender (woman/nonbinary)	0.121	0.102	1.129	0.233	0.280
		Race (Asian)	0.257	0.131	1.293	0.049	0.147
		Race (Black)	0.485	0.281	1.624	0.085	0.127
		Race (Latin*)	0.083	0.181	1.087	0.647	0.647
		Race (other)	0.109	0.251	1.115	0.665	0.813
		LGBTQ+ (yes)	-0.093	0.104	0.911	0.370	0.555
		Financial stability (not always)	0.173	0.093	1.189	0.062	0.186
		Time in program (<3 years)	0.207	0.093	1.229	0.027	0.081

Supplementary Table 6. Results from ordinal regressions of impact on depression or anxiety on aspects of teaching based on individual characteristics. Reference groups are men, white, non-LGBTQ+, always financially stable, 3+ years in program.

Aspect	Condition	Predictor	beta	SE	OR	p-value	Adjusted p-value
<i>Teaching - exacerbate mental health</i>							
Increased responsibility	Depression	Gender (woman/nonbinary)	0.141	0.098	1.152	0.151	0.151
		Race (Asian)	0.543	0.127	1.722	0.000	0.000
		Race (Black)	-0.026	0.269	0.974	0.922	0.922
		Race (Latin*)	0.180	0.169	1.197	0.288	0.680
		Race (other)	-0.056	0.235	0.945	0.810	0.852
		LGBTQ+ (yes)	-0.021	0.102	0.980	0.841	0.841
		Financial stability (not always)	0.379	0.091	1.461	0.000	0.000
		Time in program (<3 years)	0.185	0.092	1.204	0.043	0.054
	Anxiety	Gender (woman/nonbinary)	0.471	0.101	1.601	0.000	0.000
		Race (Asian)	-0.247	0.128	0.781	0.054	0.128
		Race (Black)	-0.289	0.274	0.749	0.291	0.485
		Race (Latin*)	0.060	0.168	1.062	0.719	0.719
		Race (other)	-0.324	0.252	0.723	0.198	0.495
		LGBTQ+ (yes)	0.095	0.103	1.100	0.353	0.634
		Financial stability (not always)	0.478	0.092	1.612	0.000	0.000
		Time in program (<3 years)	0.131	0.091	1.140	0.151	0.151
Negative reinforcement	Depression	Gender (woman/nonbinary)	0.335	0.117	1.398	0.004	0.016
		Race (Asian)	0.523	0.145	1.688	0.000	0.001
		Race (Black)	-0.203	0.343	0.816	0.554	0.922
		Race (Latin*)	0.179	0.205	1.196	0.382	0.680
		Race (other)	0.070	0.265	1.072	0.793	0.852
		LGBTQ+ (yes)	0.235	0.119	1.265	0.048	0.241
		Financial stability (not always)	0.174	0.107	1.190	0.102	0.102
		Time in program (<3 years)	0.053	0.107	1.054	0.624	0.624
	Anxiety	Gender (woman/nonbinary)	0.487	0.121	1.627	0.000	0.000
		Race (Asian)	0.315	0.145	1.370	0.030	0.128
		Race (Black)	0.191	0.306	1.210	0.533	0.667
		Race (Latin*)	0.170	0.195	1.185	0.383	0.682
		Race (other)	-0.080	0.281	0.923	0.774	0.808
		LGBTQ+ (yes)	0.103	0.117	1.109	0.380	0.634
		Financial stability (not always)	0.234	0.106	1.264	0.027	0.034
		Time in program (<3 years)	0.161	0.106	1.175	0.130	0.151
Pressure to teach well	Depression	Gender (woman/nonbinary)	0.293	0.107	1.340	0.006	0.016
		Race (Asian)	0.628	0.134	1.874	0.000	0.000
		Race (Black)	0.042	0.300	1.043	0.889	0.922
		Race (Latin*)	-0.014	0.184	0.986	0.938	0.938
		Race (other)	0.358	0.253	1.431	0.157	0.784

Lack of training	Anxiety	LGBTQ+ (yes)	-0.036	0.109	0.965	0.743	0.841
		Financial stability (not always)	0.443	0.099	1.558	0.000	0.000
		Time in program (<3 years)	0.260	0.099	1.297	0.009	0.015
		Gender (woman/nonbinary)	0.552	0.104	1.737	0.000	0.000
		Race (Asian)	0.094	0.131	1.098	0.474	0.593
		Race (Black)	-0.042	0.265	0.959	0.875	0.875
		Race (Latin*)	0.140	0.170	1.151	0.409	0.682
		Race (other)	0.149	0.261	1.160	0.569	0.808
	Depression	LGBTQ+ (yes)	0.054	0.103	1.055	0.602	0.641
		Financial stability (not always)	0.337	0.093	1.401	0.000	0.001
		Time in program (<3 years)	0.309	0.094	1.362	0.001	0.002
		Gender (woman/nonbinary)	0.240	0.113	1.271	0.034	0.042
		Race (Asian)	0.210	0.148	1.233	0.155	0.155
		Race (Black)	-0.540	0.362	0.583	0.136	0.525
		Race (Latin*)	0.073	0.191	1.075	0.704	0.880
		Race (other)	-0.046	0.249	0.955	0.852	0.852
Public speaking	Anxiety	LGBTQ+ (yes)	0.073	0.115	1.076	0.524	0.841
		Financial stability (not always)	0.234	0.103	1.264	0.023	0.038
		Time in program (<3 years)	0.355	0.104	1.426	0.001	0.002
		Gender (woman/nonbinary)	0.692	0.112	1.998	0.000	0.000
		Race (Asian)	-0.259	0.146	0.772	0.077	0.128
		Race (Black)	-0.677	0.308	0.508	0.028	0.140
		Race (Latin*)	-0.106	0.180	0.899	0.555	0.694
		Race (other)	-0.522	0.266	0.593	0.050	0.249
	Depression	LGBTQ+ (yes)	0.240	0.112	1.272	0.032	0.158
		Financial stability (not always)	0.341	0.100	1.407	0.001	0.001
		Time in program (<3 years)	0.330	0.101	1.391	0.001	0.002
		Gender (woman/nonbinary)	0.269	0.118	1.309	0.022	0.037
		Race (Asian)	0.452	0.148	1.572	0.002	0.003
		Race (Black)	0.388	0.309	1.474	0.210	0.525
		Race (Latin*)	0.160	0.193	1.173	0.408	0.680
		Race (other)	0.182	0.276	1.200	0.508	0.852
	Anxiety	LGBTQ+ (yes)	-0.065	0.120	0.937	0.588	0.841
		Financial stability (not always)	0.220	0.108	1.246	0.042	0.052
		Time in program (<3 years)	0.423	0.109	1.527	0.000	0.000
		Gender (woman/nonbinary)	0.418	0.100	1.520	0.000	0.000
		Race (Asian)	-0.024	0.129	0.976	0.853	0.853
		Race (Black)	0.326	0.264	1.385	0.218	0.485
		Race (Latin*)	0.275	0.164	1.317	0.094	0.471
		Race (other)	0.062	0.256	1.064	0.808	0.808
		LGBTQ+ (yes)	0.047	0.100	1.048	0.641	0.641
		Financial stability (not always)	0.078	0.090	1.081	0.385	0.385
		Time in program (<3 years)	0.359	0.091	1.432	0.000	0.000

<i>Teaching - alleviate mental health</i>							
Positive reinforcement	Depression	Gender (woman/nonbinary)	0.139	0.096	1.149	0.147	0.262
		Race (Asian)	0.218	0.124	1.243	0.079	0.118
		Race (Black)	0.274	0.284	1.315	0.336	0.504
		Race (Latin*)	0.288	0.175	1.334	0.099	0.146
		Race (other)	-0.183	0.222	0.833	0.410	0.492
		LGBTQ+ (yes)	0.170	0.100	1.185	0.091	0.159
		Financial stability (not always)	0.139	0.089	1.149	0.118	0.146
		Time in program (<3 years)	-0.161	0.089	0.852	0.072	0.108
	Anxiety	Gender (woman/nonbinary)	0.190	0.100	1.209	0.056	0.085
		Race (Asian)	0.092	0.128	1.097	0.470	0.495
		Race (Black)	0.611	0.288	1.842	0.034	0.102
		Race (Latin*)	0.329	0.166	1.389	0.048	0.058
		Race (other)	-0.070	0.248	0.933	0.779	0.779
		LGBTQ+ (yes)	0.010	0.101	1.010	0.924	0.924
		Financial stability (not always)	0.159	0.090	1.172	0.077	0.118
		Time in program (<3 years)	-0.013	0.090	0.987	0.885	0.885
Increased structure	Depression	Gender (woman/nonbinary)	0.308	0.101	1.361	0.002	0.013
		Race (Asian)	0.464	0.126	1.590	0.000	0.001
		Race (Black)	0.783	0.276	2.187	0.005	0.027
		Race (Latin*)	0.311	0.171	1.364	0.069	0.146
		Race (other)	0.300	0.236	1.349	0.204	0.409
		LGBTQ+ (yes)	0.029	0.103	1.030	0.775	0.775
		Financial stability (not always)	0.153	0.092	1.166	0.097	0.146
		Time in program (<3 years)	0.058	0.092	1.060	0.529	0.529
	Anxiety	Gender (woman/nonbinary)	0.581	0.100	1.788	0.000	0.000
		Race (Asian)	0.399	0.126	1.490	0.002	0.010
		Race (Black)	0.921	0.263	2.511	0.000	0.003
		Race (Latin*)	0.453	0.167	1.572	0.007	0.012
		Race (other)	0.415	0.249	1.514	0.096	0.486
		LGBTQ+ (yes)	-0.031	0.100	0.969	0.755	0.915
		Financial stability (not always)	0.148	0.090	1.160	0.098	0.118
		Time in program (<3 years)	0.032	0.090	1.032	0.724	0.869
Relationships with TAs	Depression	Gender (woman/nonbinary)	0.132	0.097	1.141	0.174	0.262
		Race (Asian)	0.283	0.125	1.327	0.023	0.070
		Race (Black)	0.466	0.271	1.593	0.085	0.256
		Race (Latin*)	0.262	0.169	1.299	0.122	0.146
		Race (other)	0.004	0.254	1.004	0.988	0.988
		LGBTQ+ (yes)	0.172	0.101	1.187	0.091	0.159
		Financial stability (not always)	0.105	0.090	1.111	0.241	0.241
		Time in program (<3 years)	0.145	0.090	1.156	0.108	0.130
	Anxiety	Gender (woman/nonbinary)	0.335	0.100	1.398	0.001	0.002
		Race (Asian)	0.291	0.127	1.338	0.022	0.044

Passion	Depression	Race (Black)	0.463	0.265	1.588	0.081	0.161
		Race (Latin*)	0.568	0.172	1.765	0.001	0.006
		Race (other)	0.100	0.277	1.105	0.719	0.779
		LGBTQ+ (yes)	0.103	0.102	1.109	0.309	0.915
		Financial stability (not always)	0.241	0.091	1.273	0.008	0.024
		Time in program (<3 years)	0.347	0.092	1.415	0.000	0.001
		Gender (woman/nonbinary)	-0.107	0.097	0.899	0.272	0.326
		Race (Asian)	0.071	0.124	1.074	0.567	0.567
		Race (Black)	0.085	0.272	1.089	0.754	0.857
		Race (Latin*)	0.233	0.168	1.263	0.165	0.165
		Race (other)	-0.329	0.237	0.720	0.166	0.409
		LGBTQ+ (yes)	0.165	0.102	1.179	0.106	0.159
		Financial stability (not always)	0.216	0.090	1.241	0.017	0.100
		Time in program (<3 years)	-0.246	0.090	0.782	0.007	0.020
Welcome distraction	Anxiety	Gender (woman/nonbinary)	0.103	0.101	1.108	0.312	0.374
		Race (Asian)	0.150	0.126	1.162	0.235	0.353
		Race (Black)	0.247	0.285	1.280	0.386	0.463
		Race (Latin*)	0.304	0.166	1.355	0.067	0.067
		Race (other)	-0.243	0.261	0.784	0.352	0.704
		LGBTQ+ (yes)	-0.067	0.102	0.935	0.510	0.915
		Financial stability (not always)	0.250	0.091	1.284	0.006	0.024
		Time in program (<3 years)	-0.156	0.091	0.855	0.087	0.174
	Depression	Gender (woman/nonbinary)	-0.038	0.112	0.963	0.738	0.738
		Race (Asian)	0.292	0.139	1.340	0.036	0.071
		Race (Black)	0.056	0.311	1.058	0.857	0.857
		Race (Latin*)	0.350	0.196	1.419	0.074	0.146
		Race (other)	-0.240	0.282	0.786	0.395	0.492
		LGBTQ+ (yes)	0.116	0.119	1.123	0.329	0.395
		Financial stability (not always)	0.194	0.103	1.214	0.060	0.146
		Time in program (<3 years)	-0.395	0.104	0.674	0.000	0.001
	Anxiety	Gender (woman/nonbinary)	-0.059	0.117	0.942	0.613	0.613
		Race (Asian)	0.348	0.144	1.417	0.016	0.044
		Race (Black)	0.050	0.303	1.051	0.869	0.869
		Race (Latin*)	0.532	0.201	1.702	0.008	0.012
		Race (other)	-0.449	0.321	0.638	0.162	0.486
		LGBTQ+ (yes)	0.149	0.119	1.161	0.211	0.915
		Financial stability (not always)	0.155	0.104	1.167	0.138	0.138
		Time in program (<3 years)	-0.252	0.105	0.777	0.016	0.049
Confidence	Depression	Gender (woman/nonbinary)	0.096	1.161	0.120	0.262	0.291
		Race (Asian)	0.123	1.204	0.132	0.158	0.133
		Race (Black)	0.276	1.351	0.277	0.504	0.506
		Race (Latin*)	0.174	1.464	0.028	0.146	0.150
		Race (other)	0.230	0.719	0.151	0.409	0.444

Anxiety	LGBTQ+ (yes)	0.102	1.242	0.034	0.159	0.142
	Financial stability (not always)	0.090	1.149	0.122	0.146	0.169
	Time in program (<3 years)	0.090	0.823	0.030	0.061	0.068
	Gender (woman/nonbinary)	0.100	1.414	0.000	0.001	0.001
	Race (Asian)	0.127	1.090	0.495	0.495	0.567
	Race (Black)	0.275	1.557	0.108	0.161	0.162
	Race (Latin*)	0.172	1.701	0.002	0.006	0.003
	Race (other)	0.248	0.859	0.539	0.779	0.766
	LGBTQ+ (yes)	0.103	1.032	0.762	0.915	0.831
	Financial stability (not always)	0.091	1.167	0.089	0.118	0.090
	Time in program (<3 years)	0.091	0.877	0.150	0.224	0.178

Supplementary Table 7. Results from mediation analyses of impact of research and teaching on depression. For all models, the mediator is PHQ-9 score.

Demographic (independent variable)	Impact (dependent variable)	model	beta	SE	p-val	predictor	proportion mediated	Mediated?
<i>Research – exacerbate depression</i>								
Gender	failure.worsen.dep	one	0.310	0.092	0.001	Xwoman.nb	0.679	Fully
	failure.worsen.dep	two	0.144	0.094	0.126	Xwoman.nb	0.679	
	failure.worsen.dep	two	0.140	0.008	0.000	M	0.679	
	failure.worsen.dep	three	1.501	0.290	0.000	Xwoman.nb	0.679	
LGBTQ+	failure.worsen.dep	one	0.451	0.096	0.000	Xyes	0.668	Partially
	failure.worsen.dep	two	0.212	0.098	0.031	Xyes	0.668	
	failure.worsen.dep	two	0.139	0.008	0.000	M	0.668	
	failure.worsen.dep	three	2.171	0.300	0.000	Xyes	0.668	
Financial stability	failure.worsen.dep	one	0.285	0.088	0.001	Xnot_always	1.181	Fully
	failure.worsen.dep	two	0.012	0.090	0.897	Xnot_always	1.181	
	failure.worsen.dep	two	0.141	0.008	0.000	M	1.181	
	failure.worsen.dep	three	2.386	0.271	0.000	Xnot_always	1.181	
Time in program	failure.worsen.dep	one	-0.260	0.088	0.003	X<3	-0.473	No
	failure.worsen.dep	two	-0.474	0.090	0.000	X<3	-0.473	
	failure.worsen.dep	two	0.147	0.008	0.000	M	-0.473	
	failure.worsen.dep	three	0.840	0.276	0.002	X<3	-0.473	
Gender	struct.worsen.dep	one	0.202	0.092	0.028	Xwoman.nb	0.813	Fully
	struct.worsen.dep	two	0.048	0.093	0.608	Xwoman.nb	0.813	
	struct.worsen.dep	two	0.110	0.008	0.000	M	0.813	
	struct.worsen.dep	three	1.501	0.290	0.000	Xwoman.nb	0.813	
LGBTQ+	struct.worsen.dep	one	0.332	0.095	0.000	Xyes	0.711	Fully
	struct.worsen.dep	two	0.116	0.097	0.234	Xyes	0.711	
	struct.worsen.dep	two	0.109	0.008	0.000	M	0.711	
	struct.worsen.dep	three	2.171	0.300	0.000	Xyes	0.711	
Financial stability	struct.worsen.dep	one	0.201	0.087	0.020	Xnot_always	1.318	Fully
	struct.worsen.dep	two	-0.038	0.089	0.672	Xnot_always	1.318	
	struct.worsen.dep	two	0.111	0.008	0.000	M	1.318	
	struct.worsen.dep	three	2.386	0.271	0.000	Xnot_always	1.318	
Time in program	struct.worsen.dep	one	-0.246	0.086	0.004	X<3	-0.389	No
	struct.worsen.dep	two	-0.395	0.088	0.000	X<3	-0.389	
	struct.worsen.dep	two	0.114	0.008	0.000	M	-0.389	
	struct.worsen.dep	three	0.840	0.276	0.002	X<3	-0.389	
Gender	neg.ref.worsen.dep	one	0.537	0.113	0.000	Xwoman.nb	0.240	Partially
	neg.ref.worsen.dep	two	0.463	0.114	0.000	Xwoman.nb	0.240	
	neg.ref.worsen.dep	two	0.086	0.009	0.000	M	0.240	
	neg.ref.worsen.dep	three	1.501	0.290	0.000	Xwoman.nb	0.240	
Black	neg.ref.worsen.dep	one	-0.651	0.326	0.046	Xyes	0.226	Fully

LGBTQ+	neg.ref.worsen.dep	two	-0.566	0.326	0.082	Xyes	0.226	Partially
	neg.ref.worsen.dep	two	0.090	0.009	0.000	M	0.226	
	neg.ref.worsen.dep	three	-1.643	0.788	0.037	Xyes	0.226	
	neg.ref.worsen.dep	one	0.474	0.117	0.000	Xyes	0.388	
	neg.ref.worsen.dep	two	0.322	0.120	0.007	Xyes	0.388	
Financial stability	neg.ref.worsen.dep	two	0.085	0.009	0.000	M	0.388	Fully
	neg.ref.worsen.dep	three	2.171	0.300	0.000	Xyes	0.388	
	neg.ref.worsen.dep	one	0.247	0.107	0.020	Xnot_always	0.872	
	neg.ref.worsen.dep	two	0.061	0.109	0.579	Xnot_always	0.872	
	neg.ref.worsen.dep	two	0.090	0.009	0.000	M	0.872	
Gender	neg.ref.worsen.dep	three	2.386	0.271	0.000	Xnot_always	0.872	Fully
	expect.worsen.dep	one	0.324	0.103	0.002	Xwoman.nb	0.538	
	expect.worsen.dep	two	0.185	0.105	0.077	Xwoman.nb	0.538	
	expect.worsen.dep	two	0.116	0.009	0.000	M	0.538	
	expect.worsen.dep	three	1.501	0.290	0.000	Xwoman.nb	0.538	
Black	expect.worsen.dep	one	-0.789	0.282	0.005	Xyes	0.243	Fully
	expect.worsen.dep	two	-0.546	0.286	0.056	Xyes	0.243	
	expect.worsen.dep	two	0.117	0.009	0.000	M	0.243	
	expect.worsen.dep	three	-1.643	0.788	0.037	Xyes	0.243	
	expect.worsen.dep	one	0.419	0.107	0.000	Xyes	0.599	
LGBTQ+	expect.worsen.dep	two	0.222	0.109	0.042	Xyes	0.599	Partially
	expect.worsen.dep	two	0.116	0.009	0.000	M	0.599	
	expect.worsen.dep	three	2.171	0.300	0.000	Xyes	0.599	
	compare.worsen.dep	one	0.582	0.090	0.000	Xwoman.nb	0.335	
	compare.worsen.dep	two	0.462	0.091	0.000	Xwoman.nb	0.335	
Gender	compare.worsen.dep	two	0.130	0.008	0.000	M	0.335	Partially
	compare.worsen.dep	three	1.501	0.290	0.000	Xwoman.nb	0.335	
	compare.worsen.dep	one	0.452	0.093	0.000	Xyes	0.621	
	compare.worsen.dep	two	0.231	0.095	0.015	Xyes	0.621	
	compare.worsen.dep	two	0.129	0.008	0.000	M	0.621	
LGBTQ+	compare.worsen.dep	three	2.171	0.300	0.000	Xyes	0.621	Fully
	compare.worsen.dep	one	0.260	0.085	0.002	Xnot_always	1.233	
	compare.worsen.dep	two	-0.014	0.087	0.869	Xnot_always	1.233	
	compare.worsen.dep	two	0.134	0.008	0.000	M	1.233	
	compare.worsen.dep	three	2.386	0.271	0.000	Xnot_always	1.233	
Financial stability	tech.worsen.dep	one	0.248	0.098	0.011	Xwoman.nb	0.577	Fully
	tech.worsen.dep	two	0.151	0.099	0.127	Xwoman.nb	0.577	
	tech.worsen.dep	two	0.095	0.008	0.000	M	0.577	
	tech.worsen.dep	three	1.501	0.290	0.000	Xwoman.nb	0.577	
	tech.worsen.dep	one	0.230	0.102	0.024	Xyes	0.915	
LGBTQ+	tech.worsen.dep	two	0.046	0.104	0.654	Xyes	0.915	Fully
	tech.worsen.dep	two	0.097	0.008	0.000	M	0.915	
	tech.worsen.dep	three	2.171	0.300	0.000	Xyes	0.915	

Financial stability	tech.worsen.dep	one	0.324	0.093	0.000	Xnot_always	0.700	Fully
	tech.worsen.dep	two	0.105	0.095	0.271	Xnot_always	0.700	
	tech.worsen.dep	two	0.095	0.008	0.000	M	0.700	
	tech.worsen.dep	three	2.386	0.271	0.000	Xnot_always	0.700	
Time in program	tech.worsen.dep	one	-0.287	0.092	0.002	X<3	-0.298	No
	tech.worsen.dep	two	-0.444	0.094	0.000	X<3	-0.298	
	tech.worsen.dep	two	0.102	0.008	0.000	M	-0.298	
	tech.worsen.dep	three	0.840	0.276	0.002	X<3	-0.298	
Gender	isolated.worsen.dep	one	0.467	0.098	0.000	Xwoman.nb	0.280	Partially
	isolated.worsen.dep	two	0.361	0.099	0.000	Xwoman.nb	0.280	
	isolated.worsen.dep	two	0.087	0.008	0.000	M	0.280	
	isolated.worsen.dep	three	1.501	0.290	0.000	Xwoman.nb	0.280	
Black	isolated.worsen.dep	one	-0.659	0.286	0.021	Xyes	0.223	Partially
	isolated.worsen.dep	two	-0.589	0.290	0.042	Xyes	0.223	
	isolated.worsen.dep	two	0.089	0.008	0.000	M	0.223	
	isolated.worsen.dep	three	-1.643	0.788	0.037	Xyes	0.223	
LGBTQ+	isolated.worsen.dep	one	0.382	0.103	0.000	Xyes	0.507	Partially
	isolated.worsen.dep	two	0.220	0.105	0.037	Xyes	0.507	
	isolated.worsen.dep	two	0.089	0.008	0.000	M	0.507	
	isolated.worsen.dep	three	2.171	0.300	0.000	Xyes	0.507	
Financial stability	present.worsen.dep	one	0.357	0.099	0.000	Xnot_always	0.630	Fully
	present.worsen.dep	two	0.165	0.103	0.108	Xnot_always	0.630	
	present.worsen.dep	two	0.094	0.009	0.000	M	0.630	
	present.worsen.dep	three	2.386	0.271	0.000	Xnot_always	0.630	
Time in program	present.worsen.dep	one	0.220	0.098	0.025	X<3	0.365	Fully
	present.worsen.dep	two	0.128	0.101	0.204	X<3	0.365	
	present.worsen.dep	two	0.096	0.009	0.000	M	0.365	
	present.worsen.dep	three	0.840	0.276	0.002	X<3	0.365	
Financial stability	require.worsen.dep	one	0.222	0.088	0.011	Xnot_always	1.115	Fully
	require.worsen.dep	two	-0.001	0.090	0.995	Xnot_always	1.115	
	require.worsen.dep	two	0.104	0.008	0.000	M	1.115	
	require.worsen.dep	three	2.386	0.271	0.000	Xnot always	1.115	

Research – alleviate depression

Time in program	passion.better.dep	one	0.263	0.084	0.002	X<3	-0.056	No
	passion.better.dep	two	0.280	0.085	0.001	X<3	-0.056	
	passion.better.dep	two	-0.017	0.007	0.014	M	-0.056	
	passion.better.dep	three	0.840	0.276	0.002	X<3	-0.056	
Gender	flex.better.dep	one	0.269	0.090	0.003	Xwoman.nb	-0.039	No
	flex.better.dep	two	0.283	0.091	0.002	Xwoman.nb	-0.039	
	flex.better.dep	two	-0.007	0.007	0.331	M	-0.039	
	flex.better.dep	three	1.501	0.290	0.000	Xwoman.nb	-0.039	
Gender	emosh.better.dep	one	0.336	0.097	0.001	Xwoman.nb	0.014	No
	emosh.better.dep	two	0.333	0.098	0.001	Xwoman.nb	0.014	

Financial stability	emosh.better.dep	two	0.003	0.008	0.686	M	0.014	No
	emosh.better.dep	three	1.501	0.290	0.000	Xwoman.nb	0.014	
	emosh.better.dep	one	0.233	0.091	0.011	Xnot_always	0.046	
	emosh.better.dep	two	0.230	0.093	0.013	Xnot_always	0.046	
	emosh.better.dep	two	0.005	0.008	0.570	M	0.046	
	emosh.better.dep	three	2.386	0.271	0.000	Xnot_always	0.046	
Demographic (independent variable)	Impact (dependent variable)	model	beta	SE	p-val	predictor	proportion mediated	Mediated?
<i>Teaching – exacerbate depression</i>								
Financial stability	response.worsen.dep	one	0.368	0.088	0.000	Xnot_always	0.425	Partially
	response.worsen.dep	two	0.249	0.090	0.006	Xnot_always	0.425	
	response.worsen.dep	two	0.066	0.008	0.000	M	0.425	
	response.worsen.dep	three	2.386	0.271	0.000	Xnot_always	0.425	
Gender	negT.worsen.dep	one	0.361	0.111	0.001	Xwoman.nb	0.310	Partially
	negT.worsen.dep	two	0.277	0.112	0.014	Xwoman.nb	0.310	
	negT.worsen.dep	two	0.074	0.009	0.000	M	0.310	
	negT.worsen.dep	three	1.501	0.290	0.000	Xwoman.nb	0.310	
LGBTQ+	negT.worsen.dep	one	0.286	0.112	0.011	Xyes	0.597	Fully
	negT.worsen.dep	two	0.128	0.115	0.264	Xyes	0.597	
	negT.worsen.dep	two	0.079	0.009	0.000	M	0.597	
	negT.worsen.dep	three	2.171	0.300	0.000	Xyes	0.597	
Financial stability	negT.worsen.dep	one	0.219	0.103	0.034	Xnot_always	0.828	Fully
	negT.worsen.dep	two	0.084	0.105	0.425	Xnot_always	0.828	
	negT.worsen.dep	two	0.076	0.009	0.000	M	0.828	
	negT.worsen.dep	three	2.386	0.271	0.000	Xnot_always	0.828	
Gender	pressure.worsen.dep	one	0.249	0.101	0.014	Xwoman.nb	0.467	Fully
	pressure.worsen.dep	two	0.120	0.103	0.246	Xwoman.nb	0.467	
	pressure.worsen.dep	two	0.077	0.008	0.000	M	0.467	
	pressure.worsen.dep	three	1.501	0.290	0.000	Xwoman.nb	0.467	
Financial stability	pressure.worsen.dep	one	0.421	0.096	0.000	Xnot_always	0.431	Partially
	pressure.worsen.dep	two	0.282	0.098	0.004	Xnot_always	0.431	
	pressure.worsen.dep	two	0.076	0.008	0.000	M	0.431	
	pressure.worsen.dep	three	2.386	0.271	0.000	Xnot_always	0.431	
Time in program	pressure.worsen.dep	one	0.217	0.095	0.022	X<3	0.303	Fully
	pressure.worsen.dep	two	0.132	0.096	0.171	X<3	0.303	
	pressure.worsen.dep	two	0.079	0.008	0.000	M	0.303	
	pressure.worsen.dep	three	0.840	0.276	0.002	X<3	0.303	
Gender	lackTT.worsen.dep	one	0.253	0.106	0.017	Xwoman.nb	0.468	Fully
	lackTT.worsen.dep	two	0.152	0.108	0.160	Xwoman.nb	0.468	
	lackTT.worsen.dep	two	0.079	0.009	0.000	M	0.468	
	lackTT.worsen.dep	three	1.501	0.290	0.000	Xwoman.nb	0.468	
	lackTT.worsen.dep	one	0.270	0.099	0.007	Xnot_always	0.719	Fully

Financial stability	lackTT.worsen.dep	two	0.100	0.102	0.324	Xnot_always	0.719	Partially
	lackTT.worsen.dep	two	0.081	0.009	0.000	M	0.719	
	lackTT.worsen.dep	three	2.386	0.271	0.000	Xnot_always	0.719	
Time in program	lackTT.worsen.dep	one	0.348	0.099	0.000	X<3	0.193	
	lackTT.worsen.dep	two	0.254	0.101	0.012	X<3	0.193	
	lackTT.worsen.dep	two	0.080	0.009	0.000	M	0.193	
Gender	lackTT.worsen.dep	three	0.840	0.276	0.002	X<3	0.193	Fully
	public.worsen.dep	one	0.279	0.111	0.012	Xwoman.nb	0.375	
	public.worsen.dep	two	0.173	0.113	0.127	Xwoman.nb	0.375	
Financial stability	public.worsen.dep	two	0.070	0.009	0.000	M	0.375	Fully
	public.worsen.dep	three	1.501	0.290	0.000	Xwoman.nb	0.375	
	public.worsen.dep	one	0.286	0.104	0.006	Xnot_always	0.586	
	public.worsen.dep	two	0.144	0.107	0.179	Xnot_always	0.586	
	public.worsen.dep	two	0.070	0.009	0.000	M	0.586	
Time in program	public.worsen.dep	three	2.386	0.271	0.000	Xnot_always	0.586	Partially
	public.worsen.dep	one	0.438	0.104	0.000	X<3	0.133	
	public.worsen.dep	two	0.364	0.106	0.001	X<3	0.133	
	public.worsen.dep	two	0.069	0.009	0.000	M	0.133	
	public.worsen.dep	three	0.840	0.276	0.002	X<3	0.133	
Teaching – alleviate depression								
Gender	inc.struc.better.dep	one	0.309	0.095	0.001	Xwoman.nb	0.062	No
	inc.struc.better.dep	two	0.289	0.096	0.003	Xwoman.nb	0.062	
	inc.struc.better.dep	two	0.013	0.007	0.089	M	0.062	
	inc.struc.better.dep	three	1.501	0.290	0.000	Xwoman.nb	0.062	
Black	inc.struc.better.dep	one	0.705	0.257	0.006	Xyes	-0.040	No
	inc.struc.better.dep	two	0.759	0.259	0.003	Xyes	-0.040	
	inc.struc.better.dep	two	0.017	0.008	0.024	M	-0.040	
	inc.struc.better.dep	three	-1.643	0.788	0.037	Xyes	-0.040	
Time in program	relash.better.dep	one	0.180	0.087	0.038	X<3	0.119	Fully
	relash.better.dep	two	0.140	0.088	0.110	X<3	0.119	
	relash.better.dep	two	0.025	0.007	0.000	M	0.119	
	relash.better.dep	three	0.840	0.276	0.002	X<3	0.119	
Financial stability	passion.T.better.dep	one	0.207	0.087	0.018	Xnot_always	0.135	No
	passion.T.better.dep	two	0.182	0.089	0.041	Xnot_always	0.135	
	passion.T.better.dep	two	0.012	0.007	0.115	M	0.135	
	passion.T.better.dep	three	2.386	0.271	0.000	Xnot_always	0.135	
Time in program	passion.T.better.dep	one	-0.232	0.087	0.008	X<3	-0.060	No
	passion.T.better.dep	two	-0.251	0.087	0.004	X<3	-0.060	
	passion.T.better.dep	two	0.017	0.007	0.022	M	-0.060	
	passion.T.better.dep	three	0.840	0.276	0.002	X<3	-0.060	
Time in program	distract.better.dep	one	-0.402	0.100	0.000	X<3	-0.038	No
	distract.better.dep	two	-0.429	0.101	0.000	X<3	-0.038	
	distract.better.dep	two	0.018	0.009	0.033	M	-0.038	

LGBTQ+	distract.better.dep	three	0.840	0.276	0.002	X<3	-0.038	Fully
	conf.better.dep	one	0.200	0.096	0.038	Xyes	0.245	
	conf.better.dep	two	0.155	0.097	0.112	Xyes	0.245	
	conf.better.dep	two	0.023	0.008	0.003	M	0.245	
	conf.better.dep	three	2.171	0.300	0.000	Xyes	0.245	

Supplementary Table 8. Results from mediation analyses of impact of research and teaching on anxiety.
For all models, the mediator is GAD-7 score.

Demographic (independent variable)	Impact (dependent variable)	model	beta	SE	p-value	predictor	proportion mediated	Mediated?
<i>Research - exacerbate anxiety</i>								
Gender	failure.worsen.anx	one	0.511	0.096	0.000	Xwoman.nb	0.411	Partially
	failure.worsen.anx	two	0.344	0.098	0.000	Xwoman.nb	0.411	
	failure.worsen.anx	two	0.134	0.009	0.000	M	0.411	
	failure.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.411	
Asian	failure.worsen.anx	one	0.276	0.121	0.023	Xyes	-0.571	No
	failure.worsen.anx	two	0.460	0.124	0.000	Xyes	-0.571	
	failure.worsen.anx	two	0.142	0.009	0.000	M	-0.571	
	failure.worsen.anx	three	-1.111	0.350	0.002	Xyes	-0.571	
LGBTQ+	failure.worsen.anx	one	0.301	0.098	0.002	Xyes	0.538	Fully
	failure.worsen.anx	two	0.145	0.100	0.148	Xyes	0.538	
	failure.worsen.anx	two	0.137	0.009	0.000	M	0.538	
	failure.worsen.anx	three	1.182	0.274	0.000	Xyes	0.538	
Financial stability	failure.worsen.anx	one	0.451	0.090	0.000	Xnot_always	0.674	Fully
	failure.worsen.anx	two	0.170	0.092	0.066	Xnot_always	0.674	
	failure.worsen.anx	two	0.133	0.009	0.000	M	0.674	
	failure.worsen.anx	three	2.284	0.245	0.000	Xnot_always	0.674	
Gender	struct.worsen.anx	one	0.737	0.097	0.000	Xwoman.nb	0.256	Partially
	struct.worsen.anx	two	0.611	0.099	0.000	Xwoman.nb	0.256	
	struct.worsen.anx	two	0.121	0.009	0.000	M	0.256	
	struct.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.256	
LGBTQ+	struct.worsen.anx	one	0.495	0.097	0.000	Xyes	0.289	Partially
	struct.worsen.anx	two	0.388	0.099	0.000	Xyes	0.289	
	struct.worsen.anx	two	0.121	0.009	0.000	M	0.289	
	struct.worsen.anx	three	1.182	0.274	0.000	Xyes	0.289	
Financial stability	struct.worsen.anx	one	0.295	0.089	0.001	Xnot_always	0.980	Fully
	struct.worsen.anx	two	0.003	0.092	0.970	Xnot_always	0.980	
	struct.worsen.anx	two	0.126	0.009	0.000	M	0.980	
	struct.worsen.anx	three	2.284	0.245	0.000	Xnot_always	0.980	
Gender	neg.ref.worsen.anx	one	0.623	0.119	0.000	Xwoman.nb	0.202	Partially
	neg.ref.worsen.anx	two	0.549	0.120	0.000	Xwoman.nb	0.202	
	neg.ref.worsen.anx	two	0.080	0.011	0.000	M	0.202	
	neg.ref.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.202	
LGBTQ+	neg.ref.worsen.anx	one	0.398	0.121	0.001	Xyes	0.243	Partially
	neg.ref.worsen.anx	two	0.350	0.123	0.004	Xyes	0.243	
	neg.ref.worsen.anx	two	0.082	0.011	0.000	M	0.243	
	neg.ref.worsen.anx	three	1.182	0.274	0.000	Xyes	0.243	
Gender	expect.worsen.anx	one	0.698	0.110	0.000	Xwoman.nb	0.283	Partially

Asian	expect.worsen.anx	two	0.578	0.111	0.000	Xwoman.nb	0.283	Fully
	expect.worsen.anx	two	0.126	0.010	0.000	M	0.283	
	expect.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.283	
	expect.worsen.anx	one	-0.319	0.134	0.017	Xyes	0.449	
	expect.worsen.anx	two	-0.174	0.136	0.201	Xyes	0.449	
LGBTQ+	expect.worsen.anx	two	0.129	0.010	0.000	M	0.449	Partially
	expect.worsen.anx	three	-1.111	0.350	0.002	Xyes	0.449	
	expect.worsen.anx	one	0.345	0.111	0.002	Xyes	0.448	
	expect.worsen.anx	two	0.245	0.114	0.033	Xyes	0.448	
	expect.worsen.anx	two	0.131	0.010	0.000	M	0.448	
Financial stability	expect.worsen.anx	three	1.182	0.274	0.000	Xyes	0.448	Fully
	expect.worsen.anx	one	0.203	0.100	0.043	Xnot_always	1.514	
	expect.worsen.anx	two	-0.053	0.104	0.609	Xnot_always	1.514	
	expect.worsen.anx	two	0.134	0.010	0.000	M	1.514	
	expect.worsen.anx	three	2.284	0.245	0.000	Xnot_always	1.514	
Gender	compare.worsen.anx	one	0.780	0.096	0.000	Xwoman.nb	0.229	Partially
	compare.worsen.anx	two	0.651	0.097	0.000	Xwoman.nb	0.229	
	compare.worsen.anx	two	0.114	0.009	0.000	M	0.229	
	compare.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.229	
	compare.worsen.anx	one	0.248	0.095	0.009	Xyes	0.574	
LGBTQ+	compare.worsen.anx	two	0.129	0.096	0.180	Xyes	0.574	Fully
	compare.worsen.anx	two	0.121	0.009	0.000	M	0.574	
	compare.worsen.anx	three	1.182	0.274	0.000	Xyes	0.574	
	compare.worsen.anx	one	0.305	0.086	0.000	Xnot_always	0.901	
	compare.worsen.anx	two	0.037	0.090	0.681	Xnot_always	0.901	
Financial stability	compare.worsen.anx	two	0.120	0.009	0.000	M	0.901	Fully
	compare.worsen.anx	three	2.284	0.245	0.000	Xnot_always	0.901	
	tech.worsen.anx	one	0.680	0.104	0.000	Xwoman.nb	0.240	
	tech.worsen.anx	two	0.594	0.105	0.000	Xwoman.nb	0.240	
	tech.worsen.anx	two	0.104	0.009	0.000	M	0.240	
LGBTQ+	tech.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.240	Partially
	tech.worsen.anx	one	0.440	0.104	0.000	Xyes	0.280	
	tech.worsen.anx	two	0.347	0.105	0.001	Xyes	0.280	
	tech.worsen.anx	two	0.104	0.009	0.000	M	0.280	
	tech.worsen.anx	three	1.182	0.274	0.000	Xyes	0.280	
Financial stability	tech.worsen.anx	one	0.417	0.095	0.000	Xnot_always	0.568	Partially
	tech.worsen.anx	two	0.211	0.097	0.030	Xnot_always	0.568	
	tech.worsen.anx	two	0.104	0.009	0.000	M	0.568	
	tech.worsen.anx	three	2.284	0.245	0.000	Xnot_always	0.568	
	isolated.worsen.anx	one	0.421	0.102	0.000	Xwoman.nb	0.359	
Gender	isolated.worsen.anx	two	0.298	0.103	0.004	Xwoman.nb	0.359	Partially
	isolated.worsen.anx	two	0.097	0.009	0.000	M	0.359	
	isolated.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.359	

Financial stability	isolated.worsen.anx	one	0.372	0.094	0.000	Xnot_always	0.595	Fully
	isolated.worsen.anx	two	0.158	0.097	0.103	Xnot_always	0.595	
	isolated.worsen.anx	two	0.097	0.009	0.000	M	0.595	
	isolated.worsen.anx	three	2.284	0.245	0.000	Xnot_always	0.595	
Gender	present.worsen.anx	one	0.560	0.098	0.000	Xwoman.nb	0.189	Partially
	present.worsen.anx	two	0.459	0.099	0.000	Xwoman.nb	0.189	
	present.worsen.anx	two	0.068	0.009	0.000	M	0.189	
	present.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.189	
LGBTQ+	present.worsen.anx	one	0.314	0.097	0.001	Xyes	0.268	Partially
	present.worsen.anx	two	0.260	0.098	0.008	Xyes	0.268	
	present.worsen.anx	two	0.071	0.009	0.000	M	0.268	
	present.worsen.anx	three	1.182	0.274	0.000	Xyes	0.268	
Financial stability	present.worsen.anx	one	0.263	0.089	0.003	Xnot_always	0.625	Fully
	present.worsen.anx	two	0.109	0.091	0.231	Xnot_always	0.625	
	present.worsen.anx	two	0.072	0.009	0.000	M	0.625	
	present.worsen.anx	three	2.284	0.245	0.000	Xnot_always	0.625	
Gender	require.worsen.anx	one	0.614	0.099	0.000	Xwoman.nb	0.264	Partially
	require.worsen.anx	two	0.491	0.100	0.000	Xwoman.nb	0.264	
	require.worsen.anx	two	0.103	0.009	0.000	M	0.264	
	require.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.264	
LGBTQ+	require.worsen.anx	one	0.350	0.098	0.000	Xyes	0.358	Partially
	require.worsen.anx	two	0.248	0.099	0.012	Xyes	0.358	
	require.worsen.anx	two	0.106	0.009	0.000	M	0.358	
	require.worsen.anx	three	1.182	0.274	0.000	Xyes	0.358	
Financial stability	require.worsen.anx	one	0.236	0.089	0.008	Xnot_always	1.052	Fully
	require.worsen.anx	two	-0.001	0.092	0.994	Xnot_always	1.052	
	require.worsen.anx	two	0.109	0.009	0.000	M	1.052	
	require.worsen.anx	three	2.284	0.245	0.000	Xnot_always	1.052	

Research - alleviate anxiety

Gender	tasks.better.anx	one	0.349	0.094	0.000	Xwoman.nb	-0.098	No
	tasks.better.anx	two	0.375	0.094	0.000	Xwoman.nb	-0.098	
	tasks.better.anx	two	-0.022	0.008	0.007	M	-0.098	
	tasks.better.anx	three	1.565	0.269	0.000	Xwoman.nb	-0.098	
Gender	progress.better.anx	one	0.190	0.093	0.042	Xwoman.nb	-0.084	No
	progress.better.anx	two	0.198	0.094	0.036	Xwoman.nb	-0.084	
	progress.better.anx	two	-0.010	0.008	0.219	M	-0.084	
	progress.better.anx	three	1.565	0.269	0.000	Xwoman.nb	-0.084	
LGBTQ+	passion.better.anx	one	-0.185	0.094	0.049	Xyes	-0.002	No
	passion.better.anx	two	-0.188	0.094	0.046	Xyes	-0.002	
	passion.better.anx	two	0.000	0.008	0.973	M	-0.002	
	passion.better.anx	three	1.182	0.274	0.000	Xyes	-0.002	
Financial stability	passion.better.anx	one	0.297	0.085	0.001	Xnot_always	-0.074	No
	passion.better.anx	two	0.323	0.087	0.000	Xnot_always	-0.074	

Gender	passion.better.anx	two	-0.010	0.008	0.244	M	-0.074	No
	passion.better.anx	three	2.284	0.245	0.000	Xnot_always	-0.074	
	flex.better.anx	one	0.331	0.095	0.001	Xwoman.nb	-0.035	
	flex.better.anx	two	0.335	0.096	0.000	Xwoman.nb	-0.035	
Gender	flex.better.anx	two	-0.007	0.008	0.360	M	-0.035	No
	flex.better.anx	three	1.565	0.269	0.000	Xwoman.nb	-0.035	
	emosh.better.anx	one	0.316	0.102	0.002	Xwoman.nb	0.084	
	emosh.better.anx	two	0.285	0.103	0.006	Xwoman.nb	0.084	
Financial stability	emosh.better.anx	two	0.017	0.009	0.054	M	0.084	No
	emosh.better.anx	three	1.565	0.269	0.000	Xwoman.nb	0.084	
	collab.better.anx	one	0.182	0.090	0.044	Xnot_always	-0.272	
	collab.better.anx	two	0.234	0.093	0.012	Xnot_always	-0.272	
	collab.better.anx	two	-0.022	0.009	0.014	M	-0.272	
	collab.better.anx	three	2.284	0.245	0.000	Xnot_always	-0.272	
<i>Teaching - exacerbate anxiety</i>								
Gender	response.worsen.anx	one	0.499	0.096	0.000	Xwoman.nb	0.294	Partially
	response.worsen.anx	two	0.371	0.097	0.000	Xwoman.nb	0.294	
	response.worsen.anx	two	0.094	0.009	0.000	M	0.294	
Asian	response.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.294	Fully
	response.worsen.anx	one	-0.290	0.122	0.018	Xyes	0.364	
	response.worsen.anx	two	-0.205	0.123	0.098	Xyes	0.364	
LGBTQ+	response.worsen.anx	two	0.095	0.009	0.000	M	0.364	Fully
	response.worsen.anx	three	-1.111	0.350	0.002	Xyes	0.364	
	response.worsen.anx	one	0.259	0.097	0.008	Xyes	0.452	
Financial stability	response.worsen.anx	two	0.163	0.098	0.099	Xyes	0.452	Partially
	response.worsen.anx	two	0.099	0.009	0.000	M	0.452	
	response.worsen.anx	three	1.182	0.274	0.000	Xyes	0.452	
Gender	response.worsen.anx	one	0.518	0.089	0.000	Xnot_always	0.398	Partially
	response.worsen.anx	two	0.334	0.091	0.000	Xnot_always	0.398	
	response.worsen.anx	two	0.090	0.009	0.000	M	0.398	
Financial stability	response.worsen.anx	three	2.284	0.245	0.000	Xnot_always	0.398	Partially
	negT.worsen.anx	one	0.484	0.115	0.000	Xwoman.nb	0.153	
	negT.worsen.anx	two	0.431	0.116	0.000	Xwoman.nb	0.153	
Gender	negT.worsen.anx	two	0.047	0.010	0.000	M	0.153	Fully
	negT.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.153	
	negT.worsen.anx	one	0.275	0.102	0.007	Xnot_always	0.391	
Financial stability	negT.worsen.anx	two	0.181	0.104	0.083	Xnot_always	0.391	Partially
	negT.worsen.anx	two	0.047	0.010	0.000	M	0.391	
	negT.worsen.anx	three	2.284	0.245	0.000	Xnot_always	0.391	
Gender	pressure.worsen.anx	one	0.554	0.099	0.000	Xwoman.nb	0.242	Partially
	pressure.worsen.anx	two	0.454	0.100	0.000	Xwoman.nb	0.242	
	pressure.worsen.anx	two	0.086	0.009	0.000	M	0.242	
	pressure.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.242	

Financial stability	pressure.worsen.anx	one	0.369	0.091	0.000	Xnot_always	0.530	Partially
	pressure.worsen.anx	two	0.188	0.093	0.043	Xnot_always	0.530	
	pressure.worsen.anx	two	0.086	0.009	0.000	M	0.530	
	pressure.worsen.anx	three	2.284	0.245	0.000	Xnot_always	0.530	
Gender	lackTT.worsen.anx	one	0.722	0.107	0.000	Xwoman.nb	0.188	Partially
	lackTT.worsen.anx	two	0.633	0.108	0.000	Xwoman.nb	0.188	
	lackTT.worsen.anx	two	0.087	0.010	0.000	M	0.188	
	lackTT.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.188	
Asian	lackTT.worsen.anx	one	-0.315	0.140	0.025	Xyes	0.332	Fully
	lackTT.worsen.anx	two	-0.275	0.142	0.053	Xyes	0.332	
	lackTT.worsen.anx	two	0.094	0.010	0.000	M	0.332	
	lackTT.worsen.anx	three	-1.111	0.350	0.002	Xyes	0.332	
LGBTQ+	lackTT.worsen.anx	one	0.474	0.107	0.000	Xyes	0.233	Partially
	lackTT.worsen.anx	two	0.400	0.107	0.000	Xyes	0.233	
	lackTT.worsen.anx	two	0.093	0.010	0.000	M	0.233	
	lackTT.worsen.anx	three	1.182	0.274	0.000	Xyes	0.233	
Financial stability	lackTT.worsen.anx	one	0.391	0.097	0.000	Xnot_always	0.523	Partially
	lackTT.worsen.anx	two	0.215	0.099	0.030	Xnot_always	0.523	
	lackTT.worsen.anx	two	0.089	0.010	0.000	M	0.523	
	lackTT.worsen.anx	three	2.284	0.245	0.000	Xnot_always	0.523	
Gender	public.worsen.anx	one	0.442	0.095	0.000	Xwoman.nb	0.210	Partially
	public.worsen.anx	two	0.352	0.097	0.000	Xwoman.nb	0.210	
	public.worsen.anx	two	0.059	0.008	0.000	M	0.210	
	public.worsen.anx	three	1.565	0.269	0.000	Xwoman.nb	0.210	
Financial stability	public.worsen.anx	one	0.190	0.087	0.030	Xnot_always	0.762	Fully
	public.worsen.anx	two	0.049	0.090	0.581	Xnot_always	0.762	
	public.worsen.anx	two	0.063	0.008	0.000	M	0.762	
	public.worsen.anx	three	2.284	0.245	0.000	Xnot_always	0.762	
Teaching - alleviate anxiety								
Financial stability	pos.ref.better.anx	one	0.181	0.087	0.038	Xnot_always	0.316	Fully
	pos.ref.better.anx	two	0.125	0.089	0.162	Xnot_always	0.316	
	pos.ref.better.anx	two	0.025	0.009	0.003	M	0.316	
	pos.ref.better.anx	three	2.284	0.245	0.000	Xnot_always	0.316	
Gender	inc.struc.better.anx	one	0.570	0.095	0.000	Xwoman.nb	0.050	Partially
	inc.struc.better.anx	two	0.538	0.096	0.000	Xwoman.nb	0.050	
	inc.struc.better.anx	two	0.018	0.008	0.026	M	0.050	
	inc.struc.better.anx	three	1.565	0.269	0.000	Xwoman.nb	0.050	
Financial stability	inc.struc.better.anx	one	0.181	0.087	0.036	Xnot_always	0.261	Fully
	inc.struc.better.anx	two	0.136	0.089	0.124	Xnot_always	0.261	
	inc.struc.better.anx	two	0.021	0.008	0.013	M	0.261	
	inc.struc.better.anx	three	2.284	0.245	0.000	Xnot_always	0.261	
Gender	relash.better.anx	one	0.351	0.096	0.000	Xwoman.nb	0.162	Partially
	relash.better.anx	two	0.294	0.096	0.002	Xwoman.nb	0.162	

Financial stability	relash.better.anx	two	0.036	0.008	0.000	M	0.162	Partially
	relash.better.anx	three	1.565	0.269	0.000	Xwoman.nb	0.162	
	relash.better.anx	one	0.283	0.088	0.001	Xnot_always	0.282	
	relash.better.anx	two	0.204	0.090	0.024	Xnot_always	0.282	
Financial stability	relash.better.anx	two	0.035	0.008	0.000	M	0.282	Fully
	relash.better.anx	three	2.284	0.245	0.000	Xnot_always	0.282	
	passion.T.better.anx	one	0.223	0.089	0.012	Xnot_always	0.277	
	passion.T.better.anx	two	0.168	0.091	0.064	Xnot_always	0.277	
Asian	passion.T.better.anx	two	0.027	0.009	0.002	M	0.277	No
	passion.T.better.anx	three	2.284	0.245	0.000	Xnot_always	0.277	
	distract.better.anx	one	0.296	0.139	0.034	Xyes	-0.076	
	distract.better.anx	two	0.316	0.140	0.024	Xyes	-0.076	
Gender	distract.better.anx	two	0.020	0.010	0.035	M	-0.076	Partially
	distract.better.anx	three	-1.111	0.350	0.002	Xyes	-0.076	
	conf.better.anx	one	0.349	0.095	0.000	Xwoman.nb	0.135	
	conf.better.anx	two	0.300	0.096	0.002	Xwoman.nb	0.135	
	conf.better.anx	two	0.030	0.008	0.000	M	0.135	
	conf.better.anx	three	1.565	0.269	0.000	Xwoman.nb	0.135	

Supplementary Table 9. Results from ordinal regressions of impact on depression or anxiety based on program characteristics. Reference groups are doctoral program, biology.

Aspect	Condition	Predictor	beta	SE	OR	p-value	Adjusted p-value
<i>Research - exacerbate mental health</i>							
Failure	Depression	Degree type (Master's)	0.110	0.113	1.117	0.328	0.747
		Field of study (astro)	0.965	0.604	2.624	0.110	0.496
		Field of study (chem)	0.145	0.115	1.156	0.207	0.465
		Field of study (geo)	0.048	0.140	1.050	0.730	0.939
		Field of study (other)	-0.216	0.203	0.806	0.287	0.992
		Field of study (physics)	-0.029	0.134	0.972	0.830	0.984
	Anxiety	Degree type (Master's)	0.265	0.114	1.304	0.020	0.090
		Field of study (astro)	0.334	0.602	1.397	0.579	0.987
		Field of study (chem)	0.133	0.118	1.142	0.261	0.783
		Field of study (geo)	0.140	0.143	1.150	0.329	0.696
		Field of study (other)	-0.267	0.201	0.766	0.185	0.770
Lack of structure	Depression	Field of study (physics)	0.010	0.137	1.010	0.941	0.941
		Degree type (Master's)	0.035	0.110	1.036	0.747	0.747
		Field of study (astro)	-0.260	0.620	0.771	0.675	0.914
		Field of study (chem)	0.167	0.115	1.181	0.147	0.442
		Field of study (geo)	0.216	0.136	1.241	0.111	0.747
		Field of study (other)	-0.058	0.201	0.943	0.771	0.992
	Anxiety	Field of study (physics)	-0.016	0.131	0.984	0.901	0.984
		Degree type (Master's)	0.047	0.112	1.048	0.676	0.813
		Field of study (astro)	-0.164	0.509	0.849	0.748	0.987
		Field of study (chem)	-0.017	0.118	0.983	0.882	0.969
		Field of study (geo)	0.174	0.141	1.189	0.219	0.696
Negative reinforcement	Depression	Field of study (other)	-0.116	0.207	0.891	0.576	0.770
		Field of study (physics)	-0.366	0.136	0.693	0.007	0.032
		Degree type (Master's)	-0.049	0.147	0.952	0.737	0.747
		Field of study (astro)	0.868	0.737	2.382	0.239	0.636
		Field of study (chem)	-0.096	0.138	0.908	0.488	0.731
		Field of study (geo)	0.000	0.170	1.000	1.000	1.000
	Anxiety	Field of study (other)	-0.185	0.254	0.831	0.467	0.992
		Field of study (physics)	-0.204	0.162	0.815	0.209	0.626
		Degree type (Master's)	0.137	0.155	1.147	0.377	0.565
		Field of study (astro)	-0.213	0.721	0.808	0.767	0.987
		Field of study (chem)	0.021	0.142	1.022	0.881	0.969
		Field of study (geo)	0.131	0.179	1.140	0.464	0.696
		Field of study (other)	0.209	0.258	1.232	0.419	0.770
		Field of study (physics)	-0.061	0.172	0.941	0.725	0.815
	Depression	Degree type (Master's)	-0.041	0.125	0.960	0.746	0.747

Unreasonable expectations	Anxiety	Field of study (astro)	0.640	0.596	1.896	0.283	0.636
		Field of study (chem)	0.032	0.126	1.033	0.798	0.898
		Field of study (geo)	0.145	0.152	1.156	0.342	0.747
		Field of study (other)	-0.105	0.224	0.900	0.638	0.992
		Field of study (physics)	-0.057	0.154	0.945	0.712	0.984
		Degree type (Master's)	0.146	0.132	1.157	0.269	0.484
		Field of study (astro)	-0.082	0.600	0.922	0.892	0.996
		Field of study (chem)	-0.266	0.129	0.766	0.038	0.191
		Field of study (geo)	0.054	0.159	1.055	0.736	0.828
		Field of study (other)	0.005	0.243	1.006	0.982	0.982
Comparison with others	Depression	Field of study (physics)	-0.116	0.164	0.891	0.480	0.797
		Degree type (Master's)	-0.038	0.106	0.963	0.722	0.747
		Field of study (astro)	1.065	0.605	2.901	0.078	0.496
		Field of study (chem)	0.008	0.113	1.008	0.947	0.947
		Field of study (geo)	-0.026	0.135	0.975	0.850	0.956
		Field of study (other)	-0.158	0.191	0.854	0.408	0.992
	Anxiety	Field of study (physics)	-0.242	0.125	0.785	0.052	0.470
		Degree type (Master's)	-0.038	0.107	0.963	0.723	0.813
		Field of study (astro)	0.506	0.574	1.658	0.378	0.987
		Field of study (chem)	-0.073	0.116	0.930	0.528	0.969
		Field of study (geo)	0.025	0.136	1.026	0.853	0.853
		Field of study (other)	-0.105	0.194	0.900	0.588	0.770
Lack technical support	Depression	Field of study (physics)	-0.181	0.132	0.834	0.169	0.507
		Degree type (Master's)	0.073	0.119	1.075	0.540	0.747
		Field of study (astro)	0.144	0.638	1.155	0.821	0.914
		Field of study (chem)	0.116	0.122	1.123	0.343	0.617
		Field of study (geo)	0.097	0.143	1.102	0.498	0.747
		Field of study (other)	-0.023	0.221	0.978	0.918	0.992
	Anxiety	Field of study (physics)	-0.224	0.139	0.799	0.107	0.483
		Degree type (Master's)	0.256	0.119	1.292	0.032	0.095
		Field of study (astro)	-0.200	0.576	0.819	0.728	0.987
		Field of study (chem)	-0.254	0.125	0.776	0.042	0.191
		Field of study (geo)	-0.124	0.145	0.884	0.395	0.696
		Field of study (other)	0.118	0.225	1.126	0.599	0.770
Social isolation	Depression	Field of study (physics)	-0.421	0.148	0.657	0.004	0.032
		Degree type (Master's)	-0.186	0.120	0.830	0.122	0.550
		Field of study (astro)	-0.062	0.576	0.940	0.914	0.914
		Field of study (chem)	-0.068	0.124	0.934	0.583	0.749
		Field of study (geo)	0.152	0.148	1.164	0.303	0.747
		Field of study (other)	0.300	0.240	1.349	0.212	0.992
	Anxiety	Field of study (physics)	-0.075	0.136	0.928	0.580	0.984
		Degree type (Master's)	0.000	0.122	1.000	0.998	0.998
		Field of study (astro)	1.054	0.656	2.868	0.108	0.723

Public presentations	Depression	Field of study (chem)	0.005	0.126	1.005	0.969	0.969		
		Field of study (geo)	0.313	0.147	1.367	0.033	0.296		
		Field of study (other)	0.227	0.243	1.255	0.349	0.770		
		Field of study (physics)	-0.136	0.140	0.873	0.332	0.748		
		Degree type (Master's)	0.447	0.125	1.564	0.000	0.003		
		Field of study (astro)	0.343	0.632	1.409	0.588	0.914		
		Field of study (chem)	0.359	0.131	1.432	0.006	0.055		
		Field of study (geo)	0.110	0.153	1.116	0.472	0.747		
	Anxiety	Field of study (other)	0.002	0.238	1.002	0.992	0.992		
		Field of study (physics)	0.071	0.150	1.073	0.637	0.984		
		Degree type (Master's)	0.379	0.114	1.461	0.001	0.008		
		Field of study (astro)	0.002	0.503	1.002	0.996	0.996		
		Field of study (chem)	0.038	0.119	1.039	0.750	0.969		
		Field of study (geo)	-0.082	0.136	0.921	0.546	0.702		
		Field of study (other)	0.288	0.218	1.333	0.186	0.770		
		Field of study (physics)	-0.069	0.138	0.933	0.618	0.797		
Requirements	Depression	Degree type (Master's)	0.088	0.110	1.092	0.424	0.747		
		Field of study (astro)	-0.186	0.605	0.830	0.759	0.914		
		Field of study (chem)	0.221	0.115	1.248	0.055	0.247		
		Field of study (geo)	0.167	0.138	1.181	0.227	0.747		
		Field of study (other)	-0.052	0.206	0.950	0.802	0.992		
		Field of study (physics)	-0.003	0.135	0.997	0.984	0.984		
		Degree type (Master's)	0.131	0.110	1.140	0.235	0.484		
		Field of study (astro)	-0.807	0.575	0.446	0.161	0.723		
	Anxiety	Field of study (chem)	-0.014	0.119	0.986	0.908	0.969		
		Field of study (geo)	0.137	0.139	1.146	0.324	0.696		
		Field of study (other)	-0.032	0.208	0.968	0.876	0.982		
		Field of study (physics)	-0.070	0.140	0.933	0.620	0.797		
		Research - alleviate mental health							
		Completing small tasks	Depression	Degree type (Master's)	0.236	0.108	1.267	0.028	0.169
				Field of study (astro)	1.026	0.562	2.791	0.068	0.149
				Field of study (chem)	-0.093	0.113	0.911	0.409	0.613
Field of study (geo)	0.117			0.133	1.125	0.378	0.844		
Field of study (other)	-0.228			0.206	0.796	0.267	0.534		
Field of study (physics)	0.032			0.125	1.033	0.796	0.840		
Anxiety	Degree type (Master's)		0.224	0.108	1.251	0.037	0.112		
	Field of study (astro)		0.824	0.528	2.280	0.119	0.665		
	Field of study (chem)		-0.050	0.114	0.951	0.659	0.701		
	Field of study (geo)		0.055	0.137	1.056	0.688	0.915		
	Field of study (other)		-0.301	0.202	0.740	0.137	0.274		
	Field of study (physics)		-0.068	0.134	0.934	0.610	0.914		
Progress	Depression	Degree type (Master's)	-0.054	0.108	0.947	0.616	0.862		
		Field of study (astro)	1.078	0.604	2.939	0.074	0.149		

Passion	Anxiety	Field of study (chem)	0.048	0.115	1.049	0.675	0.810
		Field of study (geo)	-0.066	0.132	0.936	0.620	0.844
		Field of study (other)	-0.402	0.199	0.669	0.043	0.260
		Field of study (physics)	0.100	0.126	1.106	0.427	0.840
		Degree type (Master's)	-0.029	0.110	0.971	0.792	0.792
		Field of study (astro)	0.417	0.519	1.518	0.421	0.665
	Depression	Field of study (chem)	-0.163	0.117	0.850	0.163	0.490
		Field of study (geo)	-0.042	0.137	0.958	0.756	0.915
		Field of study (other)	-0.375	0.204	0.687	0.065	0.252
		Field of study (physics)	-0.015	0.135	0.986	0.914	0.914
		Degree type (Master's)	-0.016	0.107	0.984	0.880	0.880
		Field of study (astro)	0.997	0.557	2.711	0.074	0.149
	Anxiety	Field of study (chem)	-0.112	0.114	0.894	0.327	0.613
		Field of study (geo)	-0.014	0.133	0.986	0.915	0.915
		Field of study (other)	-0.297	0.197	0.743	0.132	0.395
		Field of study (physics)	0.041	0.125	1.042	0.743	0.840
		Degree type (Master's)	0.165	0.107	1.179	0.121	0.182
		Field of study (astro)	0.406	0.529	1.501	0.443	0.665
Flexibility	Depression	Field of study (chem)	-0.044	0.114	0.957	0.701	0.701
		Field of study (geo)	0.079	0.134	1.082	0.556	0.915
		Field of study (other)	-0.172	0.199	0.842	0.390	0.390
		Field of study (physics)	-0.058	0.131	0.944	0.660	0.914
		Degree type (Master's)	0.039	0.108	1.040	0.718	0.862
		Field of study (astro)	0.813	0.576	2.254	0.159	0.238
	Anxiety	Field of study (chem)	-0.014	0.115	0.986	0.900	0.900
		Field of study (geo)	-0.122	0.134	0.885	0.362	0.844
		Field of study (other)	-0.088	0.201	0.916	0.663	0.663
		Field of study (physics)	-0.080	0.128	0.923	0.534	0.840
		Degree type (Master's)	0.132	0.109	1.141	0.226	0.272
		Field of study (astro)	0.099	0.475	1.104	0.835	0.835
Emotional support	Depression	Field of study (chem)	-0.064	0.116	0.938	0.584	0.701
		Field of study (geo)	-0.127	0.136	0.881	0.350	0.915
		Field of study (other)	-0.349	0.202	0.706	0.084	0.252
		Field of study (physics)	0.030	0.135	1.031	0.822	0.914
		Degree type (Master's)	0.053	0.113	1.055	0.638	0.862
		Field of study (astro)	0.611	0.574	1.841	0.288	0.295
	Anxiety	Field of study (chem)	-0.273	0.124	0.761	0.027	0.165
		Field of study (geo)	0.053	0.139	1.054	0.704	0.844
		Field of study (other)	-0.116	0.215	0.891	0.590	0.663
		Field of study (physics)	-0.104	0.139	0.902	0.456	0.840
		Degree type (Master's)	0.218	0.114	1.243	0.057	0.113
		Field of study (astro)	0.306	0.547	1.357	0.577	0.692
	Anxiety	Field of study (chem)	-0.251	0.125	0.778	0.045	0.269

Collaboration	Depression	Field of study (geo)	0.015	0.141	1.015	0.915	0.915	
		Field of study (other)	-0.191	0.211	0.826	0.365	0.390	
		Field of study (physics)	-0.072	0.145	0.931	0.620	0.914	
		Degree type (Master's)	0.185	0.116	1.203	0.110	0.330	
		Field of study (astro)	0.588	0.561	1.801	0.295	0.295	
		Field of study (chem)	-0.118	0.120	0.889	0.325	0.613	
	Anxiety	Field of study (geo)	0.103	0.144	1.109	0.474	0.844	
		Field of study (other)	0.122	0.212	1.130	0.564	0.663	
		Field of study (physics)	0.026	0.131	1.027	0.840	0.840	
		Degree type (Master's)	0.446	0.117	1.562	0.000	0.001	
		Field of study (astro)	0.635	0.548	1.888	0.246	0.665	
		Field of study (chem)	-0.104	0.121	0.901	0.392	0.701	
		Field of study (geo)	-0.027	0.144	0.973	0.850	0.915	
		Field of study (other)	-0.186	0.215	0.831	0.388	0.390	
		Field of study (physics)	0.118	0.136	1.125	0.387	0.914	
Teaching - exacerbate mental health								
Increased responsibility	Depression	Degree type (Master's)	0.005	0.109	1.005	0.961	0.961	
		Field of study (astro)	0.509	0.712	1.663	0.475	0.769	
		Field of study (chem)	0.212	0.116	1.236	0.069	0.186	
		Field of study (geo)	-0.132	0.141	0.877	0.352	0.440	
		Field of study (other)	-0.388	0.209	0.678	0.064	0.159	
	Anxiety	Field of study (physics)	-0.105	0.133	0.900	0.430	0.430	
		Degree type (Master's)	0.026	0.111	1.026	0.814	0.985	
		Field of study (astro)	-0.512	0.596	0.599	0.390	0.487	
		Field of study (chem)	-0.036	0.116	0.964	0.755	0.755	
		Field of study (geo)	-0.092	0.142	0.912	0.517	0.862	
		Field of study (other)	-0.335	0.212	0.715	0.114	0.143	
		Field of study (physics)	-0.467	0.138	0.627	0.001	0.001	
	Negative reinforcement	Depression	Degree type (Master's)	-0.147	0.128	0.864	0.252	0.420
			Field of study (astro)	0.231	0.623	1.259	0.711	0.769
			Field of study (chem)	0.163	0.136	1.177	0.230	0.288
Field of study (geo)			0.034	0.165	1.034	0.838	0.838	
Field of study (other)			-0.472	0.240	0.624	0.049	0.159	
Anxiety		Field of study (physics)	-0.417	0.161	0.659	0.009	0.024	
		Degree type (Master's)	-0.016	0.127	0.984	0.898	0.985	
		Field of study (astro)	0.629	0.610	1.876	0.302	0.487	
		Field of study (chem)	0.161	0.134	1.174	0.232	0.514	
		Field of study (geo)	-0.027	0.164	0.973	0.870	0.870	
Pressure to teach well	Depression	Field of study (other)	-0.580	0.234	0.560	0.013	0.031	
		Field of study (physics)	-0.231	0.163	0.794	0.157	0.157	
		Degree type (Master's)	-0.012	0.120	0.988	0.917	0.961	
		Field of study (astro)	-0.189	0.644	0.828	0.769	0.769	
		Field of study (chem)	0.206	0.125	1.228	0.100	0.186	

Lack of training	Anxiety	Field of study (geo)	-0.243	0.155	0.784	0.116	0.291
		Field of study (other)	-0.256	0.227	0.774	0.259	0.323
		Field of study (physics)	-0.407	0.144	0.666	0.005	0.024
		Degree type (Master's)	0.002	0.115	1.002	0.985	0.985
		Field of study (astro)	-0.773	0.587	0.462	0.188	0.471
		Field of study (chem)	-0.121	0.119	0.886	0.308	0.514
		Field of study (geo)	-0.438	0.148	0.645	0.003	0.015
	Depression	Field of study (other)	-0.712	0.219	0.491	0.001	0.006
		Field of study (physics)	-0.548	0.140	0.578	0.000	0.000
		Degree type (Master's)	0.231	0.122	1.260	0.058	0.145
		Field of study (astro)	-0.295	0.661	0.745	0.656	0.769
		Field of study (chem)	0.100	0.132	1.105	0.449	0.449
		Field of study (geo)	-0.172	0.157	0.842	0.272	0.440
		Field of study (other)	-0.352	0.240	0.703	0.143	0.238
Public speaking	Anxiety	Field of study (physics)	-0.242	0.154	0.785	0.116	0.145
		Degree type (Master's)	0.132	0.119	1.141	0.267	0.666
		Field of study (astro)	-0.836	0.600	0.433	0.163	0.471
		Field of study (chem)	-0.097	0.128	0.907	0.447	0.559
		Field of study (geo)	-0.382	0.156	0.683	0.014	0.036
		Field of study (other)	-0.540	0.230	0.583	0.019	0.031
		Field of study (physics)	-0.537	0.158	0.585	0.001	0.001
	Depression	Degree type (Master's)	0.418	0.123	1.519	0.001	0.003
		Field of study (astro)	-1.334	1.059	0.263	0.208	0.769
		Field of study (chem)	-0.228	0.143	0.797	0.112	0.186
		Field of study (geo)	-0.266	0.164	0.767	0.105	0.291
		Field of study (other)	0.146	0.231	1.157	0.528	0.528
		Field of study (physics)	-0.310	0.159	0.734	0.051	0.085
		Degree type (Master's)	0.436	0.108	1.546	0.000	0.000
	Anxiety	Field of study (astro)	-0.175	0.490	0.839	0.720	0.720
		Field of study (chem)	-0.286	0.120	0.752	0.017	0.085
		Field of study (geo)	-0.045	0.134	0.956	0.740	0.870
		Field of study (other)	-0.079	0.213	0.924	0.711	0.711
		Field of study (physics)	-0.314	0.133	0.730	0.018	0.022
	<i>Teaching - alleviate mental health</i>						
	Depression	Degree type (Master's)	0.078	0.109	1.081	0.473	0.567
		Field of study (astro)	1.546	0.660	4.695	0.019	0.102
		Field of study (chem)	0.196	0.114	1.216	0.087	0.261
		Field of study (geo)	-0.024	0.139	0.976	0.862	0.969
		Field of study (other)	-0.387	0.210	0.679	0.065	0.146
Positive reinforcement	Anxiety	Field of study (physics)	-0.073	0.127	0.930	0.568	0.811
		Degree type (Master's)	0.205	0.109	1.228	0.061	0.164
		Field of study (astro)	0.539	0.555	1.715	0.331	0.686
		Field of study (chem)	0.235	0.116	1.265	0.042	0.127

Increased structure	Depression	Field of study (geo)	-0.014	0.139	0.986	0.920	0.920
		Field of study (other)	-0.452	0.207	0.636	0.029	0.079
		Field of study (physics)	0.028	0.132	1.029	0.831	0.831
		Degree type (Master's)	0.222	0.112	1.248	0.048	0.145
		Field of study (astro)	0.605	0.596	1.830	0.311	0.373
		Field of study (chem)	-0.008	0.117	0.992	0.943	0.943
		Field of study (geo)	-0.006	0.142	0.994	0.969	0.969
	Anxiety	Field of study (other)	-0.194	0.216	0.824	0.370	0.370
		Field of study (physics)	-0.148	0.134	0.863	0.270	0.612
		Degree type (Master's)	0.190	0.109	1.209	0.082	0.164
		Field of study (astro)	0.361	0.569	1.434	0.527	0.686
		Field of study (chem)	-0.089	0.115	0.915	0.436	0.654
		Field of study (geo)	-0.085	0.137	0.919	0.537	0.920
		Field of study (other)	-0.408	0.211	0.665	0.053	0.079
Relationships with TAs	Depression	Field of study (physics)	-0.416	0.134	0.660	0.002	0.012
		Degree type (Master's)	0.258	0.110	1.295	0.019	0.113
		Field of study (astro)	-0.011	0.603	0.989	0.985	0.985
		Field of study (chem)	-0.041	0.116	0.960	0.726	0.872
		Field of study (geo)	-0.208	0.142	0.812	0.142	0.601
		Field of study (other)	-0.304	0.208	0.738	0.143	0.172
		Field of study (physics)	-0.283	0.130	0.754	0.029	0.176
	Anxiety	Degree type (Master's)	0.446	0.111	1.563	0.000	0.000
		Field of study (astro)	-0.346	0.601	0.708	0.565	0.686
		Field of study (chem)	-0.044	0.117	0.957	0.705	0.705
		Field of study (geo)	-0.172	0.139	0.842	0.216	0.769
		Field of study (other)	-0.261	0.209	0.770	0.211	0.253
		Field of study (physics)	-0.271	0.136	0.762	0.046	0.138
		Degree type (Master's)	-0.148	0.110	0.862	0.177	0.354
Passion	Depression	Field of study (astro)	1.091	0.580	2.976	0.060	0.120
		Field of study (chem)	0.139	0.118	1.149	0.240	0.479
		Field of study (geo)	0.166	0.137	1.180	0.226	0.601
		Field of study (other)	-0.381	0.213	0.683	0.073	0.146
		Field of study (physics)	0.011	0.129	1.011	0.935	0.935
		Degree type (Master's)	0.034	0.111	1.035	0.756	0.756
		Field of study (astro)	0.124	0.498	1.131	0.804	0.804
	Anxiety	Field of study (chem)	0.162	0.121	1.176	0.181	0.361
		Field of study (geo)	0.155	0.137	1.168	0.256	0.769
		Field of study (other)	-0.524	0.216	0.592	0.015	0.079
		Field of study (physics)	-0.087	0.134	0.917	0.518	0.621
		Degree type (Master's)	-0.134	0.128	0.875	0.295	0.442
		Field of study (astro)	0.730	0.625	2.075	0.243	0.364
		Field of study (chem)	0.387	0.137	1.473	0.005	0.029
Field of study (geo)	0.129	0.154	1.138	0.401	0.601		

Confidence	Anxiety	Field of study (other)	-0.373	0.240	0.689	0.120	0.172
		Field of study (physics)	0.063	0.151	1.065	0.676	0.811
		Degree type (Master's)	-0.094	0.131	0.910	0.473	0.648
		Field of study (astro)	0.313	0.554	1.368	0.572	0.686
		Field of study (chem)	0.356	0.138	1.428	0.010	0.059
		Field of study (geo)	-0.070	0.156	0.932	0.652	0.920
	Depression	Field of study (other)	-0.491	0.242	0.612	0.042	0.079
		Field of study (physics)	-0.118	0.157	0.889	0.452	0.621
		Degree type (Master's)	0.021	0.110	1.021	0.849	0.849
		Field of study (astro)	1.229	0.579	3.418	0.034	0.102
		Field of study (chem)	0.112	0.115	1.119	0.330	0.495
		Field of study (geo)	0.118	0.139	1.125	0.397	0.601
	Anxiety	Field of study (other)	-0.392	0.204	0.676	0.055	0.146
		Field of study (physics)	-0.133	0.130	0.876	0.306	0.612
		Degree type (Master's)	0.069	0.112	1.071	0.540	0.648
		Field of study (astro)	0.338	0.519	1.402	0.515	0.686
		Field of study (chem)	0.065	0.117	1.067	0.583	0.699
		Field of study (geo)	-0.038	0.139	0.963	0.787	0.920
		Field of study (other)	-0.231	0.207	0.794	0.264	0.264
		Field of study (physics)	-0.095	0.134	0.910	0.481	0.621

Supplementary Table 10. Results from logistic regressions of the impact of depression and anxiety on research and teaching based on individual characteristics. Reference groups are men, white, non-LGBTQ+, always financially stable, 3+ years in program.

Aspect	Predictor	beta	SE	OR	p-value	Adjusted p-value
<i>Impact of depression on research</i>						
Lack motivation	(Intercept)	1.943	0.162	6.980	0.000	
	Gender (woman/nonbinary)	0.218	0.141	1.244	0.121	0.182
	Race (Asian)	-0.292	0.176	0.746	0.097	0.097
	Race (Black)	-0.061	0.366	0.941	0.867	0.867
	Race (Latin*)	0.216	0.263	1.241	0.412	0.680
	Race (other)	-0.025	0.357	0.976	0.945	0.945
	LGBTQ+ (yes)	0.155	0.153	1.167	0.311	0.311
	Financially stable (not always)	0.507	0.134	1.660	0.000	0.000
	Time in program (<3 years)	-1.023	0.144	0.359	0.000	0.000
Low self-esteem	(Intercept)	0.155	0.113	1.168	0.167	
	Gender (woman/nonbinary)	0.208	0.104	1.231	0.046	0.138
	Race (Asian)	0.228	0.137	1.256	0.097	0.097
	Race (Black)	0.385	0.300	1.469	0.200	0.600
	Race (Latin*)	-0.091	0.180	0.913	0.614	0.680
	Race (other)	0.120	0.256	1.128	0.638	0.945
	LGBTQ+ (yes)	0.139	0.110	1.149	0.207	0.311
	Financially stable (not always)	0.412	0.097	1.510	0.000	0.000
	Time in program (<3 years)	-0.162	0.098	0.850	0.098	0.098
Lack focus	(Intercept)	1.317	0.137	3.732	0.000	
	Gender (woman/nonbinary)	0.052	0.124	1.054	0.674	0.674
	Race (Asian)	-0.428	0.151	0.652	0.005	0.014
	Race (Black)	-0.094	0.330	0.911	0.777	0.867
	Race (Latin*)	0.094	0.228	1.098	0.680	0.680
	Race (other)	0.457	0.367	1.579	0.213	0.640
	LGBTQ+ (yes)	0.591	0.143	1.806	0.000	0.000
	Financially stable (not always)	0.378	0.117	1.459	0.001	0.001
	Time in program (<3 years)	-0.529	0.120	0.589	0.000	0.000
<i>Impact of depression on teaching</i>						
Disconnected from students	(Intercept)	-0.907	0.121	0.404	0.000	
	Gender (woman/nonbinary)	-0.196	0.111	0.822	0.079	0.118
	Race (Asian)	0.322	0.139	1.380	0.020	0.030
	Race (Black)	-0.527	0.357	0.590	0.140	0.260
	Race (Latin*)	0.032	0.193	1.033	0.868	0.868
	Race (other)	-0.086	0.272	0.917	0.751	0.751
	LGBTQ+ (yes)	0.368	0.114	1.445	0.001	0.002
	Financially stable (not always)	0.192	0.104	1.211	0.065	0.065

Lack energy	Time in program (<3 years)	-0.209	0.104	0.812	0.045	0.045
	(Intercept)	0.137	0.111	1.146	0.219	
	Gender (woman/nonbinary)	0.011	0.102	1.011	0.911	0.911
	Race (Asian)	-0.222	0.132	0.801	0.091	0.091
	Race (Black)	-0.385	0.283	0.681	0.174	0.260
	Race (Latin*)	-0.188	0.177	0.829	0.289	0.434
	Race (other)	0.121	0.249	1.128	0.627	0.751
	LGBTQ+ (yes)	0.260	0.107	1.297	0.015	0.015
	Financially stable (not always)	0.336	0.095	1.399	0.000	0.001
Understanding of students	Time in program (<3 years)	-0.470	0.096	0.625	0.000	0.000
	(Intercept)	-0.167	0.112	0.846	0.135	
	Gender (woman/nonbinary)	0.192	0.103	1.211	0.063	0.118
	Race (Asian)	-0.385	0.134	0.680	0.004	0.012
	Race (Black)	-0.039	0.281	0.962	0.891	0.891
	Race (Latin*)	-0.201	0.179	0.818	0.261	0.434
	Race (other)	-0.224	0.248	0.799	0.366	0.751
	LGBTQ+ (yes)	0.482	0.108	1.619	0.000	0.000
	Financially stable (not always)	0.419	0.096	1.520	0.000	0.000
	Time in program (<3 years)	-0.497	0.097	0.608	0.000	0.000
<i>Impact of anxiety on research</i>						
Avoid tasks	(Intercept)	1.474	0.146	4.368	0.000	
	Gender (woman/nonbinary)	0.295	0.131	1.343	0.025	0.032
	Race (Asian)	-0.471	0.161	0.624	0.003	0.007
	Race (Black)	-0.222	0.330	0.801	0.501	0.938
	Race (Latin*)	0.094	0.235	1.099	0.688	0.918
	Race (other)	0.224	0.370	1.251	0.545	0.587
	LGBTQ+ (yes)	0.191	0.142	1.211	0.179	0.379
	Financially stable (not always)	0.218	0.123	1.243	0.077	0.154
	Time in program (<3 years)	-0.564	0.126	0.569	0.000	0.000
Lack risk-taking	(Intercept)	-0.767	0.122	0.464	0.000	
	Gender (woman/nonbinary)	0.245	0.113	1.278	0.030	0.032
	Race (Asian)	0.137	0.141	1.147	0.333	0.333
	Race (Black)	0.314	0.284	1.368	0.269	0.938
	Race (Latin*)	0.006	0.187	1.006	0.975	0.975
	Race (other)	-0.151	0.277	0.860	0.587	0.587
	LGBTQ+ (yes)	0.120	0.112	1.127	0.284	0.379
	Financially stable (not always)	-0.055	0.101	0.946	0.585	0.585
	Time in program (<3 years)	-0.144	0.101	0.866	0.154	0.307
Attention to detail - negative	(Intercept)	0.018	0.115	1.018	0.878	
	Gender (woman/nonbinary)	0.228	0.106	1.257	0.032	0.032
	Race (Asian)	-0.278	0.136	0.757	0.042	0.055
	Race (Black)	-0.065	0.279	0.937	0.816	0.938
	Race (Latin*)	0.177	0.181	1.194	0.328	0.656

Attention to detail - positive	Race (other)	-0.255	0.258	0.775	0.323	0.587
	LGBTQ+ (yes)	0.017	0.108	1.017	0.876	0.876
	Financially stable (not always)	0.296	0.097	1.345	0.002	0.009
	Time in program (<3 years)	-0.114	0.097	0.892	0.243	0.323
	(Intercept)	0.302	0.116	1.352	0.009	
	Gender (woman/nonbinary)	0.337	0.107	1.401	0.002	0.006
	Race (Asian)	-0.531	0.137	0.588	0.000	0.000
	Race (Black)	0.022	0.284	1.022	0.938	0.938
	Race (Latin*)	-0.312	0.177	0.732	0.079	0.315
	Race (other)	-0.203	0.259	0.817	0.434	0.587
	LGBTQ+ (yes)	-0.141	0.109	0.869	0.196	0.379
	Financially stable (not always)	-0.112	0.097	0.894	0.250	0.334
	Time in program (<3 years)	-0.066	0.098	0.936	0.498	0.498
<i>Impact of anxiety on teaching</i>						
Understanding of students	(Intercept)	0.623	0.119	1.864	0.000	
	Gender (woman/nonbinary)	-0.041	0.109	0.960	0.705	0.705
	Race (Asian)	-0.482	0.138	0.617	0.000	0.002
	Race (Black)	-0.199	0.281	0.820	0.479	0.734
	Race (Latin*)	0.043	0.183	1.044	0.814	0.814
	Race (other)	-0.527	0.262	0.591	0.044	0.177
	LGBTQ+ (yes)	0.288	0.112	1.334	0.010	0.017
	Financially stable (not always)	0.213	0.099	1.238	0.031	0.062
Unproductive	Time in program (<3 years)	-0.647	0.100	0.524	0.000	0.000
	(Intercept)	-0.036	0.116	0.965	0.757	
	Gender (woman/nonbinary)	-0.286	0.107	0.751	0.008	0.016
	Race (Asian)	-0.276	0.140	0.759	0.049	0.065
	Race (Black)	-0.171	0.286	0.843	0.551	0.734
	Race (Latin*)	-0.049	0.180	0.952	0.785	0.814
	Race (other)	-0.376	0.267	0.687	0.159	0.319
	LGBTQ+ (yes)	0.301	0.109	1.352	0.006	0.017
Attention to detail - negative	Financially stable (not always)	0.415	0.098	1.514	0.000	0.000
	Time in program (<3 years)	-0.440	0.098	0.644	0.000	0.000
	(Intercept)	-0.747	0.124	0.474	0.000	
	Gender (woman/nonbinary)	-0.080	0.115	0.924	0.489	0.653
	Race (Asian)	-0.166	0.151	0.847	0.273	0.273
	Race (Black)	-0.422	0.334	0.656	0.207	0.734
	Race (Latin*)	-0.051	0.193	0.950	0.792	0.814
	Race (other)	-0.256	0.291	0.774	0.379	0.484
	LGBTQ+ (yes)	0.132	0.116	1.141	0.256	0.256
	Financially stable (not always)	0.191	0.105	1.210	0.070	0.093
	Time in program (<3 years)	-0.277	0.105	0.758	0.008	0.008
	(Intercept)	-0.071	0.116	0.932	0.542	
	Gender (woman/nonbinary)	0.307	0.108	1.360	0.004	0.016

Attention to detail - positive	Race (Asian)	-0.287	0.140	0.751	0.040	0.065
	Race (Black)	-0.042	0.282	0.959	0.881	0.881
	Race (Latin*)	-0.062	0.180	0.940	0.728	0.814
	Race (other)	-0.184	0.263	0.832	0.484	0.484
	LGBTQ+ (yes)	-0.273	0.109	0.761	0.013	0.017
	Financially stable (not always)	0.118	0.097	1.125	0.226	0.226
	Time in program (<3 years)	-0.525	0.098	0.591	0.000	0.000

Supplementary Table 11. Results from mediation analyses of impact of research and teaching on depression. For models where the dependent variable is related to anxiety, the mediator is GAD-7 score. For models where the dependent variable is related to depression, the mediator is PHQ-9 score.

Demographic (independent variable)	Impact (dependent variable)	model	beta	SE	p-value	predictor	proportion mediated	Mediated?
<i>Impact of anxiety on research and teaching</i>								
Gender	Anxiety - research - avoid tasks	one	0.317	0.123	0.010	Xwoman.nb	0.199	Partially
		two	0.258	0.125	0.039	Xwoman.nb	0.199	
		two	0.040	0.011	0.000	M	0.199	
		three	1.565	0.269	0.000	Xwoman.nb	0.199	
Asian	Anxiety - research - avoid tasks	one	-0.472	0.151	0.002	Xyes	0.101	Partially
		two	-0.426	0.153	0.005	Xyes	0.101	
		two	0.043	0.011	0.000	M	0.101	
		three	-1.111	0.350	0.002	Xyes	0.101	
Financial stability	Anxiety - research - avoid tasks	one	0.231	0.117	0.049	Xnot_always	0.388	Fully
		two	0.140	0.121	0.245	Xnot_always	0.388	
		two	0.039	0.011	0.001	M	0.388	
		three	2.284	0.245	0.000	Xnot_always	0.388	
Gender	Anxiety - research - do not take risks	one	0.231	0.107	0.032	Xwoman.nb	0.350	Partially
		two	0.157	0.109	0.151	Xwoman.nb	0.350	
		two	0.052	0.009	0.000	M	0.350	
		three	1.565	0.269	0.000	Xwoman.nb	0.350	
Gender	Anxiety - research - excessive attention to detail (negative)	one	0.225	0.101	0.026	Xwoman.nb	0.490	Fully
		two	0.124	0.104	0.233	Xwoman.nb	0.490	
		two	0.070	0.009	0.000	M	0.490	
		three	1.565	0.269	0.000	Xwoman.nb	0.490	
Asian	Anxiety - research - excessive attention to detail (negative)	one	-0.295	0.130	0.024	Xyes	0.274	Fully
		two	-0.221	0.133	0.098	Xyes	0.274	
		two	0.073	0.009	0.000	M	0.274	
		three	-1.111	0.350	0.002	Xyes	0.274	
Financial stability	Anxiety - research - excessive attention to detail (negative)	one	0.316	0.094	0.001	Xnot_always	0.519	Fully
		two	0.158	0.098	0.106	Xnot_always	0.519	
		two	0.072	0.009	0.000	M	0.519	
		three	2.284	0.245	0.000	Xnot_always	0.519	
Gender	Anxiety - research - attention to detail (positive)	one	0.300	0.101	0.003	Xwoman.nb	-0.038	No
		two	0.310	0.102	0.002	Xwoman.nb	-0.038	
		two	-0.007	0.009	0.414	M	-0.038	
		three	1.565	0.269	0.000	Xwoman.nb	-0.038	
Asian	Anxiety - research -	one	-0.436	0.131	0.001	Xyes	-0.018	No
		two	-0.447	0.131	0.001	Xyes	-0.018	

Asian	attention to detail (positive)	two	-0.007	0.009	0.435	M	-0.018	No
		three	-1.111	0.350	0.002	Xyes	-0.018	
	Anxiety - teaching -	one	-0.448	0.131	0.001	Xyes	-0.020	
	understand undergrads	two	-0.458	0.131	0.000	Xyes	-0.020	
LGBTQ+		two	-0.008	0.009	0.354	M	-0.020	No
		three	-1.111	0.350	0.002	Xyes	-0.020	
	Anxiety - teaching -	one	0.258	0.105	0.014	Xyes	-0.033	
	understand undergrads	two	0.266	0.106	0.012	Xyes	-0.033	
Financial stability		two	-0.007	0.009	0.420	M	-0.033	No
		three	1.182	0.274	0.000	Xyes	-0.033	
	Anxiety - teaching -	one	0.203	0.095	0.032	Xnot_always	-0.107	
	understand undergrads	two	0.225	0.097	0.020	Xnot_always	-0.107	
Gender		two	-0.010	0.009	0.290	M	-0.107	No
		three	2.284	0.245	0.000	Xnot_always	-0.107	
	Anxiety - teaching - unproductive	one	-0.255	0.101	0.012	Xwoman.nb	-0.298	
		two	-0.334	0.103	0.001	Xwoman.nb	-0.298	
LGBTQ+		two	0.049	0.009	0.000	M	-0.298	Fully
		three	1.565	0.269	0.000	Xwoman.nb	-0.298	
	Anxiety - teaching - unproductive	one	0.221	0.103	0.031	Xyes	0.235	
		two	0.176	0.104	0.091	Xyes	0.235	
Financial stability		two	0.044	0.009	0.000	M	0.235	Partially
		three	1.182	0.274	0.000	Xyes	0.235	
	Anxiety - teaching - unproductive	one	0.381	0.094	0.000	Xnot_always	0.241	
		two	0.289	0.097	0.003	Xnot_always	0.241	
Financial stability		two	0.040	0.009	0.000	M	0.241	Fully
		three	2.284	0.245	0.000	Xnot_always	0.241	
	Anxiety - teaching - excessive	one	0.200	0.102	0.050	Xnot_always	0.647	
	attention to detail (negative)	two	0.068	0.105	0.522	Xnot_always	0.647	
Gender		two	0.057	0.010	0.000	M	0.647	Partially
		three	2.284	0.245	0.000	Xnot_always	0.647	
	Anxiety - teaching - attention to detail (positive)	one	0.230	0.102	0.024	Xwoman.nb	0.017	
		two	0.225	0.103	0.029	Xwoman.nb	0.017	
		two	0.002	0.009	0.781	M	0.017	
		three	1.565	0.269	0.000	Xwoman.nb	0.017	

Impact of depression on research and teaching

Financial stability	Depression - research - lack motivation	one	0.460	0.128	0.000	Xnot_always	0.418	Partially
		two	0.287	0.132	0.029	Xnot_always	0.418	
		two	0.081	0.012	0.000	M	0.418	
		three	2.386	0.271	0.000	Xnot_always	0.418	
Time in grad program		one	-0.956	0.138	0.000	X<3	-0.083	No
		two	-1.047	0.141	0.000	X<3	-0.083	

Gender	Depression - research - lack motivation	two	0.095	0.012	0.000 M	-0.083
		three	0.840	0.276	0.002 X<3	-0.083
	Depression - research - low self-esteem	one	0.242	0.098	0.014 Xwoman.nb	0.625 Fully
		two	0.098	0.103	0.340 Xwoman.nb	0.625
		two	0.101	0.009	0.000 M	0.625
Financial stability	Depression - research - low self-esteem	three	1.501	0.290	0.000 Xwoman.nb	0.625
		one	0.404	0.094	0.000 Xnot_always	0.590 Partially
		two	0.198	0.099	0.045 Xnot_always	0.590
		two	0.100	0.009	0.000 M	0.590
		three	2.386	0.271	0.000 Xnot_always	0.590
LGBTQ+	Depression - research - lack of focus	one	0.577	0.135	0.000 Xyes	0.457 Partially
		two	0.377	0.140	0.007 Xyes	0.457
		two	0.121	0.012	0.000 M	0.457
		three	2.171	0.300	0.000 Xyes	0.457
		one	0.342	0.112	0.002 Xnot_always	0.853 Fully
Financial stability	Depression - research - lack of focus	two	0.087	0.119	0.462 Xnot_always	0.853
		two	0.122	0.012	0.000 M	0.853
		three	2.386	0.271	0.000 Xnot_always	0.853
		one	-0.431	0.114	0.000 X<3	-0.248 No
		two	-0.547	0.119	0.000 X<3	-0.248
Time in grad program	Depression - research - lack of focus	two	0.128	0.011	0.000 M	-0.248
		three	0.840	0.276	0.002 X<3	-0.248
		one	0.266	0.108	0.014 Xyes	0.376 Fully
		two	0.163	0.110	0.139 Xyes	0.376
		two	0.046	0.008	0.000 M	0.376
LGBTQ+	Depression - teaching - disconnected	three	2.171	0.300	0.000 Xyes	0.376
		one	-0.209	0.100	0.036 X<3	-0.201 No
		two	-0.255	0.101	0.012 X<3	-0.201
		two	0.050	0.008	0.000 M	-0.201
		three	0.840	0.276	0.002 X<3	-0.201
Time in grad program	Depression - teaching - disconnected	one	0.244	0.101	0.015 Xyes	0.617 Fully
		two	0.103	0.104	0.321 Xyes	0.617
		two	0.069	0.008	0.000 M	0.617
		three	2.171	0.300	0.000 Xyes	0.617
		one	0.302	0.091	0.001 Xnot_always	0.542 Fully
Financial stability	Depression - teaching - lack energy	two	0.155	0.095	0.102 Xnot_always	0.542
		two	0.069	0.008	0.000 M	0.542
		three	2.386	0.271	0.000 Xnot_always	0.542
		one	-0.447	0.091	0.000 X<3	-0.139 No
		two	-0.534	0.094	0.000 X<3	-0.139

Gender	Depression - teaching - lack energy	two	0.074	0.008	0.000 M	-0.139
		three	0.840	0.276	0.002 X<3	-0.139
	Depression - teaching - understand undergrads	one	0.248	0.096	0.010 Xwoman.nb	0.121 Partially
		two	0.218	0.097	0.025 Xwoman.nb	0.121
		two	0.020	0.008	0.008 M	0.121
LGBTQ+		three	1.501	0.290	0.000 Xwoman.nb	0.121
	Depression - teaching - understand undergrads	one	0.480	0.101	0.000 Xyes	0.090 Partially
		two	0.437	0.102	0.000 Xyes	0.090
		two	0.020	0.008	0.011 M	0.090
		three	2.171	0.300	0.000 Xyes	0.090
Financial stability	Depression - teaching - understand undergrads	one	0.402	0.091	0.000 Xnot_always	0.098 Partially
		two	0.363	0.093	0.000 Xnot_always	0.098
		two	0.017	0.008	0.032 M	0.098
		three	2.386	0.271	0.000 Xnot_always	0.098
Time in grad program	Depression - teaching - understand undergrads	one	-0.431	0.091	0.000 X<3	-0.048 No
		two	-0.447	0.092	0.000 X<3	-0.048
		two	0.025	0.008	0.001 M	-0.048
		three	0.840	0.276	0.002 X<3	-0.048

Supplementary Table 12. Results from logistic regressions of the impact of depression and anxiety on research and teaching based on program characteristics. Reference groups are doctoral program, biology.

Aspect	Predictor	beta	SE	OR	p-value	Adjusted p-value
<i>Impact of depression on research</i>						
Lack motivation	(Intercept)	1.859	0.110	6.418	0.000	
	Degree type (Master's)	-0.216	0.155	0.805	0.163	0.244
	Field of study (astro)	-1.012	0.699	0.364	0.148	0.422
	Field of study (chem)	-0.211	0.169	0.810	0.211	0.316
	Field of study (geo)	-0.017	0.204	0.983	0.932	0.932
	Field of study (other)	-0.371	0.269	0.690	0.167	0.207
	Field of study (physics)	-0.054	0.194	0.948	0.782	0.801
Low self-esteem	(Intercept)	0.566	0.079	1.760	0.000	
	Degree type (Master's)	-0.203	0.117	0.816	0.082	0.244
	Field of study (astro)	0.821	0.795	2.272	0.302	0.422
	Field of study (chem)	-0.078	0.126	0.925	0.533	0.533
	Field of study (geo)	0.024	0.149	1.025	0.871	0.932
	Field of study (other)	0.285	0.226	1.330	0.207	0.207
	Field of study (physics)	-0.063	0.140	0.939	0.651	0.801
Lack focus	(Intercept)	1.406	0.096	4.081	0.000	
	Degree type (Master's)	-0.157	0.140	0.855	0.263	0.263
	Field of study (astro)	-0.559	0.697	0.572	0.422	0.422
	Field of study (chem)	-0.277	0.145	0.758	0.056	0.169
	Field of study (geo)	0.096	0.182	1.101	0.598	0.932
	Field of study (other)	0.570	0.309	1.769	0.065	0.196
	Field of study (physics)	0.043	0.172	1.044	0.801	0.801
<i>Impact of depression on teaching</i>						
Disconnect	(Intercept)	-0.927	0.085	0.396	0.000	
	Degree type (Master's)	-0.259	0.131	0.772	0.048	0.072
	Field of study (astro)	-0.459	0.795	0.632	0.563	0.563
	Field of study (chem)	0.359	0.130	1.432	0.006	0.009
	Field of study (geo)	0.023	0.163	1.023	0.887	0.887
	Field of study (other)	-0.253	0.254	0.776	0.318	0.318
	Field of study (physics)	0.194	0.147	1.214	0.187	0.435
Lack energy	(Intercept)	0.122	0.077	1.130	0.111	
	Degree type (Master's)	-0.267	0.115	0.766	0.020	0.060
	Field of study (astro)	-1.508	0.794	0.221	0.058	0.105
	Field of study (chem)	0.451	0.125	1.569	0.000	0.001
	Field of study (geo)	-0.257	0.145	0.774	0.077	0.231
	Field of study (other)	-0.567	0.218	0.567	0.009	0.028
	Field of study (physics)	0.023	0.136	1.024	0.863	0.863
	(Intercept)	0.051	0.076	1.053	0.501	

Understand students	Degree type (Master's)	-0.202	0.114	0.817	0.077	0.077
	Field of study (astro)	-1.438	0.794	0.237	0.070	0.105
	Field of study (chem)	0.029	0.122	1.029	0.813	0.813
	Field of study (geo)	-0.034	0.144	0.967	0.813	0.887
	Field of study (other)	-0.353	0.214	0.702	0.099	0.149
	Field of study (physics)	-0.144	0.136	0.866	0.290	0.435
<i>Impact of anxiety on research</i>						
Avoid tasks	(Intercept)	1.456	0.098	4.290	0.000	
	Degree type (Master's)	-0.034	0.146	0.966	0.815	0.815
	Field of study (astro)	0.846	1.053	2.331	0.422	0.692
	Field of study (chem)	-0.181	0.153	0.834	0.238	0.317
	Field of study (geo)	0.249	0.200	1.283	0.211	0.459
	Field of study (other)	-0.287	0.255	0.750	0.260	0.849
Lack risk-taking	Field of study (physics)	-0.122	0.176	0.885	0.488	0.488
	(Intercept)	-0.512	0.080	0.599	0.000	
	Degree type (Master's)	-0.351	0.125	0.704	0.005	0.020
	Field of study (astro)	0.330	0.611	1.391	0.589	0.692
	Field of study (chem)	-0.077	0.130	0.926	0.557	0.557
	Field of study (geo)	-0.038	0.156	0.963	0.809	0.847
Attention to detail - negative	Field of study (other)	-0.044	0.229	0.957	0.849	0.849
	Field of study (physics)	-0.128	0.149	0.880	0.392	0.488
	(Intercept)	0.309	0.077	1.363	0.000	
	Degree type (Master's)	-0.118	0.117	0.889	0.313	0.417
	Field of study (astro)	0.250	0.632	1.284	0.692	0.692
	Field of study (chem)	-0.183	0.125	0.833	0.143	0.286
Attention to detail - positive	Field of study (geo)	0.181	0.150	1.198	0.230	0.459
	Field of study (other)	0.075	0.219	1.078	0.731	0.849
	Field of study (physics)	-0.207	0.142	0.813	0.146	0.292
	(Intercept)	0.464	0.078	1.590	0.000	
	Degree type (Master's)	-0.244	0.117	0.784	0.037	0.075
	Field of study (astro)	-0.281	0.611	0.755	0.645	0.692
	Field of study (chem)	-0.246	0.126	0.782	0.051	0.205
	Field of study (geo)	-0.029	0.150	0.972	0.847	0.847
	Field of study (other)	0.148	0.223	1.160	0.507	0.849
	Field of study (physics)	-0.559	0.143	0.572	0.000	0.000
<i>Impact of anxiety on teaching</i>						
Understand students	(Intercept)	0.310	0.077	1.363	0.000	
	Degree type (Master's)	-0.247	0.116	0.781	0.034	0.057
	Field of study (astro)	-1.291	0.681	0.275	0.058	0.119
	Field of study (chem)	0.380	0.130	1.462	0.003	0.013
	Field of study (geo)	0.109	0.149	1.115	0.465	0.837
	Field of study (other)	-0.377	0.217	0.686	0.082	0.139
	Field of study (physics)	0.161	0.145	1.174	0.268	0.535

Unproductive	(Intercept)	-0.115	0.077	0.892	0.136	
	Degree type (Master's)	-0.239	0.118	0.788	0.043	0.057
	Field of study (astro)	-1.390	0.786	0.249	0.077	0.119
	Field of study (chem)	0.097	0.125	1.102	0.437	0.437
	Field of study (geo)	-0.099	0.149	0.906	0.505	0.837
	Field of study (other)	-0.679	0.235	0.507	0.004	0.016
	Field of study (physics)	-0.069	0.142	0.933	0.627	0.627
Attention to detail - negative	(Intercept)	-0.774	0.083	0.461	0.000	
	Degree type (Master's)	-0.409	0.133	0.664	0.002	0.008
	Field of study (astro)	0.214	0.632	1.239	0.735	0.735
	Field of study (chem)	0.178	0.133	1.195	0.180	0.240
	Field of study (geo)	0.069	0.162	1.071	0.671	0.837
	Field of study (other)	-0.113	0.246	0.893	0.644	0.644
	Field of study (physics)	-0.268	0.160	0.765	0.095	0.381
Attention to detail - positive	(Intercept)	-0.169	0.077	0.845	0.028	
	Degree type (Master's)	-0.167	0.117	0.846	0.153	0.153
	Field of study (astro)	-1.336	0.786	0.263	0.089	0.119
	Field of study (chem)	0.217	0.125	1.242	0.082	0.165
	Field of study (geo)	0.030	0.148	1.031	0.837	0.837
	Field of study (other)	-0.365	0.225	0.694	0.104	0.139
	Field of study (physics)	-0.094	0.143	0.910	0.511	0.627

Supplementary Table 13. Results from logistic regression of graduate school experiences based on severity of depression and anxiety.

Outcome	Condition	Severity	beta	SE	OR	<i>p</i>-value
Changing PIs	Depression	Moderate	0.416	0.189	1.52	.028
		Severe	0.776	0.204	2.17	.0001
	Anxiety	Moderate	0.177	0.217	1.19	.414
		Severe	0.402	0.226	1.50	.075
Consider leaving program	Depression	Moderate	0.671	0.116	1.96	< .00001
		Severe	1.70	0.144	5.47	< .00001
	Anxiety	Moderate	0.467	0.136	1.60	.0006
		Severe	1.09	0.147	2.97	< .00001

Copy of survey questions

What degree are you pursuing? When we say "thesis-based" we are referring to a program that requires a research component culminating in a thesis which you need to defend to earn your degree.

- Thesis-based doctoral program (e.g., PhD)
- Thesis-based master's program (e.g., MS)
- Post-baccalaureate program
- Other doctoral program (e.g., MD, JD, DSW, PharmD)
- Other master's program (e.g., MA, MBA)
- Other, please describe

If post-bac, other doctoral, other masters, other --- skip to end of survey

What is your field of study?

- Biology
- Chemistry
- Physics
- Geosciences
- Other, please describe

How long have you been in your current graduate program?

- Less than one year
- One year
- Two years
- Three years
- Four years
- Five years
- Six years
- Seven years
- More than seven years (please specify)

For PhD students: If your department has a comprehensive/qualifying exam to **advance to PhD candidacy**, have you completed it?

- Yes
- No
- Not applicable

During your graduate research, have you changed permanent labs or primary research mentors? For example, have you left one PI's lab to formally join a different lab?

- Yes
- No

If yes: In your opinion, has changing labs/PIs increased the amount of time you will spend completing your graduate program?

- Yes
- No

Have you ever seriously considered leaving your graduate program?

- Yes
- No

Please indicate the statement that most closely aligns with your experience in your current graduate program:

- I started my graduate program before the COVID-19 pandemic (prior to spring 2020)
- I started my graduate program during the COVID-19 pandemic when most lab interactions took place online
- I started my graduate program during the COVID-19 pandemic when most lab interactions took place in-person

As a part of your graduate program, do you have experience as a teaching assistant or instructor of record for undergraduate students?

- Yes
- No

With regard to gender, I most closely identify as:

- Man
- Woman
- Gender-queer or non-binary
- A gender not listed, please describe
- Decline to state

I *most closely* identify as:

- American Indian or Alaska native
- Asian or Asian American
- Black or African American
- Hispanic, Latino/a, or of Spanish origin
- Native Hawaiian
- Pacific islander
- White
- Other, please describe
- Decline to state

What is your parent's highest completed level of education? If you have more than one parent with differing levels of education, choose the parent with the highest completion level.

- Did not complete high school
- High school diploma or GED
- Some college but no degree
- Associate degree (for example: AA, AS)

- Bachelor's degree (for example: BA, BS)
- Master's degree (for example: MA, MS, Med, MSW, MBA)
- Higher than a Master's degree (for example: PhD, MD, JD)
- Other, please describe
- Decline to state

During the time you have been pursuing your graduate program, have you considered yourself financially stable (i.e., having enough money for necessities such as groceries and rent)?

- Yes
- Yes, but only sometimes
- No
- Decline to state

Do you identify as a member of the LGBTQ+ community?

- Yes
- No
- Decline to state

The purpose of this study is to learn more about your experience with mental health in the context of graduate school. As such, the following questions will be specific to your mental health. You can skip questions or quit the survey at any time if you feel uncomfortable.

Please indicate how you most closely identify. You do not need to have a formal diagnosis to identify as having currently or previously struggled with depression or a depressive disorder.

- Currently struggling with depression or a depressive disorder
- Not currently struggling with depression or a depressive disorder, but have struggled in the past
- Having never struggled with depression
- Decline to state

If currently or in the past: During your experience in graduate school, on average, how severe is/was your depression?

- Mild
- Moderate
- Severe
- I did not experience depression or a depressive disorder during my graduate experience
- Decline to state

Please indicate how you most closely identify. You do not need to have a formal diagnosis to identify as having currently or previously struggled with anxiety or an anxiety disorder.

- Currently struggling with an anxiety disorder
- Not currently struggling with an anxiety disorder, but have struggled in the past
- Never struggled with an anxiety disorder
- Decline to state

If currently or in the past: During your experience in graduate school, on average, how severe is/was your anxiety?

- Mild
- Moderate
- Severe
- I did not experience an anxiety disorder during my graduate experience
- Decline to state

If currently or in the past anxiety: Over the last two weeks, how often have you been bothered by the following problems?

- Feeling nervous, anxious, or on edge
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Not being able to stop or control worrying
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Worrying too much about different things
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Trouble relaxing
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Being so restless that it is hard to sit still
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Becoming easily annoyed or irritable
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Feeling afraid, as if something awful might happen
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)

If currently or in the past depression: Over the last 2 weeks, how often have you been bothered by any of the following problems?

- Little interest or pleasure in doing things
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Feeling down, depressed, or hopeless
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Trouble falling or staying asleep, or sleeping too much
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Feeling tired or having little energy
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Poor appetite or overeating
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Feeling bad about yourself --- or that you are a failure or have let yourself or your family down
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Trouble concentrating on things, such as reading the newspaper or watching television
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Moving or speaking so slowly that other people could have noticed? Or the opposite --- being so fidgety or restless that you have been moving around a lot more than usual
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)
- Thoughts that you would be better off dead or of hurting yourself in some way
 - Not at all (0)
 - Several days (1)
 - More than half the days (2)
 - Nearly every day (3)

There is very little data to inform how to improve science graduate programs regarding how they affect graduate student mental health. In this survey, we will be asking you a series of questions about your graduate research to learn more about how we can improve graduate programs to maximize graduate student mental health.

If depression or anxiety: Given that you currently or previously struggled with depression and/or anxiety, we are now going to ask you about your graduate **research** experiences as they relate to your mental health. Specifically, the first set of questions will ask about factors that **worsen** your mental health. Please consider all of your experiences in graduate school, including if you have been a part of multiple labs and any experiences pre- or during the COVID-19 pandemic.

If no depression or anxiety: We are now going to ask about your graduate **research** experiences. Please consider your collective experience in graduate school, including if you have been a part of multiple labs and any experiences pre- or during the COVID-19 pandemic.

On average, throughout your graduate career, how often do you **experience failures, obstacles, or setbacks during research?**

For example, this could include a grant being rejected, the rejection of papers, or an experiment or project failing.

- I have not experienced this
- Less than once a year
- Once a year
- About two times a year
- About four times a year
- Monthly
- Weekly

On average, to what extent does experiencing failures, obstacles, or setbacks during research **worsen** your anxiety?

- Extremely
- Very
- Somewhat
- Slightly
- Not at all

On average, to what extent does experiencing failures, obstacles, or setbacks during research **worsen** your depression?

- Extremely
- Very
- Somewhat
- Slightly
- Not at all

The above questions were asked for each of the following aspects of research, listed below:

On average, throughout your graduate career, how often do you **experience a lack of structure during research?**

For example, this could be because research does not have clear goals, next steps, a lack of tasks that can be completed in a short time, or is amorphous in nature.

On average, throughout your graduate career, how often do you **experience negative reinforcement from others during research?**

For example, this could include receiving overly harsh criticism, or feedback about your research or performance or being scolded or yelled at by a research mentor.

On average, throughout your graduate career, how often do you **experience unreasonable or overwhelming expectations during research?**

For example, this could include long lab hours, expectations for a high number of papers to be published, or any other expectations that you are unable to meet that are set by your faculty research mentor or the lab itself.

On average, throughout your graduate career, how often do you **compare yourself to others during research?**

For example, this could include feeling inadequate compared to your graduate student peers.

On average, throughout your graduate career, how often do you **experience feeling a lack of technical support or guidance during research?**

For example, this could include feeling that your faculty research mentor is giving little oversight, advising, mentoring, or guidance on your research projects and is not adequately answering any questions that may arise regarding your research.

On average, throughout your graduate career, how often do you **experience feeling socially isolated during research?**

For example, this could include feeling lonely or isolated or having a lack of connection with others in the lab where you conduct your research.

On average, throughout your graduate career, how often do you **present your research publicly?**

For example, presenting or sharing your research at department seminars, national conferences, or lab meetings.

On average, throughout your graduate career, how often do you **feel concerned about graduate research requirements?**

For example, this could include feeling concerned about comprehensive exams or your thesis defense.

If yes depression or anxiety: Thank you for answering our questions regarding aspects of graduate research that may worsen your depression and/or anxiety. Now, we are going to ask a series of questions about whether any aspects of research **help you manage** your mental health while in graduate school. Please consider all of your experiences in graduate school, including if you have been a part of multiple labs and any experiences pre- or during the COVID-19 pandemic.

On average, throughout your graduate career, how often do you **experience the completion of small or concrete research tasks**?

For example, this could include the feeling of checking a box on your list of weekly tasks or accomplishing a small, easy, or straightforward task.

- I have not experienced this
- Less than once a year
- Once a year
- About two times a year
- About four times a year
- Monthly
- Weekly

To what extent does experiencing the completion of small or concrete research tasks **help you manage your anxiety**?

- Extremely
- Very
- Somewhat
- Slightly
- Not at all

To what extent does experiencing the completion of small or concrete research tasks **help you manage your depression**?

- Extremely
- Very
- Somewhat
- Slightly
- Not at all

The above questions were asked for each of the following aspects of research, listed below:

On average, throughout your graduate career, how often do you **experience research progress**?

For example, this could include making significant progress on your projects or that you feel things in the lab are generally going well.

On average, throughout your graduate career, how often do you **experience collaboration with others on research**?

For example, this could include tasks or projects that involve working with peers or other members of your lab.

On average, throughout your graduate career, how often do you **experience a sense of passion about your research topic**?

For example, this could include caring about your research topic deeply and the broader impact of your research.

On average, throughout your graduate career, how often do you **experience flexibility in research**?

For example, this could include your research allowing you to schedule meetings, experiments, or time in the lab around your personal commitments or at your own convenience.

On average, throughout your graduate career, how often do you **experience emotional support from your faculty mentor**?

For example, this could include your faculty research mentor as being understanding or expressing sympathy or care for your overall well-being.

Check all of the ways in which you perceive that your depression affects your research (select all that apply).

- Lack of motivation and productivity **negatively** affects my research
- Low self-esteem **negatively** affects my research
- Difficulty focusing and concentrating **negatively** affects my research

Check all of the ways in which you perceive that your anxiety affects your research (select all that apply).

- Avoiding research tasks **negatively** affects my research
- A lack of risk-taking **negatively** affects my research
- Being detail-oriented causes me to spend too much time on tasks which **negatively** affects my research
- Being detail-oriented allows me to produce high-quality products which **positively** affects my research

If yes teaching: We really appreciate your insight on the impact of graduate student research on mental health. The final part of this survey will ask about the relationship between graduate teaching and mental health. We appreciate your willingness to complete this survey to inform science graduate programs.

If yes depression or anxiety: Given that you currently or previously struggled with depression and/or anxiety, we are now going to ask you about your graduate **teaching** experiences as they relate to your mental health. Specifically, the first set of questions will ask about factors that **worsen** your mental health. Please consider all of your experiences in graduate school, including if you have been a part of multiple labs and any experiences pre- or during the COVID-19 pandemic.

If no depression or anxiety: We are now going to ask about your graduate **teaching** experiences. Please consider your collective experience in graduate school, including if you have been a part of multiple labs and any experiences pre- or during the COVID-19 pandemic.

The questions asked about the frequency and severity of impact for the aspects of research (above) were asked for each of the following aspects of teaching, listed below:

During terms you have a teaching position, on average, throughout your graduate career, how often do you **experience feeling stressed about an increased number of responsibilities or time away from research because of your teaching obligations**?

For example, this could include feeling that the responsibilities tied to teaching such as grading, lecturing, and designing course content can make you feel that you are spending too much time away from your research.

During terms you have a teaching position, on average, throughout your graduate career, how often do you **experience negative reinforcement from undergraduates?**

For example, this could include comments or behaviors from undergraduate students that are rude, disrespectful, or show a sense of disengagement. This could also include negative feedback or scores on teaching evaluations.

During terms you have a teaching position, on average, throughout your graduate career, how often do you **experience a sense of pressure to teach course content well to undergraduate students?**

For example, this could include feeling that you are obligated to ensure that all students in the classroom where you teach understand the course content.

During terms you have a teaching position, on average, throughout your graduate career, how often do you **experience a lack of teacher training or guidance?**

For example, this could include feeling that you were not trained well enough to teach the undergraduate students the course content.

During terms you have a teaching position, on average, throughout your graduate career, how often do you **experience public speaking or lecturing in a teaching environment?**

For example, this could include teaching courses, recitations, or conducting review sessions.

If yes depression or anxiety: Thank you for answering our questions regarding aspects of graduate teaching that may worsen your depression and/or anxiety. Finally, we are going to ask a series of questions about whether any aspects of teaching **help you manage** your mental health while in graduate school. Please consider all of your experiences in graduate school, including if you have been a part of multiple labs and any experiences pre- or during the COVID-19 pandemic.

During terms you have a teaching position, on average, throughout your graduate career, how often do you **experience positive reinforcement from undergraduate students?**

For example, this could include positive comments either verbally or in writing on teacher evaluations.

During terms you have a teaching position, on average, throughout your graduate career, how often do you **experience structured tasks while teaching?**

For example, this could include having concrete tasks like grading or creating course materials.

During terms you have a teaching position, on average, throughout your graduate career, how often do you **experience being passionate about teaching?**

For example, this could include being passionate about the act of teaching or enjoying the ability to teach undergraduate students.

During terms you have a teaching position, on average, throughout your graduate career, how often do you **experience feeling that teaching is a welcomed break from research?**

For example, this could include feeling that teaching can relieve stress that is related to your work in research or act as a welcome distraction from your research.

During terms you have a teaching position, on average, throughout your graduate career, how often do you **experience feeling confident about your teaching?**

For example, this could include feeling that you are good at teaching or have a mastery of the content in the course that you are teaching.

During terms you have a teaching position, on average, throughout your graduate career, how often do you **experience positive relationships with other TAs or instructors while teaching?**

For example, this could include having good relationships with others involved in teaching such as TAs or a lead instructor.

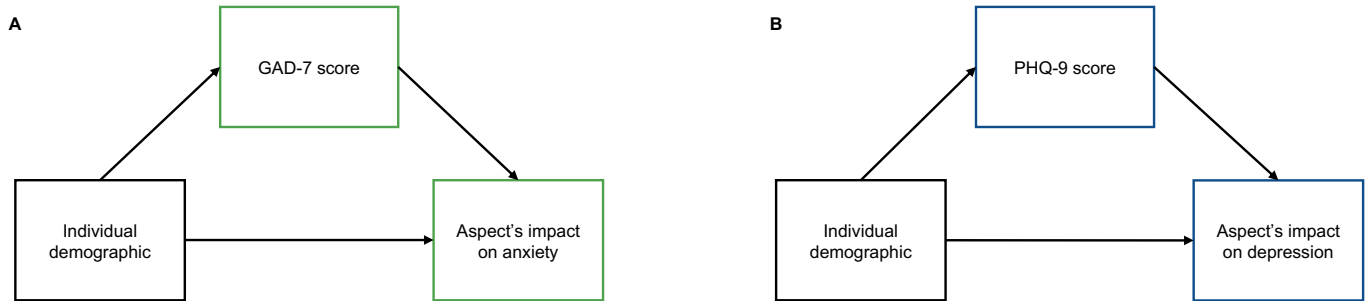
Check all of the ways in which you perceive that your depression affects your **teaching** (select all that apply).

- Experiencing disconnect from my undergraduate students **negatively** affects my teaching
- Lack of energy **negatively** affects my teaching
- Understanding of students' mental health challenges **positively** affects my teaching

Check all of the ways in which you perceive that your anxiety affects your **teaching** (select all that apply).

- Understanding of students' issues **positively** affects my teaching
- Being unproductive **negatively** affects my teaching
- Being detail-oriented causes me to spend too much time on tasks which **negatively** affects my teaching
- Being detail-oriented leads to good quality work which **positively** affects my teaching

Supplementary Figure 1. General diagram of mediation analyses for the effect of each aspect of research or teaching on **A** anxiety and **B** depression. Mediation analyses were only conducted if the demographic characteristic had a significant effect on both the aspect's impact on anxiety or depression and GAD-7 or PHQ-9 score, respectively.



Supplementary Table 14. Aspects of research that affect graduate depression or anxiety.

Effect on depression or anxiety	Aspect of research	Abbreviated aspect	Examples provided on survey	Depression interviews	Anxiety interviews
Exacerbate	Failures, obstacles, or setbacks during research	Failure	A grant being rejected, the rejection of papers, or an experiment or project failing	X	X
	A lack of structure during research	Lack of structure	Because research does not have clear goals, next steps, a lack of tasks that can be completed in a short time, or is amorphous in nature	X	X
	Negative reinforcement from others during research	Negative reinforcement	Receiving overly harsh criticism, or feedback about your research or performance or being scolded or yelled at by a research mentor	X	
	Unreasonable or overwhelming expectations during research	Unreasonable expectations	Long lab hours, expectations for a high number of papers to be published, or any other expectations that you are unable to meet that are set by your faculty research mentor or the lab itself	X	X
	Compare yourself to others during research	Comparison with others	Feeling inadequate compared to your graduate student peers	X	X
	Feeling a lack of technical support or guidance during research	Lack of technical support	Feeling that your faculty research mentor is giving little oversight, advising, mentoring, or guidance on your research projects and is not adequately answering any questions that may arise regarding your research	X	X
	Feeling socially isolated during research	Social isolation	Feeling lonely or isolated or having a lack of connection with others in the lab where you conduct your research	X	

	Present your research publicly	Public presentations	Presenting or sharing your research at department seminars, national conferences, or lab meetings		X
	Concern about graduate research requirements	Research requirements	Feeling concerned about comprehensive exams or your thesis defense		X
Alleviate	The completion of small or concrete research tasks	Completing tasks	Checking a box on your list of weekly tasks or accomplishing a small, easy, or straightforward task	X	X
	Research progress	Progress	Making significant progress on your projects or that you feel things in the lab are generally going well	X	X
	Collaboration with others on research	Collaboration	Tasks or projects that involve working with peers or other members of your lab	X	
	A sense of passion about your research topic	Passion for research	Caring about your research topic deeply and the broader impact of your research	X	X
	Flexibility in research	Flexibility	Your research allowing you to schedule meetings, experiments, or time in the lab around your personal commitments or at your own convenience	X	X
	Emotional support from your faculty mentor	Emotional support	Your faculty research mentor as being understanding or expressing sympathy or care for your overall well-being	X	X

Supplementary Table 15. Aspects of depression and anxiety that affect graduate research.

Condition	Aspect	Impact on research
Depression	Lack of motivation and productivity	negative
	Low self-esteem	negative
	Difficulty focusing or concentrating	negative
Anxiety	Avoiding research tasks	negative
	Lack of risk-taking	negative
	Being detail-oriented causes too much time spent on tasks	negative
	Being detail-oriented results in high-quality products	positive

Supplementary Table 16. Aspects of teaching that affect depression or anxiety.

Effect on depression or anxiety	Aspect of teaching	Abbreviated aspect	Full description	Depression interviews	Anxiety interviews
Exacerbate	Feeling stressed about an increased number of responsibilities or time away from research because of your teaching obligations	Increased responsibility	Feeling that the responsibilities tied to teaching such as grading, lecturing, and designing course content can make you feel that you are spending too much time away from your research	X	X
	Negative reinforcement from undergraduates	Negative reinforcement	Comments or behaviors from undergraduate students that are rude, disrespectful, or show a sense of disengagement. This could also include negative feedback or scores on teaching evaluations	X	
	A sense of pressure to teach course content well to undergraduate students	Pressure to teach well	Feeling that you are obligated to ensure that all students in the classroom where you teach understand the course content	X	X
	A lack of teacher training or guidance	Lack training	Feeling that you were not trained well enough to teach the undergraduate students the course content	X	X
	Public speaking or lecturing in a teaching environment	Public speaking	Teaching courses, recitations, or conducting review sessions		X
Alleviate	Positive reinforcement from undergraduate students	Positive reinforcement from students	Positive comments either verbally or in writing on teacher evaluations	X	X
	Structured tasks while teaching	Increased structure	Having concrete tasks like grading or creating course materials	X	X
	Being passionate about teaching	Passion	Being passionate about the act of teaching or enjoying the ability to teach undergraduate students	X	X

Feeling that teaching is a welcomed break from research	Welcome distraction	Feeling that teaching can relieve stress that is related to your work in research or act as a welcome distraction from your research	X	X
Feeling confident about your teaching	Confidence	Feeling that you are good at teaching or have a mastery of the content in the course that you are teaching	X	
Positive relationships with other TAs or instructors while teaching	Relationships with other TAs	Having good relationships with others involved in teaching such as TAs or a lead instructor	X	

Supplementary Table 17. Aspects of depression and anxiety that affect graduate teaching.

Condition	Aspect	Impact on teaching
Depression	Disconnect from my undergraduate students	negative
	Lack of energy	negative
	Understanding of students' mental health challenges	positive
Anxiety	Being unproductive	negative
	Being detail-oriented causes too much time spent on tasks	negative
	Being detail-oriented leads to good quality work	positive
	Understanding of students' issues	positive