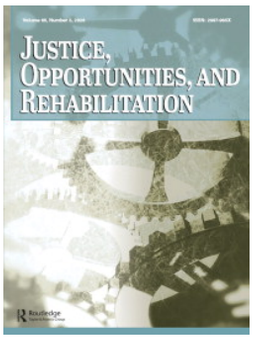

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# Higher education in prison is associated with reductions in depression and anxiety

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**ABSTRACT**

Higher education in prison has been linked to numerous positive outcomes, such as desistence from crime and employment post-release. While qualitative research indicates improvements in various aspects of psychological well-being for these students, there is yet to be a longitudinal quantitative analysis of how mental health and well-being change over time. Our study compares mental health and psychological well-being questionnaires from before, during, and after a semester of higher education in prison. The results demonstrate significant reductions in depression and trait anxiety. These novel findings associate participation in higher education in prison with improvements in mental health.

**KEYWORDS**

higher education in prison; mental health; well-being; depression; anxiety

## Introduction

Three decades of research on higher education in prison (HEP), also known as postsecondary correctional education, has demonstrated that it can improve both the lives of incarcerated students and the community at large. Early studies emphasized how education keeps the community safer by reducing reoffending, how the return on investment outweighs taxpayer costs, and how college in prison contributes to the economy after students are released (Karpowitz & Kenner, 1995). In a meta-analysis of 37 years of studies on carceral education, findings showed that participating in correctional education decreased the likelihood of recidivism by 28% (Bozick et al., 2018). Individuals who completed a college degree during incarceration were significantly less likely to reoffend and stayed crime-free longer than their counterparts who did not complete a degree (Kim & Clark, 2013). Those who received an education during incarceration were more likely to be employed after release (Oakford et al., 2019). Not including the indirect costs of recidivism, a meta-analysis completed by the RAND corporation found that taxpayers saved $5 on reincarcerating

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people for every dollar spent on education (Davis et al., 2013). Given these pronounced societal benefits of HEP, subsequent research began to examine the psychological changes among incarcerated students that could underlie the observed effects on employment and desistence from crime.

Qualitative research has indicated significant improvements in various aspects of psychological well-being as a result of HEP. Evans (2018) asserts that HEP features an aspect of humanization that fosters meaning and purpose in life, the belief that students are worthy of an education or productive life, and helps them develop critical thinking skills, communication skills, empathy, and hope. The opportunity to learn and succeed in higher education was validating against negative self-conception and offered a "disruption of a figurative sense of imprisonment" (Conway, 2023). As they reflected on their experiences, students said that HEP increased their leadership skills (e.g., public speaking), allowed them to see positive aspects to themselves, grew their sense of intrinsic worth, encouraged self-expression, and boosted their self-confidence. Additional studies have documented increases in self-efficacy (Allred et al., 2013) as well as reductions in feelings of shame (Evans et al., 2018) and self-stigma (Dewey et al., 2022).

Across multiple studies, interviews and questionnaires from students and prison staff illustrated improvements in and the successful application of students' socio-emotional skills gained from education. Students volunteered to mentor or tutor others; created peer groups; gained respect from professionals like district attorneys, doctors, and lawyers in conversation; gained the confidence they needed to apply to jobs; and created stronger bonds with their family (Baranger et al., 2018; Conway, 2023; Pelletier & Evans, 2019; Torre & Fine, 2005).

Considering the literature indicating significant improvements in psychological well-being associated with HEP, it is possible that HEP is associated with reductions in symptoms of mental health disorders. Major depressive disorder, anxiety disorders, and post-traumatic stress disorder are overrepresented in prisons compared to the general US population (Maruschak et al., 2021). A meta-analysis of studies concerning mental health and its impacts on prison climate found that individuals with mental health issues are more predisposed to violate prison rules and, therefore, face disciplinary consequences for their misconduct (Calles-Rubiales & Del Prado, 2020). In a longitudinal study of more than 200,000 incarcerated individuals, any diagnosis of a mental health condition—especially a diagnosis of severe mental health condition—was associated with higher rates of recidivism (Bales et al., 2017).

The higher education literature in traditional settings *outside* of prisons suggest that it can have a positive effect on mental health. A meta-analysis

by Lorant et al. (2003) shows an inverse relationship between educational attainment and depression. Moreover, individuals with a lower propensity of attaining a four-year degree have a greater protective effect from higher education against depressive symptomatology than those from advantaged backgrounds who are more likely to have the resources to complete a four-year degree (Bauldry, 2015). In another study, those who complete college but have a lower propensity for doing so were less likely to experience depressive symptoms and substance use (Bulczak et al., 2025). Academic supportive environments have been shown to decrease anxiety along with increasing confidence, academic performance, and persistence in school (Voisin et al., 2023). Higher education is associated with post-traumatic growth, which manifests as an appreciation for life, meaningful interpersonal relationships, a sense of personal strength, priority shifts, and new spiritual outlooks (Tedeschi & Calhoun, 2004). Moreover, higher education classes in prison, especially writing classes, offer the opportunity for students to express themselves through writing. Pennebaker and Chung (2007) explain that writing about traumatic events can improve many outcomes including physical health, academic performance, distress, negative affect, and depression (Pennebaker, 1997).

Taken together, the extant literature on HEP, and higher education in general, suggests that participation in HEP could be associated with increases in psychological well-being and decreases in mental health symptoms like anxiety, depression, and post-traumatic stress. However, to date there has not been a longitudinal quantitative study that measures such changes. In the present study, we utilize validated self-report questionnaires to assess psychological changes in incarcerated students before, during, and after one semester of an onsite college class. Specifically, we assess psychological well-being and emotion regulation outcomes that have been suggested by past literature along with mental health outcomes that have not yet been systematically examined. Such data will build on the existing qualitative data, allow us to better quantify the magnitude and specificity of effects of HEP on distinct aspects of mental health and well-being, and assist HEP programs in tailoring their programs to support students accordingly.

## Methods

### *Participants*

The names of potential participants were provided by a university-established, jumpstart HEP program operating across three correctional facilities in the Midwest. Students in this program enrolled in up to three credit-bearing courses each semester. Out of the 87 students enrolled in classes, 87 were contacted by the study team following their

semester orientation. If students were unable to attend orientation, they were contacted individually. After a discussion on what study participation looks like; risks and benefits; confidentiality; distinguishing researchers from corrections and HEP staff; and instructions for receiving and returning surveys; 85 students gave informed consent to participate in this study. If participants dropped or were removed from the class, they continued to receive surveys while they remained within the institution. $5 checks were deposited in each student's correctional account for each survey they returned. This study was approved by the university IRB.

Students participating in one of two semesters of higher education in prison were recruited for this study and asked to complete surveys within two weeks of the beginning of the semester, halfway through the semester, within the month after their semester, and six months after their semester. The study team was responsible for survey distribution and collection. The first survey was provided by the study team upon consent. Remaining surveys were distributed through the institution's mail system and returned by students in lockboxes dedicated only to the study. Surveys included the following measures.

## *Mental health measures*

### *Beck Depression Inventory–Second Edition (BDI-II)*

The BDI-II has 21 items, each representing a symptom of depression (e.g., crying, suicidal thoughts or wishes, etc., Beck et al., 1996). It can also be broken down into two subscales: cognitive and affective/somatic symptoms. Participants rate each symptom on a four-point scale ranging from zero to three. Each item is then summed to provide a single score. Cronbach's alpha for this measure was 0.892.

### *State-Trait Anxiety Inventory (STAI)*

The STAI is a 40-item measure on a four-point scale going from 1 (Not At All) to 4 (Very Much So) (Spielberger et al., 1983). The first 20 items focus on state anxiety while the remaining 20 focus on trait anxiety. Because we are more interested in changes in trait anxiety, we will be focusing on that subscale, which had a Cronbach's alpha of 0.931.

### *PTSD Checklist for DSM-5 (PCL-5)*

The PCL-5 is a 20-item instrument based on symptoms of PTSD (Weathers et al., 2013). Participants rate each item on a scale from zero (not at all) to four (extremely) and a total score is used to determine overall symptom severity. Cronbach's alpha for this scale was 0.944.

#### *Difficulty in Emotion Regulation Scale (DERS)*

The DERS scale consists of 36 items, which can be broken down into six subscales: nonacceptance of emotional responses, difficulty engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity (Gratz & Roemer, 2004). Participants rate each item on a 5-point scale from "Almost Never" to "Almost Always". Scores can be presented as a total score or subscale scores. Cronbach's alpha for this scale was 0.946.

### *Well-being measures*

#### *Psychological Well-Being Scale (PWB)*

The 42-item PWB scale assesses psychological well-being on six subscales: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance (Ryff et al., 2010). Each of the six subscales can be totaled for a subscale score as well as a total overall psychological well-being score. The Cronbach's alpha for the overall 42-item measure was 0.931.

#### *New General Self-Efficacy Scale*

The New General Self-Efficacy Scale, which assesses how much people believe they can achieve their goals, has 8-items that are rated on a 5-point scale, from Strongly Disagree to Strongly Agree (Chen et al., 2001). Cronbach's alpha was at 0.941.

#### *Revised Life Orientation Test (LOT-R)*

The LOT-R is a 10-item instrument that measures a participant's optimism about the future (Scheier et al., 1994). Each item has a score ranging from zero (strongly disagree) to four (strongly agree). Cronbach's alpha for this scale was at 0.823.

### *Data analysis*

Statistical analyses were conducted using SAS software (SAS Institute Inc., Cary NC), version 9.4. All reported $p$-values are two-sided and $p < 0.05$ was used to define statistical significance. Descriptive statistics such as count and frequency were generated for categorical variables, while mean and standard deviation (SD) were generated for continuous variables. Linear mixed effects models were used to compare the mental health measurements between different time points for students. Total prison time, age, and security level were tested and adjusted in the model if they showed marginal significance ($p < 0.10$). Bonferroni correction method was

used for multiple comparisons for multiple scales tests and Tukey method was used for pairwise comparisons between time points. When a total measurement was significant after correction, we conducted the same analysis for its subscales to further study the sub domain differences.

## Results

### Sample characteristics

Out of the 85 participants that consented to participate, 37 (43.53%) of them were in a minimum-security facility, 25 (29.41%) were in a medium-security facility, and 23 (27.06%) were in a maximum-level facility. Ages of students ranged from 22 to 63 ($M = 38.48$, $SD = 10.33$). The total number of months spent incarcerated before the semester began as reported by students ranged from 5 months to 360 ($M = 121.02$, $SD = 96.48$). 51 (60%) participants had served up to 10 years, 21 (24.71%) participants served between 10 and 20 years, 10 (11.76%) participants served between 20 and 30 years, and three participants (3.53%) did not report their total time incarcerated. As the three sites are designated as men's facilities, most participants reported their sex at birth as male ($N = 83$; 97.65%). When asked about the gender they most identified with, 81 (95.29%) selected man, one selected woman (1.17%), and one (1.17%) selected transgender woman. Two individuals (2.35%) did not report their sex at birth or gender. 33 (38.82%) participants identified as Black, 31 (36.47%) identified as White, 15 (17.65%) identified as another race or multiple races, and six did not report their race (7.06%). In addition, 36 (42.35%) students identified as not of Hispanic, Latine, or Spanish origin, 13 identified as such (15.29%), and the remainder of participants preferred not to say, did not know, or did not report (42.35%).

### Data collection completion

As detailed in Figure 1, some students were unable to return surveys due to early release, transfers to another institution, and time in restricted housing. Person means imputation with a 70% threshold was applied to handle missing items: if a student completed at least 70% of a measure, an average score across observed items was applied to fill in missing items; otherwise, the entire measure was treated as missing.

### Data analyses

Due to existing literature that indicates total time spent incarcerated, age, and security level are related to mental health and well-being (Bukten et al., 2022; Chiclana et al., 2019; Porter & DeMarco, 2019; Roy & Avdija, 2012), we included these in our analyses to see if there was an effect of

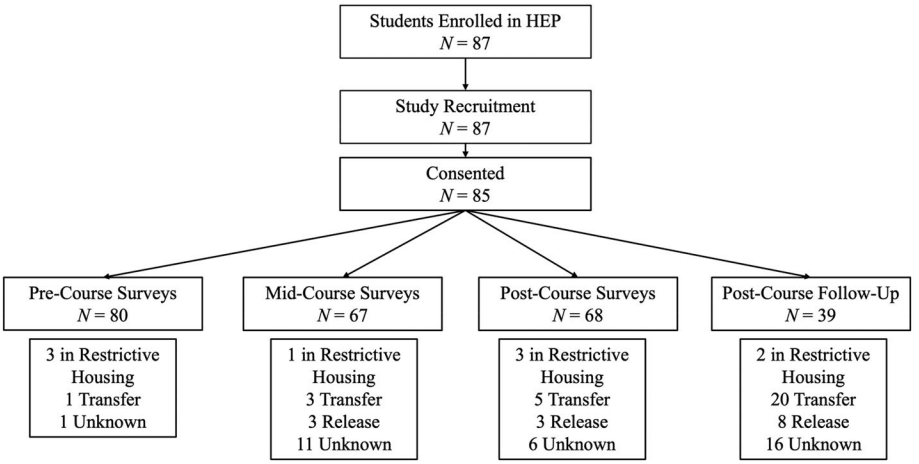


**Figure 1.** Study recruitment, consent, and retention numbers over time.

these three covariates on our outcomes. Total time spent incarcerated and age did not have any significant effect on our student outcomes. There was marginal significance with security level on the BDI ($p = 0.0996$), but not on other outcomes. As such, security is only adjusted for BDI to test for timepoint differences since it was marginally significant. It was not included in any other outcomes for testing timepoint differences.

Correcting for multiple comparisons, we observed significant differences in depression and trait anxiety across the four timepoints (Table 1, Figures 2 and 3). The pairwise comparisons show a significant reduction in depression between pre- and mid-course ($p = 0.0066$) as well as pre- and post-course ($p < 0.0001$). Students also displayed significant differences in trait anxiety among different timepoints, with a significant reduction in trait anxiety between their mid- and post-course surveys ($p = 0.0294$) as well as their pre-course and post-course surveys ($p = 0.0018$).

### *Post-hoc analyses*

In follow up analyses, we sought to determine whether the significant effect on depression symptoms was related to one or both subscales of depression (cognitive and affective/somatic). Pre-course scores for cognitive symptoms were significantly greater than mid-course ($p = 0.0285$) and post-course scores ($p < 0.0001$). Similarly, pre-course affective/somatic symptoms were significantly greater than scores in the middle of ($p = 0.0293$) and immediately after classes ($p < 0.0001$).

## Discussion

In this study, we sought to determine whether students experienced significant changes in mental health and well-being after participating in one

**Table 1.** Statistical results.

| Outcome | Pre-course | Mid-course | Post-course | Follow-up | *p*-value | Pairwise comparison |
|---|---|---|---|---|---|---|
| Depression | 16.33 (14.34–18.33) | 13.68 (11.61–15.76) | 11.87 (9.80–13.94) | 14.54 (12.01–17.07) | <0.0001* | Pre>(Mid = Post) |
| Cognitive | 6.90 (6.06–7.74) | 5.85 (4.97–6.73) | 5.14 (4.26–6.02) | 5.94 (4.83–7.06) | 0.0001 | Pre>(Mid = Post) |
| Affective/ somatic | 9.30 (7.95–10.64) | 7.73 (6.32–9.14) | 6.62 (5.21–8.03) | 8.48 (6.75–10.21) | <0.0001 | Pre>(Mid = Post) |
| Emotion regulation | 72.18 (67.44–76.92) | 73.82 (68.89–78.75) | 70.39 (65.46–75.31) | 69.35 (63.32–75.38) | 0.2316 | |
| Optimism | 13.75 (12.77–14.73) | 13.59 (12.57–14.60) | 14.33 (13.32–15.35) | 14.20 (12.98–15.42) | 0.2145 | |
| Self-efficacy | 32.59 (31.57–33.61) | 32.61 (31.54–33.68) | 33.12 (32.05–34.19) | 33.05 (31.71–34.40) | 0.5878 | |
| Psychological well-being | 186.25 (180.02–192.48) | 190.03 (183.57–196.49) | 193.41 (186.95–199.87) | 190.34 (182.43–198.25) | 0.0384 | |
| Posttraumatic stress | 24.11 (20.13–28.10) | 21.80 (17.64–25.95) | 20.90 (16.75–25.05) | 22.39 (17.26–27.51) | 0.2612 | |
| Trait anxiety | 41.91 (39.29–44.54) | 41.07 (38.36–43.78) | 38.19 (35.49–40.90) | 40.21 (36.94–43.49) | 0.0028* | (Pre = Mid)>Post |

*Bonferroni correction for multiple comparisons applied – critical value for significance was 0.007.

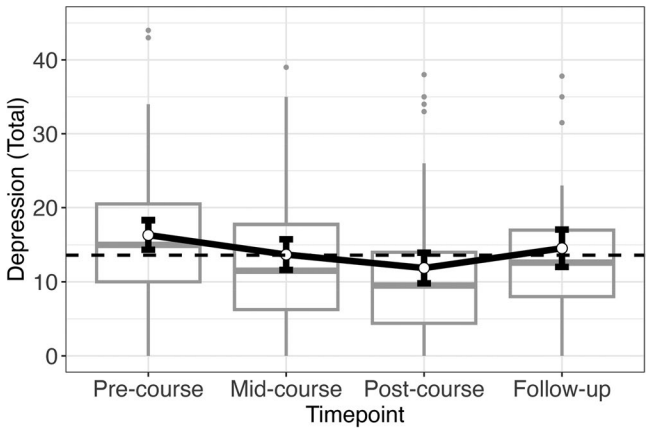


**Figure 2.** Changes in depression scores over time.

semester of college during incarceration. We observed significant changes in two domains: depression and trait anxiety.

With regard to the findings on depression, our study is the first to document and quantify significant reductions in depression during participation in HEP. While one study of a correspondence course in prison showed significant improvements in students' self-esteem and reductions in loneliness, Coticchia and Putnam (2021) did not find significant differences in depression. Unlike the correspondence course studied by Coticchia and Putnam (2021), which was conducted via mail, the students in our study participated in an in-person course for credit alongside peers, instructors, and tutors. They kept a regular schedule of weekly courses similar to that of university settings outside of prison with some interruptions due

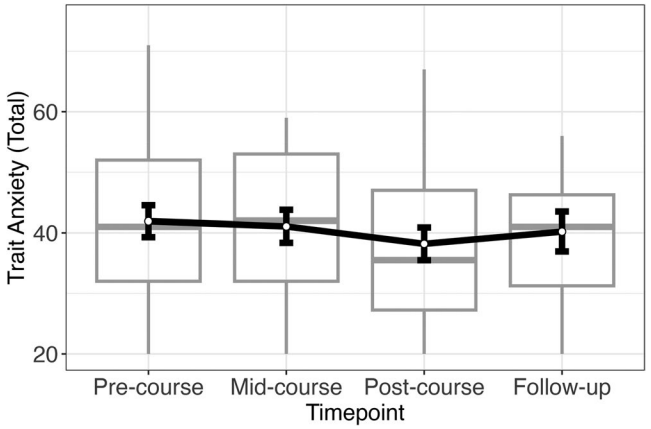


**Figure 3.** Changes in trait anxiety scores over time.

to security issues. Even then, some instructors often made up for these unanticipated issues by rescheduling classes or opting for virtual lessons over videochat. Outside of the classroom, students who were on the same unit or could go to the library were sometimes able to meet to discuss their assignments. The interaction with other students, tutors, and instructors could have been critical for the observed reduction in depression in our study, but not in Coticchia and Putnam (2021). Social support has been established as a protective factor against depression inside and outside of prisons (Coticchia & Putnam, 2021; Gariépy et al., 2016; Santini et al., 2015; Wooldredge, 2018) and, with in-person courses that encourage these interactions, there are more opportunities to connect with others compared to correspondence courses. Previous qualitative studies indicate that in-person classes create a community of mutual respect and mentorship difficult to find in prison, where others care about you, where you become invested in the success of others, people find things in common like compassion and humanity, and teachers treat students as students (via academic rigor and accountability) rather than as incarcerated people (Conway, 2023).

With regard to the findings on anxiety, there have been no previous studies that have sought to measure anxiety differences in incarcerated students. Anxiety and depression are known to be highly correlated (Kalin, 2020), so given the observed reduction in depression symptoms, a reduction in anxiety symptoms would also be expected. Like the reductions in depression, the reductions in anxiety could result from the social interaction and support experienced during the semester. A systematic review across 32 studies revealed a negative correlation between social support and common mental disorders (depression, anxiety, and PTSD) in incarcerated individuals (Machado et al., 2024). However, if social support was the mechanism for these improvements and classes increase students' socioemotional skills as suggested by the literature, it is surprising that

students did not see significant improvements in posttraumatic stress or emotion regulation as well (see Supplemental Materials, Figures 1 and 2).

Similarly, our study did not find significant differences in well-being over time. The extensive qualitative literature on HEP contains myriad anecdotes of students sharing stories of optimism, hope, agency, self-efficacy, connection, increased social support, etc. Although the findings on well-being were not significant in this study, the data still show an improvement in most measures by the end of the semester compared to the beginning of class (see Supplemental Materials, Figures 3 and 5).

One potential limitation of this study is the attrition of participants in a single-group, non-randomized longitudinal design. While a sizable majority of participants who completed the pre-course survey also completed the post-course survey (68/80; 85%), it is possible that students who did not complete the post-course survey (due to transfer, release, restricted housing placement, etc.) did not experience the same changes in mental health as the students who completed the assessments. A randomized controlled design, with intent-to-treat analysis, would allow a more definitive conclusion regarding the causal effect of participation in HEP on mental health. With a sufficiently large sample size, future research could also determine which psychological changes mediate observed outcomes related to employment and recidivism. In addition to conducting a randomized, controlled study, future research could also include qualitative data to explore how participation in HEP affects mental health. Regardless of the exact study design, retaining students in HEP programs (and related longitudinal research) will be challenging. Aside from the transfers, release, and time in restrictive housing already mentioned, additional obstacles may include lockdowns, court and hospital visits, and conflicting schedules due to work or visits. As students have shared, it can be difficult to continue classes or research when difficult life circumstances arise (e.g., family deaths). Future research on HEP should explore factors underlying attrition and test strategies to maximize retention.

Considering the disproportionately high rate of mental health symptoms and diagnoses in prison settings, along with the dire need for more effective and accessible mental health supports and services in these settings, our findings associating HEP with a reduction in depression and anxiety further bolsters the positive impacts of HEP. This finding is perhaps especially noteworthy given the fact the participants were not selected to have clinically elevated levels of mental health symptoms, nor were therapeutic elements intentionally added to courses to improve mental health, yet we still observed these changes. As future research elucidates the specific aspects of HEP that confer mental health benefits to participants, this information may be leveraged to create programs that are maximally effective and accessible for the prison setting.

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## Author contributions

CRediT: **Valerie Diem Nguyen**: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Visualization, Writing – original draft, Writing – review & editing; **Qianqian Zhao**: Formal analysis, Methodology, Visualization, Writing – original draft, Writing – review & editing; **Michael Koenigs**: Conceptualization, Funding acquisition, Methodology, Supervision, Writing – review & editing.

## Disclosure statement

No potential conflict of interest was reported by the author(s). This manuscript has not been submitted simultaneously for publication elsewhere.

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