JOURNAL OF AMERICAN COLLEGE HEALTH
https://doi.org/10.1080/07448481.2025.2574936

Routledge
Taylor & Francis Group

RESEARCH ARTICLE

Testing an adapted Illness Identity model with post-secondary students with probable PTSD

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ABSTRACT

Objective: There is a current lack of understanding of the impact of internalized (or self-) stigma among young adults experiencing a broad range of mental health conditions. **Participants:** Baseline data included 166 postsecondary students with mental health conditions and probable PTSD. **Methods:** Path and mediation analyses examined the extent to which interrelationships between self-stigma and recovery-related variables (negative cognitions, resilience, social interaction, suicidality, symptom severity, and academic skill difficulty) were adequately represented by the adapted Illness Identity model. **Results:** Self-stigma has significantly been associated with almost all recovery-related variables. Not all predictions of the model were supported, though findings suggested that self-stigma was related to variations in negative cognitions, further impacting resilience and academic skill difficulty. Negative cognitions mediated the relationship between self-stigma and both resilience and academic skill difficulty. **Conclusions:** Findings highlight the importance of interventions that address self-stigma among postsecondary students with broad ranges of mental health conditions.

ARTICLE HISTORY
Received 26 February 2025
Revised 27 August 2025
Accepted 7 October 2025

KEYWORDS
Illness identity; mental illness; post-secondary students; self-stigma

Introduction

Internalized (or self-) stigma occurs when people with mental illnesses believe that existing stereotypes about their group are true, leading to the endorsement of negative self-labels and subsequent development of emotional and behavioral consequences.[1–5] The "why try?" model[6] posits that self-stigma causes people to believe that they are incapable of achieving their goals, resulting in less engagement with opportunities related to goal pursuit and overall lower goal achievement. This phenomenon has been observed among post-secondary student samples. Previous studies have found that self-stigma of mental illness was associated with lower self-esteem and detrimental effects on academic and social functioning in higher education.[7–10]

Illness identity refers to the process by which a devalued mental illness identity comes to overtake other identities that a person holds.[5] Developed concurrently with the "why try?" model, the Illness Identity model[5] (see Figure 1) provides a comprehensive framework for understanding the impact that the awareness and meaning associated with having a psychiatric problem may have on multiple dimensions of recovery. The model proposes that self-stigma results in decreased levels of hope and self-esteem, which in turn impacts various recovery outcomes, such as increased engagement in avoidant coping, greater suicidality, reductions in social interaction, decreased vocational functioning, and greater symptom severity.[5] A comprehensive meta-analysis conducted by Yanos et al[11] reviewed 111 studies that tested individual relationships in the model. While their review found support for individual relationships between outcome variables in the model, they found a lack of studies that utilized path analysis or longitudinal designs to test the directionality and sequence of the proposed interrelationships.[11] Meta-analyses of studies testing individual relationships between variables as proposed in the Illness Identity model have found support for the predictions of the model mostly among individuals with serious mental illnesses (SMI).[11,12]

The Illness Identity model maintains that higher levels of self-stigma are associated with lower levels of hope and self-esteem.[5] In the original Illness Identity model,[5] hope and self-esteem were included in the same construct, because they are functionally interrelated and work in tandem to influence recovery-related variables. Both hope and self-esteem reflect the degree to which individuals internalize stigma. People who experience greater levels of self-stigma may have reduced levels of hope and self-esteem, whereas those who have a more positive understanding of their mental health condition may have greater levels. This relationship has been supported in research among individuals with SMI,[11,13–16] as well as college students with mental health conditions.[17,18] Studies have also suggested directionality between variables. Self-stigma levels were found to influence changes in hope and self-esteem, which subsequently led to

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changes in recovery-related outcomes.[19,20] Additionally, research has found that individuals in young adulthood believed that their experiences with stigma negatively impacted their interpersonal relationships, brought about feelings of shame and embarrassment, and increased difficulty with maintaining academic performance and employment.[10,21] The associations between self-stigma and avoidant coping and suicidality have been less studied than other components of the Illness Identity model; nonetheless, there is evidence of positive associations between those variables among samples of college students.[22]

While researchers have observed the association between self-stigma and suicidality among adult samples,[23–25] there is still uncertainty regarding this association among young adults. Self-labeling as mentally ill was significantly associated with suicidal ideation, higher depressive symptoms, and reduced self-esteem among a sample of individuals at-risk for psychosis.[26] Research suggests the pervasive impact of self-stigma on recovery-related domains among college students with mental health problems,[10] there is a relative dearth of studies with young adult samples who possess a broad range of mental health conditions.

The prevalence of mental health conditions and resulting distress among college students ranges from 35% to 60%.[27–29] Considering that symptoms of approximately half of all lifetime mental illnesses manifest by the mid-teens,[30] many students may have preexisting mental health conditions prior to starting college. Moreover, engagement in post-secondary education introduces stress-inducing factors such as social and familial pressures, academic-related stress, and financial considerations, all of which can increase students' vulnerability to mental health problems, including mood disorders, anxiety disorders, and early stages of psychotic disorders.[31–33] College students also endorse significant levels of trauma exposure and PTSD symptoms.[34,35] Studies have found associations between PTSD and academic outcomes, particularly dropping out of college and lower academic achievement.[36,37] The literature on PTSD and college students has tended to focus on student veterans, highlighting the need to examine this phenomenon among broader samples of post-secondary students.

Emerging adulthood, typically spanning the age range of 18 to 29, is considered one of the most unstable periods of the lifespan, marked by transitions in various life domains, such as relationships, education, work, and identity exploration.[38,39] From a developmental perspective, the college age range coincides with the period in which people may experience symptoms or onset of SMI.[33] Despite evidence that experiences of psychosis considerably impact identity development among young adults,[40–43] the impact of illness identity on life domains has been seldom explored.

While considerable research has tested components of the Illness Identity model among adult samples with serious mental health conditions, there is a relative dearth of studies exploring illness identity among a broader range of mental health conditions and young adults. This study addresses that gap by testing an adapted Illness Identity model (see Figure 2), using available measures rather than directly replicating the original model. The applicability of the model was tested among a diverse sample of postsecondary students with mental health conditions and probable PTSD. We hypothesized that (1) self-stigma levels will be significantly positively correlated with negative cognitions, suicide risk, academic skill difficulty, and PTSD symptom severity and negatively correlated with college self-efficacy, resilience, social interaction with friends, and social interaction with family; (2) the predictions of the Illness Identity model will be supported in this sample, using path analysis; and (3) consistent with the Illness Identity model, negative cognitions will mediate the relationship between self-stigma and suicide risk, resilience, and academic skill difficulty.

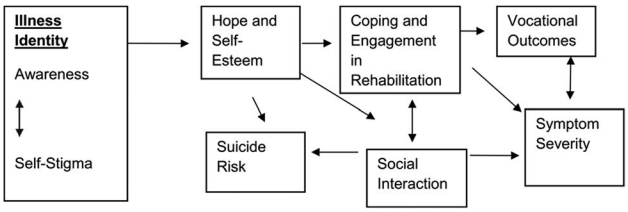

Figure 1. The original Illness Identity model. *Note.* From Yanos et al.[5]

Method

Procedure

The present study consisted of a secondary analysis of baseline data, collected between 2021 and 2023, from a larger randomized controlled trial examining the impact of a cognitive behavioral therapy intervention for PTSD among a

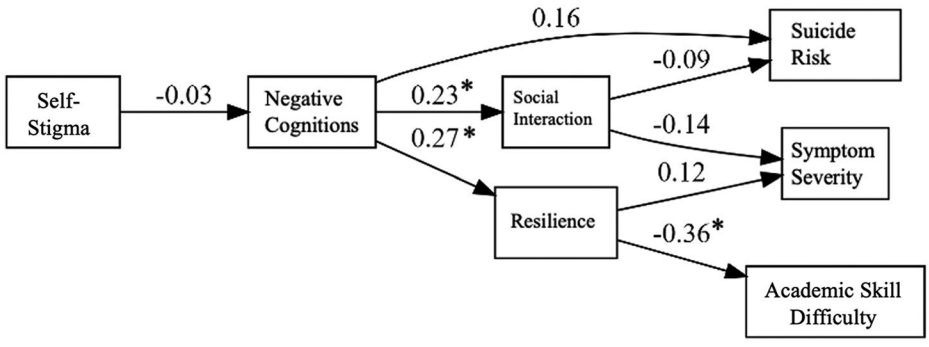

Figure 2. Proposed adapted Illness Identity model. *Note*. Coefficients presented are standardized linear regression coefficients. *$p < .05$.

post-secondary student sample with mental health conditions and PTSD ($N = 166$). As a result of the initial screening process for the larger study, all participants had probable PTSD, which became a focus of the current study. The study was approved by the university's Institutional Review Board. The analysis was designed to test proposed pathways between variables of the study rather than assess the effectiveness of the intervention, making baseline data appropriate for use.

To recruit a treatment-seeking sample of post-secondary students with PTSD, the study team partnered with offices of disability services at primarily Northeastern universities to share IRB-approved study flyers. The team also shared study flyers on social media sites including Reddit, Facebook, X (formerly known as Twitter), Craigslist, and *via* email. Interested individuals were provided informed consent and a screening measure, the PTSD Checklist for DSM-5 (PCL-5). The screening threshold was defined as scoring at least 1 on the Traumatic Life Events Questionnaire and at least 33 on the PCL-5, indicating that the potential participant had probable PTSD.[44] Once participants were determined to meet the screening threshold, they were scheduled to meet again with staff to complete a more comprehensive baseline interview. Study surveys were administered through REDCap, a secure online data-collection platform.

Participants

Out of 940 participants who completed the screening measure, 709 met the screening threshold. Of those, a total of 166 participants met with research staff and successfully completed comprehensive baseline interviews. The inclusion criteria for participants in the larger study were (a) Ages 18 and above; (b) English speaker; (c) Diagnosis of current PTSD determined by Clinician Administered PTSD Scale for DSM-5 (CAPS-5); (d) Diagnosis of a mental health condition; (e) A current postsecondary student with at least two semesters remaining; (f) No hospitalization or suicide attempt in the past two months. Since the PCL-5 was completed by all participants in the baseline interview, this was the measure was used to determine probable PTSD, with specifically a score of 33 or higher indicating probable PTSD.[44] Descriptive statistics for the sample ($N = 166$) are reported in Table 1 to characterize the sample. These variables were not included as control variables in the primary analyses.

The number of participants with a likely SMI was also estimated based on either a self-reported psychiatric diagnosis of schizophrenia spectrum and other psychotic disorders or a bipolar spectrum disorder, and/or at least one prior psychiatric hospitalization. Criteria for likely SMI were derived from the Substance Abuse and Mental Health Services Administration's[45] definition of SMI, which specifies that while there is no defined set of diagnoses that encompass the term SMI, it traditionally has been used to refer to diagnoses of schizophrenia, bipolar disorder, and major depressive disorder. While the definition of SMI varies by jurisdiction, having a prior hospitalization experience was also a common element of SMI definitions.[46] According to these criteria, approximately 33% of the sample was found to have likely SMI.

Table 1. Sociodemographic characteristics of participants at baseline.

Demographic/clinical characteristics	*n*	%
Gender		
Cisgender male	23	13.9
Cisgender female	122	73.5
Transgender male	1	0.6
Transgender female	1	0.6
Other	14	8.4
Ethnicity		
White	70	42.2
African/African American/Caribbean	38	22.9
Hispanic/Latino	25	15.1
Asian/Pacific Islander	18	10.8
Other	12	7.2
Classification in post-secondary education		
Freshman	17	10.2
Sophomore	23	13.9
Junior	41	24.7
Senior	22	13.3
Graduate student	38	22.9
Unclassified	9	5.4
Enrollment status		
Full time	103	62.0
Part time	36	21.7
Taking classes only	5	3.0
Gap year	1	0.6
Leave of absence	3	2.4
Other	2	1.2
Primary self-reported psychiatric diagnosis		
Anxiety disorders	32	19.3
Depressive disorders	32	19.3
Trauma and stressor-related disorders	25	15.1
Neurodevelopmental disorders	12	7.2
Bipolar spectrum	7	4.2
Obsessive-compulsive and related disorders	5	3.0
Personality disorders	4	2.4
Schizophrenia spectrum and other psychotic disorders	1	0.6
Feeding and eating disorders	1	0.6
PTSD as an existing diagnosis	56	33.7
Prior hospitalization for a psychiatric condition	47	28.3
Likely SMI	54	32.5
Has taken a leave of absence due to mental health/PTSD	83	50.0
History of mental health treatment	110	66.3
Currently in treatment for mental health	78	47.0
	M	*SD*
Age	26.0	7.5
Age of first hospitalization	18.0	5.1
Current cumulative GPA	3.3	0.6

Note. $N = 166$.

Measures

Only the measures relevant to this study are reported below; however, it is noted that this data came from a larger study that included a range of other validated measures as a part of the baseline and comprehensive screening that assessed for psychiatric symptoms (Beck Depression Inventory,[47] Beck Anxiety Inventory,[48] Brief Psychiatric Rating Scale[49]) trauma exposure, functional status and quality of life, and employment-related questions.

Demographic information

The demographic information questionnaire included questions on participants' gender identity, ethnicity, age, marital status, educational history, work history, and psychiatric history.

Self-stigma

The Internalized Stigma of Mental Illness Scale Brief Version (ISMI-10)[50] is a 10-item self-report questionnaire used to assess the degree to which people with mental illnesses apply negative stereotypes and discrimination to themselves. Each item is rated on a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The ISMI-10 was created to address "survey fatigue" and retains the properties of the original scale.[50] Two positively worded items (items 2 and 9) were reverse-coded prior to scoring. The total score was determined by computing the average of items, with higher scores indicating greater self-stigma. The ISMI-10 was validated among college students with depression and anxiety and exhibited good reliability (α = .80).[51] In the present study, this scale exhibited good internal consistency (α = .77). The ISMI is commonly used to measure and explore the effects of self-stigma.[13,52] For this reason, self-stigma measured by the ISMI-10 was chosen for the construct of self-stigma.

Negative cognitions

The original Illness Identity model includes the construct of hope and self-esteem; however, the individual constructs of hope and self-esteem are not included in the present analysis, as these constructs were not directly measured in the original dataset. Instead, negative cognitions were examined as a proxy for low hope and self-esteem. Research on self-stigma and PTSD has suggested that there are core features of both experiences, particularly the negative appraisal of one's diagnosis and possession of negative beliefs about onself.[53,54] Despite these two constructs having similar symptom expression, these are distinct constructs, with PTSD reflecting maladaptive thoughts and attempts to process a traumatic experience, whereas self-stigma reflects cultural context and internalized stereotypes about having PTSD or seeking treatment.[53] Furthermore, negative post-trauma cognitions have also been associated with engagement in avoidant coping behaviors.[54,55] Due to the similar associations between both constructs of hope and self-esteem and negative cognitions to self-stigma, PTSD symptom severity, and avoidant coping, we focused on negative cognitions as an indicator of low hope and self-esteem, working within the constraints of the available dataset.

The Negative Cognitions about the Self (NCAS) subscale of the Posttraumatic Cognitions Inventory (PTCI)[56] was used to assess negative beliefs that participants endorsed about themselves. This subscale contained 21 items out of the total 36 item scale, and encompassed areas including a general view of oneself, hopelessness, alienation, self-trust, and negative interpretation of symptoms. A total score was calculated by averaging responses on the 21 items, with higher scores indicating a greater endorsement of negative cognitions about oneself. The NCAS subscale had excellent internal consistency in the current sample, with α = .93. The College Self-Efficacy Inventory (CSEI)[57] was also used as a measure of negative cognitions in this study. This is a 22-item scale that uses a nine-point scale to measure an individual's confidence level regarding completing tasks that are typically associated with being a college student. A total score was computed by calculating the mean score across all items, with higher scores being indicative of greater confidence. The CSEI had excellent internal consistency in this study, with α = .92. The NCAS and CSEI include items measuring hopelessness, view of oneself, and confidence in one's abilities. On that account, the construct of negative cognitions was chosen to represent the construct of hope and self-esteem found in the original Illness Identity model.

Suicide risk

Item 9 on the Beck Depression Inventory—II (BDI-II)[47] measured suicidal thoughts and wishes. This item was rated on a four-point Likert scale ranging from 0 (I don't have any thoughts of killing myself) to 3 (I would kill myself if I had the chance), with a higher score indicating greater suicidality. There is evidence for the predictive validity of single-item assessments of suicide risk.[58–60] The construct of suicide risk in this study is representative of the construct of suicide risk found in the original Illness Identity model.

Resilience

While the original Illness Identity model includes the construct of coping and treatment engagement, resilience was chosen to represent that construct in the present study's model. Resilience refers to how an individual appraises a situation, whereas coping refers to the use of strategies to mitigate stressful demands of the situation.[61] Studies have asserted that there is an association between coping and resilience, such that resilience impacts what coping strategies people may engage in, and being able to better cope with stress can lead to greater resilience.[62,63] Resilience has been significantly associated with coping strategies and is considered a key protective factor against the development of PTSD symptoms.[64]

Resilience was measured using the Connor-Davidson Resilience scale (CD-RISC).[65] This 25-item scale measures components of resilience, such as the ability to adapt to changes, handle unpleasant emotions, and ability to cope with stress. Each item is rated on a five-point Likert scale, with higher scores being attributed to greater resilience. The internal consistency of this scale in the study was .92, which is excellent.

Social interaction

To measure social interactions with friends and family, two subscales were created from the Brief Quality of Life Interview (BQOLI)[66] Items 8a, 8b, 8c, and 8d were chosen for the friend subscale, since they measure social interactions with friends. Items were measured with a five-point scale ranging from 1 (not at all) to 5 (at least once a day), with greater scores indicating more time spent with friends. The internal consistency of the friend subscale was acceptable (α = .62). Items 5 and 6 were chosen for the family subscale, since they measure the time spent with or talking to family members using a six-point scale ranging from 0 (no family) to 5 (at least once a day), with greater scores

indicating greater frequency of spending time or talking to family members. The internal consistency of the family subscale was acceptable (α = .60).

Previous studies have created subscales from the BQOLI to measure satisfaction with family and with social relationships in relation to self-stigma levels among people with SMI.[67] As such, the BQOLI was deemed appropriate for measuring the construct of social interaction in the present study's model.

Symptom severity

The PTSD Checklist for the DSM-5 (PCL-5)[68] is a 20-item self-report questionnaire was used to screen potential participants for probable PTSD. Each item represented a symptom of PTSD from the DSM-5 and was rated on a five-point Likert scale, ranging from 0 (not at all) to 4 (extremely, daily or almost daily), with higher scores indicating greater endorsement and severity of PTSD symptoms. Since the reliability and validity of the PCL-5 has been supported,[69] it was chosen to measure the symptom severity construct in this study's model. The internal consistency in the study was excellent, with α = .91.

Academic skill difficulty

Academic skill difficulty was chosen to represent the construct of vocational functioning from the original Illness Identity model. Since this sample is mostly comprised of students in young adulthood and vocational exploration is a central part of development,[70] it would not have been worthwhile to measure vocational outcomes. Academic performance has been recognized as a predictor of future vocational outcomes,[71] making academic skill difficulty a more appropriate construct to measure.

The Educational Barriers Questionnaire (EBQ)[72] is a 34-item self-report questionnaire that measures difficulty with skills typically employed in an academic context. Difficulty with each item was scored on a five-point scale ranging from 0 (never) to 4 (always), with greater scores indicating more difficulty with the skill. While the EBQ has been used in previous studies,[73,74] the scale has not yet been validated. We performed a preliminary factor analysis with the observed data and found that items mapped onto four constructs, including students' abilities in areas of academic study skills, requesting accommodations, enrollment and class registration, and class etiquette. In addition to using the entire scale for analyses, the first subscale consisting of items related to academic study skills was also used for bivariate analyses. The internal consistency of the EBQ total scale was excellent (α = .93) and the academic study skills subscale was good (α = .89).

Data analysis plan

IBM SPSS Statistics Version 29 was used for data cleaning, calculating descriptive statistics, and conducting bivariate analyses. Preliminary data analysis began with data cleaning. Since this analysis used baseline data, the entries labeled as baseline were kept in the dataset, while entries of all other timepoints were deleted. Data was checked for duplicates, test entries, and missing data. Entries that were partially missing data, were left in the dataset, since there was usuable data. After that, reverse-worded items were reverse-coded and subscales were created for questionnaires that would be used for data analysis.

To address the first hypothesis, this study employed bivariate correlational analyses to better understand the relationships between study variables. Structural equation modeling (SEM), particularly path analysis, was used to address the second hypothesis. SEM can determine the utility of an existing model within one's dataset that is consistent with what has been tested in prior research.[75] RStudio version 4.4.0 with the "lavaanPlot" package[76] was used for path analysis, to determine the extent to which interrelationships between self-stigma and the identified study variables are adequately represented by and consistent with the predictions of the adapted Illness Identity model. Modification indices, a function providing an approximation of how the chi-square statistic might improve due to adjustments of various parameters in the model, was used to examine potential model improvements.[77] The PROCESS[78] macro for SPSS, specifically model 4, was used to conduct mediation analysis to address the third hypothesis and test whether negative cognitions mediated the relationship between self-stigma and recovery-related outcomes. Demographic variables were not included as covariates in the models, as preliminary correlational and regression analyses indicated that they did not alter the strength or significance of the hypothesized relationships.[1]

Results

Bivariate analyses

Pearson's product-moment correlation coefficients (Pearson r), were used to examine significant statistical associations between self-stigma, college self-efficacy, negative cognitions about the self, social interaction with friends and family, resilience, suicide risk, academic skill difficulty, and symptom severity (see Table 2). Statistically significant relationships were found between self-stigma and almost all study scales. Specifically, self-stigma was significantly positively correlated with negative cognitions about the self ($r = .611$, $p < .001$), suicide risk ($r = .195$, $p = .014$), academic skill difficulty (EBQ total scale, $r = .427$, $p < .001$; EBQ subscale, $r = .308$, $p < .001$), and greater symptom severity ($r = .183$, $p = .026$), and significantly negatively correlated with college self-efficacy ($r = -.476$, $p < .001$), resilience ($r = -.424$, $p < .001$), and social interactions with friends ($r = -.279$, $p = .002$). There was no significant relationship between self-stigma and social interactions with family ($r = .073$, $p = .432$).

Since negative cognitions was proposed to have significant relationships with recovery-related outcomes, we also examined the relationships of this construct with study scales. Negative cognitions about the self was significantly positively correlated with suicide risk ($r = .377$, $p < .001$), academic skill difficulty (EBQ total scale, $r = .501$, $p < .001$; EBQ subscale, $r = .421$, $p < .001$), and PTSD symptom severity ($r = .451$, $p < .001$); it was also significantly negatively correlated with resilience ($r = -.583$, $p < .001$). Furthermore, college self-efficacy

was significantly positively correlated with resilience ($r = .623$, $p < .001$) and social interaction with friends ($r = .313$, $p < .001$); it was significantly negatively correlated with negative cognitions about the self ($r = -.526$, $p < .001$) and academic skill difficulty (EBQ total scale, $r = -.554$, $p < .001$; EBQ subscale, $r = -.489$, $p < .001$).

Path analysis

We used criteria from Hu and Bentler[79] to evaluate the fit indices of the following path models. The authors suggested using cutoff values of .95 for Comparative Fit Index (CFI), .95 for Tucker-Lewis Index (TLI), .06 for Root Mean Square Error of Approximation (RMSEA), and .08 for Standardized Root Mean Square Residual (SRMR) to determine if there is relatively good fit between the observed data and proposed model.[79]

Preliminary data analysis included testing a model containing constructs deemed comparable to those of the original Illness Identity model (see Figure 2), which resulted in poor fit between the predictions of the model and our observed data. The modification indices and theoretical considerations of the preliminary analysis both suggested that there may not be a significant pathway between self-stigma and college self-efficacy.[19] We removed college self-efficacy from the negative cognitions construct (see Figure 3). Goodness-of-fit statistics ($\chi^2(10) = 63.435$, $p < .001$; CFI = .685; TLI = .339; RMSEA = .230; SRMR = .150) suggested that this model was a poor fit to the observed data. We also found that social interaction and symptom severity had nonsignificant independent pathways. These pathways were removed for the next iteration of the model (see Figure 4). This model was more parsimonious and had more statistical

Table 2. Correlation coefficients for study scales.

	1	2	3	4	5	6	7	8	9	10
1. Self-stigma	–	−.476*	.611*	.195*	−.424**	−.279*	.073	.427*	.308*	.183*
2. College self efficacy		–	−.526*	−.113	.623*	.313*	.108	−.554*	−.489**	−.137
3. Negative cognitions about the self			–	.377**	−.583*	−.174	.049	.501*	.421**	.451*
4. Suicide risk				–	−.241*	−.004	−.032	.107	.139	.141
5. Resilience					–	.363*	.082	−.348*	−.233*	.013
6. Social interaction (friends)						–	.037	−.288*	−.153	.035
7. Social interaction (family)							–	−.123	−.077	−.232*
8. Academic skill difficulty								–	.804*	.407*
9. Academic study skills									–	.398*
10. PTSD symptom severity										–

Note. Academic skill difficulty refers to the EBQ total scale; academic study skills refers to the EBQ subscale.
*$p < .05$. **$p < .01$.

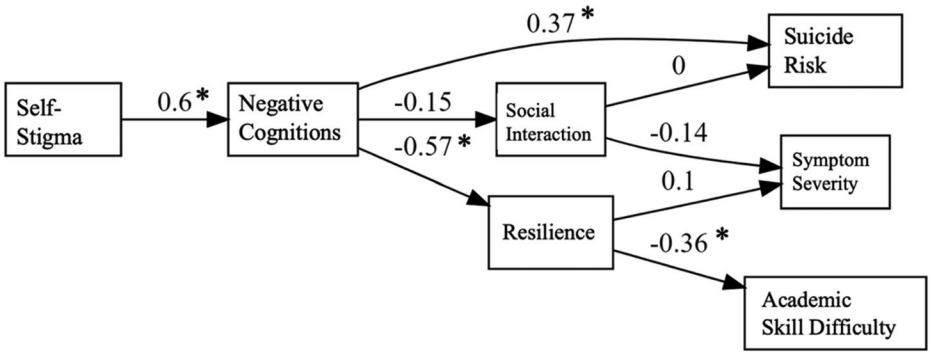

Figure 3. Modified path analysis with college self-efficacy removed. *Note*. Coefficients presented are standardized linear regression coefficients. *$p < .05$.

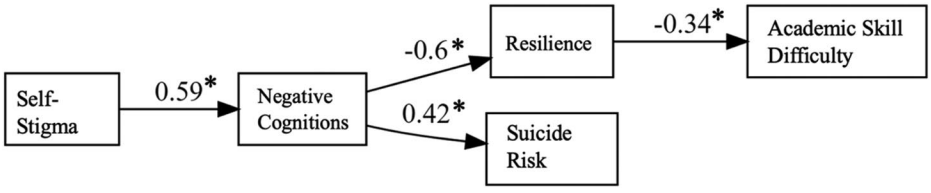

Figure 4. Modified path analysis with social interaction and symptom severity removed. *Note.* Coefficients presented are standardized linear regression coefficients. *$p < .05$.

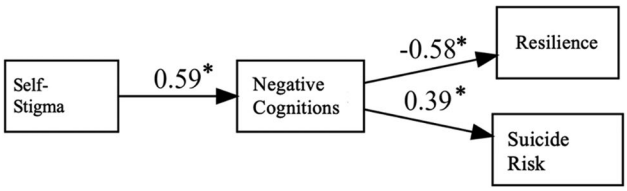

Figure 5. Modified path analysis with academic skill difficulty, social interaction, and symptom severity removed. *Note.* Coefficients presented are standardized linear regression coefficients. *$p < .05$.

power than the previous models. Goodness-of-fit statistics ($\chi^2(5) = 30.562$, $p < .001$; CFI = .866; TLI = .732; RMSEA = .190; SRMR = .115) suggested a better fit between this model and the observed data.

Modification indices were used to examine how adjusting parameters of the model could lead to better model fit. They suggested that model fit would improve if the constraints between resilience and academic skill difficulty were removed (see Figure 5). Model fit indices ($\chi^2(2) = 2.044$, $p = .360$; CFI = 1.000; TLI = .999; RMSEA = .012; SRMR = .024) were closer to those suggested by Hu and Bentler[79] which indicates that this more parsimonious model fit the observed data better than the original model. However, this model does not accurately reflect the relationships and outcomes primarily investigated in this study.

Overall, the modified models (Figures 4 and 5) fit the observed data better. All models suggested significant pathways between self-stigma and academic skill difficulty, as well as self-stigma and suicide risk. More broadly, greater self-stigma co-occurred with greater negative cognitions. Nevertheless, these models can only suggest that these relationships occur in stages, and longitudinal data analysis is needed to determine which variables may precede others.

Mediation analyses

Findings of the path analysis did not suggest that self-stigma affects academic skill difficulty directly, but provided support for the model suggesting that self-stigma may have an indirect effect on one of the primary study outcomes, academic skill difficulty, through its effect on negative cognitions and resilience. To test this, we conducted two simple mediation analyses.

Negative cognitions as a mediator of self-stigma and resilience

We followed the conditions of mediation detailed by Baron and Kenny[80] to determine if negative cognitions mediated the relationship between self-stigma and resilience (see Figure 6). The total effect (path c, B = −1.608, $p < .001$) of self-stigma on resilience was statistically significant. Self-stigma was significantly associated with negative cognitions (path a, $B = 3.343$, $p < .001$), and negative cognitions was significantly associated with resilience when controlling for self-stigma (path b, B = −0.356, $p < .001$). The direct effect of self-stigma on resilience, controlling for negative cognitions (path c', B = −0.417, $p = .190$) was not significant. Since these conditions were met, we concluded that the relationship between self-stigma and resilience was completely mediated by negative cognitions.

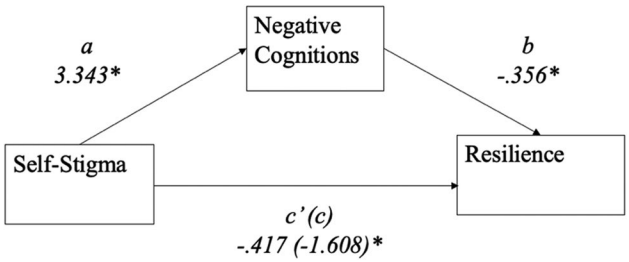

Figure 6. Mediation model for the relationship between self-stigma and resilience. *Note.* Unstandardized regression coefficients are provided. *$p < .05$.

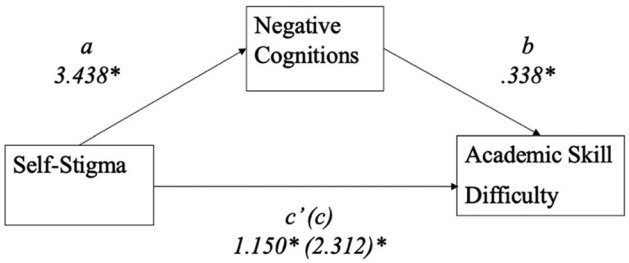

Figure 7. Mediation model for the relationship between self-stigma and academic skills. *Note.* Unstandardized regression coefficients are provided. *$p < .05$.

As suggested by Hayes and Rockwood[81] to further support this conclusion, we calculated the indirect effect (ab), which had a coefficient of −1.191. We constructed a 95% confidence interval with bootstrapping, and since this interval did not contain zero (lower limit = −1.169, upper limit = −0.778), the conclusion that the indirect effect of self-stigma on resilience through negative cognitions is statistically significant.

Negative cognitions as a mediator of self-stigma and academic skill difficulty

The conditions of mediation were followed to determine if negative cognitions mediated the relationship between self-stigma and academic skill difficulty (see Figure 7). The total effect of self-stigma on academic skill difficulty was significant (path c, $B = 2.312$, $p < .001$). Self-stigma was significantly associated with negative cognitions (path a, $B = 3.438$, $p < .001$), and when controlling for self-stigma, the association between negative cognitions and academic skill difficulty was also significant (path b, $B = .338$, $p < .001$). Although the direct effect of self-stigma on academic skill difficulty while controlling for negative cognitions was significant (path c', $B = 1.151$, $p = .015$), since the direct effect was closer to zero than the total effect, we concluded that the relationship between self-stigma and academic skill difficulty was partially mediated by negative cognitions.

The indirect effect (ab) was calculated to support this conclusion, resulting in a coefficient of 1.162. We obtained a 95% confidence interval after bootstrapping, which ranged from .570 to 1.809. Since this interval did not contain zero, we rejected the null hypothesis and the indirect effect was found to be statistically significant.

Discussion

The primary aim of the study was to examine the utility of an adapted Illness Identity model among a sample of post-secondary students with mental health conditions and probable PTSD, using measures of resilience, social interaction, suicide risk, PTSD symptom severity, and academic skill difficulty as proxies for constructs included in the original Illness Identity model. On a bivariate level, self-stigma was associated with almost all of the tested scales corresponding to recovery-related variables. While the path analysis results did not support the predictions of the full Illness Identity model among this sample, results of the models suggested that there may be a pathway between self-stigma and academic skill difficulty, through negative cognitions. Mediational analyses revealed that negative cognitions mediated the relationship between self-stigma and resilience and academic skill difficulty.

The bivariate analysis results were mostly consistent with the relationships between self-stigma and recovery-related variables found in existing literature. Studies have maintained that higher levels of self-stigma are related to increased symptom severity[82] and greater suicide risk.[24,83,84] Studies have also found that higher levels of self-stigma are associated with lower self-esteem,[84] decreased social interaction,[85] and reduced use of adaptive coping strategies.[86] Existing studies mostly feature samples of individuals with SMI; therefore, findings contribute support for these associations among a sample of postsecondary students with a broader range of mental health conditions.

Although we hypothesized that the relationships between study variables would be consistent with the proposed relationships between constructs of the original Illness Identity model, the findings from the path analysis did not provide support for all the model's predictions. Despite this, the models indicated a significant association between self-stigma and negative cognitions, which is consistent with existing research positing that greater levels of self-stigma lead to decreased hope and self-esteem.[20,84] Additionally, the models suggest a significant pathway between self-stigma and suicide risk, which has previously been established among adult samples,[23–25] but is relatively less studied among samples of young adults with mental health conditions.

Consistent with our third hypothesis, we found that negative cognitions mediated the relationships between self-stigma and the outcomes of resilience and academic skill difficulty. These results are in line with studies finding that negative thoughts about oneself was a mediator in relationships between self-stigma and recovery-related outcomes, specifically social interactions and symptom severity.[19,20,87] Unlike those studies, our analysis did not find support for significant pathways between self-stigma and the outcomes of social interactions and symptom severity.

Implications and applications to self-stigma research

Findings contribute to the importance of addressing self-stigma in prevention and treatment efforts targeting post-secondary student samples. Existing treatments that address self-stigma have been shown to facilitate reductions of suffering in young people's narrative identities, underscoring the utility of these treatments for individuals experiencing early onset of mental health conditions.[42,88] Social contact-based programs, such as Honest, Open, and Proud,[89] focus on the social inclusion of people living with mental health conditions, and have been shown to reduce self-stigma levels and facilitate positive changes in illness identity.[90,91] Another intervention that has shown effectiveness in reducing self-stigma is Narrative Enhancement and Cognitive Therapy (NECT)[5] which incorporates psychoeducation and cognitive restructuring to challenge negative attitudes about oneself, help develop an integrated sense of self, and improve subjective aspects of recovery.[92–94] While research is needed to better address limitations of these studies, including the lack of diversity regarding mental health diagnoses featured among study samples, the findings suggest that these interventions may help individuals develop personal narratives that reflect their own interpretations of their experiences.

While the findings are based on a clinical sample of individuals with likely PTSD, limiting generalization to non-clinical populations, mechanisms highlighted by the adapted Illness Identity model may have relevance beyond this specific clinical context. Practitioners and researchers targeting non-clinical populations may consider how self-stigma and negative cognitions about oneself may have further impacts on various areas of people's lives, such as social functioning.

Limitations and future directions

There were many limitations regarding study data. Since the data represented one point in time, our ability to establish causal relationships between study variables was restricted. As such, although results of the path analysis indicate a significant relationship between self-stigma and negative cognitions, with changes in resilience, academic skill difficulty, and suicide risk, we are not able to assert that self-stigma precluded changes in those variables. Future studies can use longitudinal data to gain a better understanding of the directionality of relationships and draw causal inferences. Missing data was another limitation, which was particularly concerning for the BQOLI, since approximately 28% of the data for this measure was missing. This may have limited the accuracy of our conclusions about social interaction and reduced statistical power. Future studies would benefit from efforts to ensure that all participants complete study measures.

There were also limitations of the sample. All participants were individuals who expressed prior interest in participating in a larger randomized controlled trial of a telehealth CBT intervention for PTSD, which limited the scope of our secondary study to participants with probable PTSD. This inclusion criterion introduces sampling bias, since participants of this study may have characteristics and motivations different from a non-treatment-seeking sample. Furthermore, another inclusion criterion was PTSD symptom endorsement at or above the threshold of a provisional PTSD diagnosis, which reduces generalizability to the greater postsecondary student population. Additionally, this study was comprised

mostly of cisgender females, which reflects the consistent epidemiological finding of a roughly two-fold greater prevalence of PTSD among cisgender females than cisgender males,[95–97] but still reduces generalizability. Our sample size also limited statistical power. According to the power program GPower 3.1,[98] a sample size of 281 is recommended to detect effects with good power (.95) and a medium effect size (.3) for models with 10 covariates. GPower 3.1 estimates power as low (.72) to detect an effect with a sample of 166. Therefore, our ability to detect effects with the full model was hampered by our sample size.

Another significant limitation of this study concerns the design of our adapted Illness Identity model. Some of the constructs chosen to represent correlates of self-stigma (e.g., negative cognitions, resilience, and academic skill difficulty) were different from those typically used in studies of self-stigma and recovery-related outcomes. While there was theoretical reasoning behind these substitutions, there was a lack of empirical evidence illustrating the specific relationships between these constructs. Furthermore, while we chose measures for each construct that included items that seemed appropriate, the measures were not necessarily designed to assess these constructs. For example, we used a measure for academic skill difficulty that has not yet been validated. We also created subscales to measure social interaction with friends and family from items of the BQOLI, which had relatively low internal consistency values ($\alpha = .62$ and $\alpha = .60$). Our choice of measures may have negatively impacted the fit indices of our models and may have contributed to non-significant findings, particularly the lack of a significant pathway between self-stigma and social interaction. Since this study uses an adapted Illness Identity model, we cannot assume that we would obtain the same results if the measures of the original constructs were available. Future studies may benefit from choosing measures that have been validated and appropriately represent the construct being observed. For example, the Relationship Assessment Scale[99] has been used to measure satisfaction with interpersonal relationships among college students,[100] and a measure of academic achievement that can be used in future studies is GPA from university records.[101]

This study bridges a gap in self-stigma research, since existing studies tend to focus on adult samples with SMI. While we were not able to find support for all the predictions of the adapted Illness Identity model among the observed data, this research provides evidence of the significant correlations between self-stigma and recovery-related variables among postsecondary students with mental health conditions and PTSD. Findings highlight the need for the development of targeted interventions to reduce self-stigma among postsecondary students, which could further improve academic outcomes and overall mental health.

Note

1. To assess whether key demographic variables (presence of likely SMI, gender, and full-time student status) influenced the tested relationships, we conducted follow-up correlational and regression analyses to examine whether significant associations between self-stigma and recovery-related variables remained after adjusting for relevant covariates. Correlational analyses revealed that likely SMI was significantly associated with resilience, negative cognitions, and suicide risk; however, after running regression analyses, we found that the relationships between self-stigma and resilience, negative cognitions, and suicide risk remained significant after controlling for likely SMI. The correlations also showed that gender was significantly correlated with resilience and enrollment was significantly correlated with suicide risk. After running the regressions with gender and enrollment status as covariates, we found that gender did not change the significance of the relationship between self-stigma and resilience. Similarly, enrollment status did not change the significance of the relationship between self-stigma and suicide risk. The results suggest that the associations between self-stigma and the outcomes of negative cognitions about the self, resilience, and suicide risk remain strong even after accounting for these covariates.

Author contributions

CRediT: **Amanda Siriram**: Conceptualization, Formal analysis, Methodology, Visualization, Writing – original draft, Writing – review & editing; **Philip T. Yanos**: Conceptualization, Methodology, Project administration, Writing – review & editing; **Weili Lu**: Funding acquisition, Investigation, Writing – review & editing.

Conflict of interest disclosure

The authors have no financial relationships or any other conflicts of interest to report. The authors confirm that the research presented in this article met the ethical guidelines, including adherence to the legal requirements, of the United States of America and received approval from the Institutional Review Board of Rutgers University. The views expressed here are those of the authors.

Funding

This study is funded by National Institute on Disability, Independent Living, and Rehabilitative Research (NIDILRR), grant number 90IFRE0038. The views expressed in this manuscript do not represent those of the funding agency.

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