

Stigma and Health

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Cross-Sectional and Longitudinal Relationships Between Mental Health Stigma and Suicidal Ideation: A Comparison of Regression and Structural Equation Modeling in Two Undergraduate Samples

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Stigmatizing beliefs may increase the risk of suicidal ideation (SI), yet few studies have explored the relationship between mental health-related stigma and SI. Existing work on this topic has largely been conducted cross-sectionally and/or focused on populations without SI. This investigation examined the associations between mental health stigma and SI cross-sectionally and longitudinally using two methodological approaches in two U.S.-based undergraduate samples ($N = 286$; $N = 237$), with one selectively recruiting individuals with recent SI. We conducted regression analyses to examine the cross-sectional and longitudinal associations between the type of stigma (i.e., perceived stigma, barriers to seeking care, suicide stigma, and help-seeking self-stigma) and SI. We also conducted random-intercept cross-lagged panel models adjusting for unmeasured, stable confounders that vary across people to approximate quasi-explanatory associations. This approach allowed us to determine what stigma was associated with SI, examine whether these associations differed by SI severity, and dissociate within- from between-person variability. Regression analyses indicated that (a) perceived stigma, barriers to care, and help-seeking self-stigma were associated cross-sectionally with SI in both samples and (b) beliefs glorifying/normalizing suicide were associated cross-sectionally and longitudinally with SI only among those with recent SI. Random-intercept cross-lagged panel models only found a quasi-explanatory association between stigma (i.e., perceived stigma, stigmatizing beliefs of suicide, beliefs that suicide is related to depression and isolation, and help-seeking self-stigma) and SI for the recent SI sample. These contrasting results highlight the importance of considering which type of stigma matters for whom when developing SI interventions.

Clinical Impact Statement

Stigmatizing beliefs about mental health and stigma predicted increased suicidal ideation among young adults, but these associations may be partly explained by factors that are unique to individuals (e.g., stable risk factors for suicidal ideation, personality factors, mental health disorders). These findings highlight the importance of assessing the function of different types of stigma when conceptualizing suicide risk.

Keywords: mental health stigma, suicide stigma, stigma of seeking mental health care, suicidal ideation, longitudinal

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Data utilized in the present study was collected as a part of an author's dissertation (Melanie A. Hom), though the analyses are original to the current article. The authors wish to provide transparency about our backgrounds. With respect to gender, when the article was submitted, four authors

identified as women and one author as a man. With respect to race, three authors identified as white, and two identified as Asian.

Work for this study was performed at Florida State University. The protocol was approved by the Florida State University Institutional Review Board for Study 1 (Protocol No. 2016.18893; Investigating the Prospective Relationship Between Sleep Problems and Suicide Risk) and Study 2 (Protocol No. 2017.20774; Identifying Cross-Sectional and Longitudinal Predictors of Help-Seeking and Treatment Engagement among Undergraduates at Elevated Suicide Risk). All authors have seen and approved the article. Opinions, interpretations, conclusions, and recommendations are those of the authors and are not necessarily

continued

In 2019, suicide was the second leading cause of death among young adults in the United States (Centers for Disease Control and Prevention, 2021). Research on suicide risk factors is needed to facilitate prevention efforts in this age group. One factor that may confer suicide risk is mental health stigma. While the conceptualization of stigma has expanded and varied since its original explication by Erving Goffman in 1963, stigma can be broadly understood as the conveyance of shared beliefs of devaluation due to one's characteristics/attributes (Link & Phelan, 2001). Constructs within stigma have been delineated, including perceived stigma (i.e., perception of others' stigmatizing beliefs) and self-stigma (i.e., internalization of stigmatizing beliefs). Mental health stigma, specifically, is a belief that an individual is tainted due to their mental health symptoms/diagnosis. Mental health stigma has been associated with numerous adverse outcomes, including suicidal ideation (SI; Ahmedani, 2011), though methodological limitations in this work hinder its interpretability. Research on various types of mental health stigma and their relationships with SI is needed to further conceptualize suicide risk and identify intervention targets. In the current article, we consider beliefs about mental health broadly (e.g., about those with any mental health condition), specific diagnoses or behaviors, and seeking treatment.

Prior literature has established a relationship between mental health stigma broadly and SI (Oexle, Waldmann, et al., 2018; Xu et al., 2016), though this research has been predominantly cross-sectional, which limits the ability to examine directionality. One of the few longitudinal studies on mental health stigma and SI found that self-stigmatizing beliefs about baseline mental health were predictive of SI at a 2-year follow-up among those with disability pension (Oexle, Müller, et al., 2018). This finding suggests that mental health stigma may contribute to SI; however, prior work has largely focused on mental health stigma (about any disorder) and overlooked other types of stigma in relation to SI.

Suicide stigma, which includes stigmatizing beliefs about SI and behavior, shares similarities with mental health stigma (e.g., includes constructs of perceived stigma and self-stigma) but is conceptually distinct (Kelly & Jorm, 2007; Nicholas et al., 2023). Suicide stigma may confer heightened stigma-related stress, prejudice, and discriminatory practices above mental health stigma (Oexle et al., 2020). Additionally, individuals and cultures may respond more positively to suicide, including reactions such as normalization, beautification, glorification, and justification of suicide (An et al., 2023); this domain has been included in suicide stigma measures. Much of the research on suicide stigma is derived from those with prior SI or suicidal behaviors (Frey et al., 2016). For example, a sample of Chinese students who endorsed more glorifying or normalizing beliefs also endorsed more recent SI

(Han et al., 2017). It is possible that those who normalize or glorify suicide may believe suicide is a more acceptable option for coping with stress. In past research, for example, the acceptability of suicide explained the relationship between exposure to suicidal behavior and subsequent SI (Kleiman, 2015). When considering one's own personal experiences with SI, it is unclear whether SI precedes these suicide stigma beliefs or vice versa. Disentangling suicide stigma and SI ordering may inform when to intervene.

Another type of stigma that may contribute to SI is the stigma of seeking mental health services, which is an overlapping but distinct construct from mental health stigma (Tucker et al., 2013). Most research has focused on the negative association between mental health-related stigma, specifically self-stigma, and help-seeking intentions and behaviors (Michelmores & Hindley, 2012; Pattyn et al., 2014; Sickel et al., 2014). This association may be particularly salient among those with SI, such that reduced treatment-seeking behaviors may, in turn, predict worsening SI. Indeed, studies have found that SI severity is negatively associated with help-seeking intentions for SI among adolescents and college-aged adults (Carlton & Deane, 2000; Wilson et al., 2010). In these studies, SI has been conceptualized as a predictor of future help-seeking. To our knowledge, the converse—help-seeking stigma as a predictor of SI—has not been investigated.

Though the preponderance of work examining the relationship between stigma and SI has been cross-sectional (Carpiniello & Pinna, 2017), a few studies have examined longitudinal relationships (Oexle et al., 2017). Cross-sectional and longitudinal relationships have both typically been examined using predictive models, which aim to predict one variable from the others (e.g., identifying what factors increase risk for SI). An important consideration of this approach is that the observed relationship may be confounded by factors that differ between people (e.g., genetic predisposition, depression, trauma, mental health knowledge). Though efforts have been made to reduce confounding through covariate inclusion, it is challenging to capture all potential variables that could be driving the effect in a single study. An alternative to predictive models is explanatory models; while explanatory models are inherently predictive, they provide additional information by attempting to isolate causal mechanisms (Hamaker et al., 2020). Explanatory research is ideally conducted in randomized settings; however, this research can be challenging or unethical, thereby necessitating the use of observational methods that adjust for unmeasured confounding factors. This can partly be done by isolating between- from within-individual variance (i.e., quasi-experimental designs; Shadish et al., 2002), providing stronger causal inference than predictive models. It is important to note that although explanatory models provide additional information regarding possible causality, they are not necessarily more optimal than predictive models

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and writing—review and editing. Anne Krendl played a supporting role in conceptualization, supervision, and writing—review and editing. Thomas Joiner played a lead role in funding acquisition and a supporting role in project administration, supervision, and writing—review and editing. Carol Chu played a lead role in supervision and a supporting role in data curation, resources, and writing—review and editing.

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(Hamaker et al., 2020). Rather, the relative utility of the approach depends on the research question. A predictive model examining the association between stigma and SI may be beneficial to identifying risk factors and differentiating groups. However, an explanatory model might be useful to determine what an intervention should target. Both approaches can be helpful theoretically (in developing and refining theoretical causal models) and practically (in identifying whom to target with interventions).

This investigation aims to explore the relationship between mental health-related stigma and SI from both predictive and (quasi-) explanatory perspectives using two U.S.-based samples with varying SI severity. Our goals were to determine what types of stigma are associated with SI, whether associations differ by the presence of SI, and the magnitude of the association after accounting for potential confounders. First, we used predictive approaches (i.e., regression models) to examine the following stigma domains predicting SI cross-sectionally and longitudinally: (a) mental health stigma (perceived stigma, barriers to seeking care), (b) suicide stigma, and (c) help-seeking self-stigma. While our aim was not to specifically disentangle perceived from self-stigma, we did include measures of both. Second, we used a quasi-explanatory approach to conduct random-intercept cross-lagged panel models (RI-CLPM), which are structural equation models that decompose the observed variance into between- and within-individual factors. The primary difference between these models is the adjustment for stable, between-person variance, thereby underscoring its impact on the relation between stigma and SI. We expected to observe that greater endorsement of stigmatizing beliefs about mental health, suicide, and seeking services would be significantly associated with more severe SI cross-sectionally and longitudinally (Aims 1 and 2). However, we expected the associations would weaken in magnitude or become null when adjusting for between-person variance (Aim 3), as it may partially explain associations observed in Aims 1 and 2.

Study 1: General Undergraduate Students

Method

Study Design and Participants

Data were collected among undergraduate students (≥ 18 years) enrolled at a large, public university in the Southeastern United States. The main purpose of the study was to investigate interpersonal mediators between sleep disturbances and SI. Participants were enrolled in a psychology course and completed a mass departmental screening survey. Questionnaires were administered and stored in Qualtrics, a web-based software platform that is confidential, secure, and Health Insurance Portability and Accountability Act-compliant. Data were collected at three time points (baseline [T1], 1-month [T2], and 2-month follow-up [T3]). Participants were compensated with 1.0 extra credit points in a participating psychology course. Approximate participation duration was 60 min.

A total of 286 participants completed T1, 259 completed T2 (90.5%), and 230 completed T3 (80.4%). Past mental health treatment and part-time employment did not differentiate T3 completion. However, a greater proportion of men ($N = 13$, 32.5%) did not complete T3 compared to women ($N = 43$, 17.5%), $\chi^2(1, 286) = 4.93$, $p = .03$. To increase the number of expected counts for chi-square tests, age (18, 19, 20, ≥ 21 years old), race/ethnicity (White, racial/ethnic minority), sexual orientation (identify and do not identify as a sexual

minority), and education (first-year undergraduate, second, third, fourth or above) were recoded; these variables did not differentiate T3 completion. Low expected counts precluded a valid chi-square test for marital status, military status, and full-time employment.

Participants were provided with local and national mental health resources, including the National Suicide Prevention Lifeline. If participants endorsed a nonzero answer to the question ($n = 23$ at T1, 13 at T2, 9 at T3), “What is your current intent to make a suicide attempt in the near future from 0 to 10, with 0 being none at all and 10 being a very strong intention?,” participants were contacted via phone and risk was assessed and managed using the Decision Tree Framework (Chu et al., 2015). The study protocol stipulated participants at imminent risk (i.e., endorsed current plan or preparatory behavior and intent) would be connected with emergency care and excluded from the study; no individuals in the study were excluded at any time point based on this criterion. The protocol was approved by the Southeastern University internal review board. Deidentified data and source code are available at <https://github.com/LaurenMOREilly/Stigma-SI>. Design and analyses were not preregistered.

Measures

Questionnaires, except demographic information, were administered at each time point.

Demographics. Participants provided basic demographic information, including sex assigned at birth, age, race/ethnicity, sexual orientation, marital status, military service status, undergraduate education level, and employment status.

Perceived Stigma and Barriers to Care for Psychological Problems Scale (Britt, 2000; Britt et al., 2008). The 11-item Perceived Stigma and Barriers to Care for Psychological Problems Scale was used to index barriers to mental health treatment. Participants were prompted with, “Using the scale provided, rate each of the possible concerns that might affect your decision to seek treatment for a psychological problem from a mental health professional.” Participants indicated the extent to which they agree (1 = *strongly disagree* and 5 = *strongly agree*) with six stigma-related barriers (“It would be too embarrassing”) and five structural barriers (“I don’t have adequate transportation”). The stigma-related barriers reflect perceived stigma, such that if one sought psychological help, it would be met with stigmatizing responses. See Supplemental Table 1 for item distribution. Prior research supported a two-factor structure (i.e., perceived stigma and barriers to care; Pietrzak et al., 2009). To examine whether the factor structure was replicated within the current sample, we conducted a confirmatory factor analysis with correlated factors using SAS software, Version 9.4 (SAS Institute, 2016). All factor loadings were significant. While the two-factor structure demonstrated fair-mediocre fit, two factors were utilized in analyses based on the original validation study (Britt, 2000; see Supplemental Table 2). For analyses, we created an average score of the items contributing to the respective factor, which we standardized (i.e., $M = 0$, $SD = 1$). Internal consistency was good for the perceived stigma ($\alpha = .88$, $.93$, and $.93$ at each time point, respectively) and structural barriers subscales ($\alpha = .81$, $.81$, and $.83$).

Stigma of Suicide Scale-Short Form (Batterham et al., 2013). The 16-item Stigma of Suicide Scale-Short Form (SOSS-SF) measures perceived suicide stigma. Participants indicate agreement (1 = *strongly disagree* and 5 = *strongly agree*) with items following, “In general, people who die by suicide are ...” Prior

SOSS-SF research found a three-factor structure of (a) stigma (e.g., those who die by suicide are “pathetic”), (b) isolation/depression (e.g., those who die by suicide are “lonely”), and (c) glorification/normalization (e.g., those who die by suicide are “brave”). See Supplemental Table 3 for the item distribution. We conducted a confirmatory factor analysis with correlated factors; a three-factor structure demonstrated an acceptable fit (Supplemental Table 4). For analyses, we created an average score of items contributing to each respective factor, which we then standardized. Internal consistency was excellent for the stigma ($\alpha = .95, .94$, and $.93$, at each time point, respectively), isolation/depression ($\alpha = .93, .95$, and $.97$), and glorification/normalization ($\alpha = .92, .94$, and $.94$) subscales.

Self-Stigma of Seeking Help (Vogel et al., 2006). The 10-item Self-Stigma of Seeking Help was used to index the self-stigma of seeking mental health care. Participants indicate agreement (1 = *strongly disagree* and 5 = *strongly agree*) with items such as, “It would make me feel inferior to ask a therapist for help.” We generated a summed total score, which we standardized. See Supplemental Table 5 for item distribution. Internal consistency was good at each time point ($\alpha = .83, .81$, and $.82$).

Depressive Symptom Inventory-Suicidality Subscale (Joiner et al., 2002). The Depressive Symptom Inventory-Suicidality Subscale (DSI-SS) is a four-item measure that assesses the frequency, controllability, intensity, and nature of SI over the past two weeks scored on a 0–3 scale. Total scores range from 0 to 12, with higher scores indicating greater SI severity. Prior research has demonstrated the reliability and validity of the DSI-SS among undergraduates (Metalsky & Joiner, 1997). For analyses, the item sum was utilized. Internal consistency was good to excellent (Supplemental Table 6).

Main Analyses

First, we conducted descriptive analyses to characterize the distribution and correlation of measures. Second, to conduct predictive modeling, we used negative binomial regression models due to overdispersion. A set of three cross-sectional models (stigma at T1 predicting DSI-SS at T1; stigma at T2 predicting DSI-SS at T2; stigma at T3 predicting DSI-SS at T3) and three longitudinal (stigma at T1 predicting DSI-SS at T2 and T3; stigma at T2 predicting DSI-SS at T3) models were conducted. To account for potential confounds, we included sex assigned at birth, race/ethnicity, age, sexual orientation, and any engagement in past mental health treatment as covariates due to their associations with SI (Huang et al., 2017; Nock et al., 2008). We also included T1 DSI-SS as a covariate in all models except for the model examining T1 stigma predicting T1 DSI-SS. Analyses were modeled using SAS 9.4 (SAS Institute, 2016), and incidence rate ratios were calculated. Standardized mean difference effect sizes were calculated using a Shiny web application (Coxe, 2022).

Third, to examine the quasi-explanatory association between stigma measures and SI while accounting for stable confounding factors, we used RI-CLPM. In these models, at least two variables (X, Y) over two or more time points ($time_1, time_2$) are regressed on themselves (autoregressive paths: $X_1 \rightarrow X_2; Y_1 \rightarrow Y_2$) and each other (cross-lagged paths: $X_1 \rightarrow Y_2; Y_1 \rightarrow X_2$). Notably, the cross-lagged paths are often interpreted as quasi-explanatory paths of interest (Usami, 2021). Specifically, RI-CLPM regresses these effects at the residual level and decomposes the variance into unobserved,

stable, between-person and time-varying, within-person latent factors (Mulder & Hamaker, 2021). We utilized structural equation modeling with maximum likelihood using the lavaan package (Rosseel, 2012) in R Version 4.2.1 (R Core Team, 2022). The models were identified with one degree of freedom. Analytic code was adapted from Mulder and Hamaker (2021). To facilitate model fit, DSI-SS was modeled continuously. A conceptual model can be viewed in Supplemental Figure 1.

Sensitivity Analyses

To examine the impact of analytic choices on our results, we conducted two sensitivity analyses. First, to examine whether differing samples at each time affected results, we conducted all models on a complete case sample. Second, to examine the impact of covariate inclusion on results, we conducted all models from Aims 1 and 2 without covariates.

Results

Descriptive Analyses

The sample was largely female (86% at T1), between 18 and 20 years old (80% at T1), White/Caucasian (73% at T1), heterosexual (93% at T1), never married (99% at T1), of civilian-military status (99% at T1), and first- or second-year undergraduates (65% at T1), and had not sought prior mental health treatment (63% at T1). Table 1 presents the demographic information, and Supplemental Table 7 presents the univariate statistics of the predictors and DSI-SS. Supplemental Table 8 presents the Pearson correlations among the predictors and DSI-SS.

Aim 1: Cross-Sectional Examination of Stigma Measures as Predictors of SI

Time 1. When conducting negative binomial regression, results indicated that perceived stigma, barriers to care, and help-seeking self-stigma were associated with DSI-SS cross-sectionally. For perceived stigma at T1, a one-unit increase in the standardized measure was associated with a 0.80 increase (standard error [SE] = 0.24) in the log of the expected count of DSI-SS at T1, or a 2.22-times greater incident rate ratio (confidence interval [1.38, 3.57]). Barriers to care at T1 were associated with an increase in DSI-SS at T1 ($\beta = 0.54, SE = 0.25$). Help-seeking self-stigma measured at T1 was also associated with DSI-SS at T1 ($\beta = 0.67, SE = 0.23$). All regression estimates are presented in Table 2; effect sizes were small to medium (Supplemental Table 9). The SOSS-SF subscales were not associated with SI.

Time 2. Barriers to care at T2 were associated with an increase in T2 DSI-SS ($\beta = 0.96, SE = 0.26$).

Time 3. The only statistically significant association at T3 was barriers to care; one SD increase was associated with an increase of 1.30 ($SE = 0.51$) in the expected log count of DSI-SS at T3.

Aim 2: Longitudinal Examination of Stigma Measures as Predictors of SI

Perceived stigma at T1 was associated with an increase of DSI-SS at T2 ($\beta = 0.60, SE = 0.26$). Barriers to care at T2 were associated

Table 1
Sample Demographics

Variable	N (%)					
	General undergraduate			Recent suicidal ideation		
	Time 1 ^a	Time 2 ^b	Time 3 ^c	Time 1 ^d	Time 2 ^e	Time 3 ^f
Sex assigned at birth						
Male	40 (13.99)	32 (12.36)	27 (11.74)	60 (25.32)	54 (25.59)	36 (24.16)
Female	246 (86.01)	227 (87.64)	203 (88.26)	177 (74.68)	157 (74.41)	113 (75.84)
Age						
18	98 (34.27)	88 (32.66)	78 (33.91)	84 (35.44)	71 (33.65)	43 (28.86)
19	75 (26.22)	67 (25.87)	62 (26.96)	75 (31.65)	69 (32.70)	50 (33.56)
20	57 (19.93)	53 (20.46)	46 (20.00)	42 (17.72)	40 (18.96)	28 (18.79)
≥21	56 (19.58)	51 (19.69)	44 (19.13)	36 (15.19)	31 (14.69)	28 (18.79)
Race/ethnicity						
White/Caucasian	210 (73.43)	191 (73.75)	169 (73.48)	128 (54.01)	115 (54.50)	81 (24.36)
Black	21 (7.34)	18 (6.95)	16 (6.96)	29 (12.24)	25 (11.85)	23 (15.44)
Hispanic/Latino/a	36 (12.59)	34 (13.13)	31 (13.48)	56 (23.63)	49 (23.22)	34 (22.82)
Asian/Pacific Islander	12 (4.20)	11 (4.25)	9 (3.91)	16 (6.75)	15 (7.11)	8 (5.37)
Other	7 (2.45)	5 (1.93)	5 (2.17)	8 (3.38)	7 (3.32)	3 (2.01)
Sexual orientation						
Heterosexual/straight	266 (93.01)	240 (92.66)	214 (93.04)	171 (72.15)	152 (72.04)	105 (70.47)
Gay/lesbian	4 (1.40)	3 (1.16)	1 (0.43)	9 (3.80)	8 (3.79)	4 (2.68)
Bisexual	15 (5.24)	15 (5.79)	14 (6.09)	45 (18.99)	40 (18.96)	32 (21.48)
Not sure	1 (0.35)	1 (0.39)	1 (0.43)	10 (4.22)	9 (4.27)	6 (4.03)
Decline to answer				2 (0.84)	2 (0.95)	2 (1.34)
Any prior mental health treatment	107 (37.41)	97 (37.45)	83 (36.09)	108 (45.57)	94 (44.55)	63 (42.28)
Marital status						
Married	2 (0.70)	2 (0.77)	1 (0.43)	3 (1.27)	2 (0.95)	2 (1.34)
Divorced or separated	1 (0.35)	1 (0.39)	1 (0.43)	1 (0.42)	1 (0.47)	1 (0.67)
Widowed				1 (0.42)	1 (0.47)	1 (0.67)
Never married	283 (98.95)	256 (98.84)	228 (99.13)	232 (97.89)	207 (98.10)	145 (97.32)
Military status						
National guard	1 (0.35)	1 (0.39)	0			
Army reserve				1 (0.42)	0	0
Veteran				1 (0.42)	1 (0.47)	1 (0.67)
Civilian	285 (99.65)	258 (99.61)	230 (100)	235 (99.16)	210	148 (99.33)
Undergraduate education						
First year	118 (41.26)	106 (40.93)	95 (41.30)	105 (44.30)	92 (43.60)	61 (40.94)
Second year	69 (24.13)	60 (23.17)	56 (24.35)	59 (24.89)	55 (26.07)	35 (23.49)
Third year	56 (19.58)	54 (20.85)	44 (19.13)	47 (19.83)	41 (19.43)	33 (22.15)
Fourth year	38 (13.29)	35 (13.51)	31 (13.48)	20 (8.44)	19 (9.00)	17 (11.41)
Fifth year	4 (1.40)	3 (1.16)	3 (1.30)	5 (2.11)	4 (1.90)	3 (2.01)
Other	1 (0.35)	1 (0.39)	1 (0.43)	1 (0.42)	0	0
Employed full-time (>30 hr/week)	5 (1.75)	4 (1.54)	4 (1.74)	5 (2.11)	5 (2.37)	4 (2.68)
Employed part-time (<30 hr/week)	72 (25.17)	68 (26.25)	63 (27.39)	72 (30.38)	66 (31.28)	51 (34.22)

^aBased on 286 individuals. ^bBased on 259 individuals. ^cBased on 230 individuals. ^dBased on 237 individuals. ^eBased on 211 individuals. ^fBased on 149 individuals.

with an increase at T3 ($\beta = 1.40, SE = 0.51$). SOSS-SF subscales and help-seeking self-stigma were not associated with SI (see Table 2).

stigma ($\beta = 0.54, SE = 0.10$) all demonstrated statistically significant autoregressive associations (Table 3).

Aim 3: Quasi-Explanatory Examination of the Associations Between Stigma Measures and SI

Results from the RI-CLPM demonstrated few statistically significant associations, all of which were autoregressive paths. Perceived stigma showed stability over time (T1 predicted T2, which predicted T3; $\beta = 0.34, SE = 0.14$ and $\beta = 0.44, SE = 0.11$, respectively). From T2 and T3, the SOSS-SF isolation/depression subscale ($\beta = 0.25, SE = 0.11$), the SOSS-SF glorification/normalization subscale ($\beta = 0.31, SE = 0.10$), and help-seeking self-

Sensitivity Analyses

Results from the complete case analyses indicated comparable results, suggesting that perceived stigma and barriers to care were predominantly associated with DSI-SS (Supplemental Tables 10a and 10b). When excluding covariates, associations were similar to the main analyses; however, help-seeking self-stigma at T1 was associated with DSI-SS at T2 ($\beta = 0.73, SE = 0.24$) and perceived stigma at T2 with DSI-SS at T2 ($\beta = 0.49, SE = 0.22$; Supplemental Table 11).

Table 2
Regression Estimates Between Stigma and Suicidal Ideation (Aims 1 and 2)

Stigma measure	Time 1 SI		Time 2 SI		Time 3 SI	
	(β , <i>SE</i>)	(IRR, CI)	(β , <i>SE</i>)	(IRR, CI)	(β , <i>SE</i>)	(IRR, CI)
General undergraduate						
Time 1						
Perceived stigma	0.80 (0.24)** ^a	2.22 [1.38, 3.57]** ^a	0.60 (0.26) ^c	1.81 [1.10, 3.00] ^c	0.51 (0.59) ^e	1.66 [0.53, 5.24] ^e
Barriers to care	0.54 (0.25) ^a	1.72 [1.06, 2.79] ^a	0.51 (0.26) ^c	1.66 [1.00, 2.78] ^c	-0.21 (0.57) ^e	0.81 [0.26, 2.49] ^e
SOSS-SF stigma	-0.04 (0.24) ^a	0.97 [0.61, 1.53] ^a	-0.60 (0.31) ^c	0.55 [0.30, 1.01] ^c	-0.22 (0.42) ^e	0.80 [0.35, 1.84] ^e
SOSS-SF isolation/depression	-0.12 (0.24) ^a	0.89 [0.56, 1.41] ^a	0.16 (0.24) ^c	1.17 [0.73, 1.88] ^c	0.43 (0.58) ^e	1.54 [0.50, 4.78] ^e
SOSS-SF glorification/ normalization	0.23 (0.23) ^a	1.26 [0.80, 2.00] ^a	0.36 (0.24) ^c	1.43 [0.89, 2.30] ^c	-0.23 (0.56) ^e	0.80 [0.27, 2.39] ^e
Self-stigma of seeking help	0.67 (0.23)** ^b	1.95 [1.24, 3.07]** ^b	0.41 (0.23) ^d	1.50 [0.96, 2.36] ^d	-0.12 (0.52) ^f	0.89 [0.32, 2.47] ^f
Time 2						
Perceived stigma			0.42 (0.21) ^c	1.52 [1.00, 2.31] ^c	0.02 (0.52) ^e	1.02 [0.37, 2.85] ^e
Barriers to care			0.96 (0.26)** ^c	2.61 [1.56, 4.38]** ^c	1.40 (0.51) ^{**c}	4.05 [1.50, 10.90]** ^c
SOSS-SF stigma			-0.18 (0.31) ^d	0.83 [0.45, 1.54] ^d	0.10 (0.49) ^e	1.10 [0.42, 2.88] ^e
SOSS-SF isolation/depression			0.53 (0.32) ^c	1.70 [0.91, 3.16] ^c	0.38 (0.57) ^e	1.46 [0.48, 4.47] ^e
SOSS-SF glorification/ normalization			0.40 (0.28) ^c	1.49 [0.86, 2.56] ^c	0.56 (0.52) ^e	1.75 [0.63, 4.87] ^e
Self-stigma of seeking help			0.29 (0.25) ^d	1.34 [0.82, 2.17] ^d	-0.33 (0.49) ^e	0.71 [0.28, 1.86] ^e
Time 3						
Perceived stigma					0.23 (0.49) ^e	1.25 [0.48, 3.26] ^e
Barriers to care					1.30 (0.51) ^{**c}	3.67 [1.34, 10.03]** ^c
SOSS-SF stigma					-0.31 (0.53) ^e	0.74 [0.26, 2.06] ^e
SOSS-SF isolation/depression					-0.07 (0.46) ^e	0.93 [0.38, 2.30] ^e
SOSS-SF glorification/ normalization					-0.19 (0.56) ^e	0.83 [0.28, 2.45] ^e
Self-stigma of seeking help					0.11 (0.43) ^e	1.12 [0.48, 2.61] ^e
Recent suicidal ideation						
Time 1						
Perceived stigma	0.15 (0.05)** ^g	1.16 [1.06, 1.27]** ^g	0.28 (0.06)** ^h	1.33 [1.17, 1.51]** ^h	0.16 (0.11) ⁱ	1.17 [0.94, 1.46] ⁱ
Barriers to care	0.17 (0.05)** ^g	1.18 [1.08, 1.29]** ^g	0.10 (0.06) ^h	1.10 [0.97, 1.25] ^h	0.04 (0.11) ⁱ	1.05 [0.83, 1.31] ⁱ
SOSS-SF stigma	-0.01 (0.04) ^g	0.99 [0.91, 1.08] ^g	-0.07 (0.07) ^h	0.92 [0.81, 1.04] ^h	-0.10 (0.12) ⁱ	0.91 [0.72, 1.14] ⁱ
SOSS-SF isolation/depression	0.08 (0.05) ^g	1.09 [0.99, 1.19] ^g	-0.03 (0.07) ^h	0.97 [0.85, 1.10] ^h	-0.11 (0.12) ⁱ	0.90 [0.71, 1.13] ⁱ
SOSS-SF glorification/ normalization	0.17 (0.05)** ^g	1.18 [1.08, 1.30]** ^g	0.19 (0.07)** ^h	1.21 [1.07, 1.38]** ^h	0.28 (0.11)** ⁱ	1.33 [1.07, 1.65]** ⁱ
Self-stigma of seeking help	0.07 (0.05) ^g	1.08 [0.98, 1.18] ^g	0.19 (0.06)** ^h	1.21 [1.07, 1.37]** ^h	-0.16 (0.11) ⁱ	0.85 [0.68, 1.06] ⁱ
Time 2						
Perceived stigma			0.33 (0.06)** ^h	1.39 [1.23, 1.57]** ^h	-0.04 (0.11) ⁱ	0.96 [0.78, 1.18] ⁱ
Barriers to care			0.28 (0.06)** ^h	1.32 [1.17, 1.50]** ^h	0.31 (0.12)** ⁱ	1.37 [1.09, 1.72]** ⁱ
SOSS-SF stigma			0 (0.06) ^h	1.00 [0.88, 1.12] ^h	-0.35 (0.12)** ⁱ	0.70 [0.55, 0.89]** ⁱ
SOSS-SF isolation/depression			0.16 (0.07) ^h	1.18 [1.03, 1.35] ^h	0.06 (0.11) ⁱ	1.06 [0.85, 1.32] ⁱ
SOSS-SF glorification/ normalization			0.30 (0.06)** ^h	1.35 [1.19, 1.53]** ^h	0.30 (0.10)** ⁱ	1.35 [1.10, 1.65]** ⁱ
Self-stigma of seeking help			0.24 (0.06)** ^h	1.27 [1.13, 1.43]** ^h	-0.16 (0.10) ⁱ	0.86 [0.70, 1.05] ⁱ
Time 3						
Perceived stigma					0.30 (0.10)** ⁱ	1.35 [1.10, 1.65]** ⁱ
Barriers to care					0.70 (0.12)** ⁱ	2.02 [1.59, 2.57]** ⁱ
SOSS-SF stigma					-0.32 (0.12)** ⁱ	0.73 [0.57, 0.92]** ⁱ
SOSS-SF isolation/depression					0.13 (0.13) ⁱ	1.14 [0.90, 1.45] ⁱ
SOSS-SF glorification/ normalization					0.41 (0.10)** ⁱ	1.51 [1.24, 1.85]** ⁱ
Self-stigma of seeking help					0.07 (0.10) ^j	1.07 [0.87, 1.31] ^j

Note. Each predictor was estimated by maximum-likelihood negative binomial regression and Poisson regression in the general undergraduate and recent suicidal ideation sample, respectively. Each was standardized with a $M = 0$ and $SD = 1$. Covariates: sex assigned at birth, race/ethnicity, age, sexual orientation, and any past mental health treatment. All covariates were dummy coded (reference = female, White, age 18, and heterosexual, respectively). Time 1 DSI-SS was included as a covariate for all models except T1 to T1. SI = suicidal ideation; *SE* = standard error; IRR = incidence rate ratio; CI = confidence interval; SOSS-SF = Stigma of Suicide Scale-Short Form; DSI-SS = Depressive Symptom Inventory-Suicidality Subscale; T = time.

^a Based on 286 individuals. ^b Based on 284 individuals. ^c Based on 259 individuals. ^d Based on 258 individuals. ^e Based on 230 individuals. ^f Based on 229 individuals. ^g Based on 237 individuals. ^h Based on 211 individuals. ⁱ Based on 149 individuals. ^j Based on 148 individuals.

* $p < .05$. ** $p < .01$.

Table 3
Estimates From Random-Intercept Cross-Lagged Panel Models
(Aim 3)

Path between measure	General undergraduate ^a β (SE)	Recent suicidal ideation ^b β (SE)
Perceived stigma (PS) ^c		
Autoregressive paths		
PS ₁ → PS ₂	0.34 (0.14)**	0.47 (0.13)**
PS ₂ → PS ₃	0.44 (0.11)**	0.14 (0.19)
DSI-SS ₁ → DSI-SS ₂	0.10 (0.09)	0.29 (0.11)*
DSI-SS ₂ → DSI-SS ₃	0.02 (0.12)	0.17 (0.13)
Cross-lagged paths		
PS ₁ → DSI-SS ₂	0.21 (0.11)	0.09 (0.25)
DSI-SS ₁ → PS ₂	0.11 (0.09)	0.03 (0.04)
PS ₂ → DSI-SS ₃	0.16 (0.11)	-0.45 (0.27)*
DSI-SS ₂ → PS ₃	0.07 (0.10)	0.03 (0.07)
Barriers to care (BC) ^d		
Autoregressive paths		
BC ₁ → BC ₂	0.20 (0.15)	0.30 (0.18)
BC ₂ → BC ₃	0.07 (0.17)	0.19 (0.17)
DSI-SS ₁ → DSI-SS ₂	0.09 (0.09)	0.31 (0.10)**
DSI-SS ₂ → DSI-SS ₃	-0.06 (0.13)	0.10 (0.13)
Cross-lagged paths		
BC ₁ → DSI-SS ₂	0.18 (0.12)	0.06 (0.29)
DSI-SS ₁ → BC ₂	-0.02 (0.08)	0.08 (0.04)
BC ₂ → DSI-SS ₃	0.21 (0.13)	0.11 (0.26)
DSI-SS ₂ → BC ₃	0.04 (0.13)	0.21 (0.06)
SOSS-SF stigma (SS) ^e		
Autoregressive paths		
SS ₁ → SS ₂	-0.15 (0.10)	0.51 (0.13)**
SS ₂ → SS ₃	-0.15 (0.21)	0.43 (0.16)*
DSI-SS ₁ → DSI-SS ₂	0.13 (0.09)	0.28 (0.11)*
DSI-SS ₂ → DSI-SS ₃	0.01 (0.13)	0.05 (0.13)
Cross-lagged paths		
SS ₁ → DSI-SS ₂	-0.11 (0.14)	-0.20 (0.21)
DSI-SS ₁ → SS ₂	0.02 (0.06)	-0.14 (0.04)
SS ₂ → DSI-SS ₃	-0.01 (0.17)	-0.45 (0.30)*
DSI-SS ₂ → SS ₃	0.06 (0.13)	-0.16 (0.05)
SOSS-SF isolation/depression (SD) ^f		
Autoregressive paths		
SD ₁ → SD ₂	-0.24 (0.40)	0.001 (0.43)
SD ₂ → SD ₃	0.25 (0.11)**	0.24 (0.15)*
DSI-SS ₁ → DSI-SS ₂	0.12 (0.09)	0.27 (0.10)*
DSI-SS ₂ → DSI-SS ₃	-0.01 (0.13)	0.04 (0.13)
Cross-lagged paths		
SD ₁ → DSI-SS ₂	0.07 (0.16)	0.01 (0.48)
DSI-SS ₁ → SD ₂	-0.07 (0.13)	0.04 (0.04)
SD ₂ → DSI-SS ₃	0.07 (0.07)	0.07 (0.23)
DSI-SS ₂ → SD ₃	0.08 (0.15)	0.25 (0.06)*
SOSS-SF glorification/normalization (SG) ^g		
Autoregressive paths		
SG ₁ → SG ₂	-0.13 (0.27)	0.16 (0.18)
SG ₂ → SG ₃	0.31 (0.10)**	0.08 (0.14)
DSI-SS ₁ → DSI-SS ₂	0.10 (0.10)	0.29 (0.10)**
DSI-SS ₂ → DSI-SS ₃	-0.01 (0.13)	0.10 (0.12)
Cross-lagged paths		
SG ₁ → DSI-SS ₂	0.05 (0.14)	0.01 (0.30)
DSI-SS ₁ → SG ₂	-0.16 (0.12)	0.14 (0.04)
SG ₂ → DSI-SS ₃	0.01 (0.08)	0.01 (0.21)

(table continues)

Table 3 (continued)

Path between measure	General undergraduate ^a β (SE)	Recent suicidal ideation ^b β (SE)
DSI-SS ₂ → SG ₃	0.05 (0.13)	0.21 (0.06)
Self-stigma of seeking help (SSOSH) ^h		
Autoregressive paths		
SSOSH ₁ → SSOSH ₂	0.11 (0.26)	0.51 (0.14)**
SSOSH ₂ → SSOSH ₃	0.54 (0.10)**	0.54 (0.15)**
DSI-SS ₁ → DSI-SS ₂	0.11 (0.09)	0.24 (0.10)*
DSI-SS ₂ → DSI-SS ₃	-0.01 (0.14)	0.03 (0.13)
Cross-lagged paths		
SSOSH ₁ → DSI-SS ₂	0.17 (0.02)	0.23 (0.03)*
DSI-SS ₁ → SSOSH ₂	-0.09 (0.70)	0.18 (0.32)*
SSOSH ₂ → DSI-SS ₃	-0.21 (0.02)	0.04 (0.04)
DSI-SS ₂ → SSOSH ₃	0.15 (0.65)	0.03 (0.39)

Note. Note that for all models, the degrees of freedom = 1. SE = standard error; DSI-SS = Depressive Symptom Inventory-Suicidality Subscale; SOSS-SF = Stigma of Suicide Scale-Short Form; NFI = normed fit index; CFI = comparative fit index; RMSEA = root-mean-square error of approximation; SI = suicidal ideation.

^aBased on 286 individuals. ^bBased on 237 individuals. ^cFor general undergraduate sample, NFI = 0.99, CFI = 1, RMSEA = 0. For recent SI sample, NFI = 0.99, CFI = 0.99, RMSEA = 0.09. ^dFor general undergraduate sample, NFI = 1, CFI = 1, RMSEA = 0. For recent SI sample, NFI = 0.97, CFI = 0.98, RMSEA = 0.15. ^eFor general undergraduate sample, NFI = 0.99, CFI = 0.99, RMSEA = 0.03. For recent SI sample, NFI = 0.99, CFI = 0.99, RMSEA = 0.07. ^fFor general undergraduate sample, NFI = 0.99, CFI = 0.99, RMSEA = 0.04. For recent SI sample, NFI = 0.99, CFI = 1, RMSEA = 0. ^gFor general undergraduate sample, NFI = 0.98, CFI = 0.98, RMSEA = 0.14. For recent SI sample, NFI = 0.98, CFI = 0.99, RMSEA = 0.11. ^hFor general undergraduate sample, NFI = 1, CFI = 1, RMSEA = 0. For recent SI sample, NFI = 1, CFI = 1, RMSEA = 0.

* $p < .05$. ** $p < .01$.

Study 2: Undergraduates With Recent Suicidal Ideation

Method

Study Design and Participants

Data for Study 2 were collected among undergraduate students (≥ 18 years) enrolled at the same university as Study 1. The original investigation's purpose was to investigate predictors of treatment initiation and engagement in a higher-risk sample of undergraduates; therefore, individuals were excluded if they were receiving ongoing psychiatric or psychological care during recruitment. Individuals were not excluded if they initiated care post-recruitment. In the current article, we utilize these data in secondary analyses. The general inclusion criterion was a history of SI since the beginning of undergraduate studies, as assessed by the Self-Injurious Thoughts and Behaviors Interview-Short Form (Nock et al., 2007). Approximately half of the sample was recruited based on past-month SI on the Self-Injurious Thoughts and Behaviors Interview-Short Form.

Participants were recruited through mass screening and general fliers posted around campus. Data were collected at three time points (baseline [T1], 2-month [T2], and 6-month follow-up [T3]). Participants presented to a psychology lab at T1, whereas T2 and

T3 were collected virtually. Data storage was identical to Study 1. A total of 237 participants completed T1, 211 (89%) completed T2, and 149 (62.9%) completed T3. Chi-square tests indicated sex assigned at birth, race/ethnicity, past mental health treatment, and part-time employment did not differentiate T3 completion. To prevent low expected cell counts for chi-square tests, age (18, 19, 20, and ≥ 21), sexual orientation (identity or do not identify as a sexual minority), and education (first-year undergraduate, second, third, and fourth or above) were recoded; sexual orientation and education did not differentiate T3 completion. A greater proportion of those 21 years or older ($N = 28$, 18.8%) completed the study compared to those who did not ($N = 8$, 9.1%), $\chi^2(4, 237) = 10.57, p = .03$. Low expected counts precluded a valid chi-square test for marital status, military status, education, and full-time employment.

Participants could receive either 1.5 extra credit points in participating psychology courses or a \$15 Amazon gift card for approximately 1.5 hr of study participation. Clinical triage was conducted, and mental health resources were provided, as in Study 1.

Measures

The same self-report measures from Study 1 were included in Study 2.

Perceived Stigma and Barriers to Care for Psychological Problems Scale. Item distribution can be found in Supplemental Table 1. We first examined the factor structure (two-factor structure; Supplemental Table 2) and then created an average score of the items contributing to the respective factor. Internal consistency of the perceived stigma subscale was good ($\alpha = .87, .90$, and $.88$, at each time point, respectively), and that of the structural barriers subscale was acceptable ($\alpha = .72, .74$, and $.78$).

SOSS-SF. Item distribution can be found in Supplemental Table 3. As in Study 1, we examined the factor structure (three factors; Supplemental Table 4) and averaged items contributing to each factor, which we standardized. The internal consistency ranged from good to excellent for the stigma ($\alpha = .92, .93$, and $.92$), isolation/depression ($\alpha = .88, .92$, and $.94$), and glorification/normalization ($\alpha = .82, .88$, and $.87$) subscales.

Self-Stigma of Seeking Help. Item distribution can be found in Supplemental Table 5. We generated a total score and then standardized this measure. Internal consistency was good ($\alpha = .88, .86$, and $.82$).

DSI-SS. Consistent with Study 1, we utilized the sum of the items for analyses. Internal consistency was good ($\alpha = .84, .87, .88$). Alpha estimates are reported in Supplemental Table 6.

Main Analyses

The analytic approach in Study 1 was replicated in Study 2 with a few modifications. Given that the data did not indicate overdispersion, we conducted Poisson regression models in Study 2 instead of negative binomial models. Additionally, we conducted chi-square tests to compare whether samples from Study 1 and 2 differed in terms of demographic variables.

Sensitivity Analyses

All sensitivity analyses described in Study 1 were replicated.

Results

Descriptive Analyses

At T1, most of the sample was female (75%), between the ages of 18 and 20 years old (85%), White/Caucasian race (54%), heterosexual (72%), never married (98%), of civilian-military status (99%), and first- or second-year undergraduates (69%). Approximately 45% of participants had sought prior mental health treatment. Table 1 presents demographic information, and Supplemental Table 7 presents univariate statistics on predictors and DSI-SS. Supplemental Table 13 presents the Pearson correlations among the predictors and DSI-SS.

Chi-square tests indicated that the Study 1 and Study 2 samples did not differ in demographic characteristics, except for sex assigned at birth, race/ethnicity, and sexual orientation. A greater proportion of males were included in Study 2 ($N = 60$, 25.3%) than in Study 1 ($N = 40$, 14%), $\chi^2(1, 523) = 10.76, p < .01$. A greater proportion of Hispanic/Latino/individuals ($N = 56$, 23.6%) were included in Study 2 than Study 1 ($N = 36$, 12.6%), $\chi^2(4, 523) = 21.76, p < .01$. A greater proportion of bisexual individuals were included in Study 2 ($N = 45$, 19%) than Study 1 ($N = 5.2\%$), $\chi^2(1, 523) = 10.76, p < .01$. As expected, chi-square tests revealed that a greater proportion of individuals endorsed nonzero DSI-SS scores in Study 2 ($N = 155$, 65.4%) than Study 1 ($N = 33$, 11.5%), $\chi^2(1, 523) = 163.30, p < .01$. Two-sample t tests suggested no significant differences in sample means with respect to the stigma predictor variables.

Aim 1: Cross-Sectional Examination of Stigma Measures as Predictors of SI

Time 1. Poisson regression estimates (Table 2) suggested that perceived stigma and barriers to care at T1 were associated with DSI-SS ($\beta = 0.15, SE = 0.05$ and $\beta = 0.17, SE = 0.05$, respectively). The SOSS-SF glorification/normalization subscale demonstrated a positive association ($\beta = 0.17, SE = 0.05$) with DSI-SS. Effect sizes were small to medium (Supplemental Table 9).

Time 2. All measures except for the SOSS-SF suicide stigma subscale demonstrated cross-sectional associations. Specifically, perceived stigma ($\beta = 0.28, SE = 0.06$), barriers to care ($\beta = 0.28, SE = 0.06$), SOSS-SF isolation/depression subscale ($\beta = 0.16, SE = 0.07$), SOSS-SF glorification/normalization subscale ($\beta = 0.30 [SE = 0.06]$), and help-seeking self-stigma ($\beta = 0.24, SE = 0.06$) were positively associated with DSI-SS at T2.

Time 3. Perceived stigma and barriers to care at T3 exhibited associations ($\beta = 0.30, SE = 0.10$ and $\beta = 0.70, SE = 0.12$, respectively) with DSI-SS at T3. Of the SOSS-SF subscales, stigma and glorification/normalization subscales demonstrated a positive relationship with DSI-SS ($\beta = -0.31, SE = 0.12$ and $\beta = 0.41, SE = 0.10$, respectively).

Aim 2: Longitudinal Examination of Stigma Measures as Predictors of SI

Perceived stigma at T1 was associated with DSI-SS at T2 ($\beta = 0.28, SE = 0.06$). Perceived stigma at T2 did not demonstrate a longitudinal association with DSI-SS at T3. Barriers to care at T1 did not demonstrate an association with DSI-SS at T2 or T3. When measured at T2, barriers to care were associated with DSI-SS at T3 ($\beta = 0.31, SE = 0.12$). The SOSS-SF glorification/normalization subscale demonstrated a robust association at each timepoint (T1

and T2: $\beta = 0.19, SE = 0.07$; T1 and T3: $\beta = 0.28, SE = 0.11$; T2 and T3: $\beta = 0.30, SE = 0.10$). The SOSS-SF stigma subscale at T2 was negatively associated with DSI-SS at T3 ($\beta = -0.35, SE = 0.12$). Help-seeking self-stigma at T1 was associated with DSI-SS at T2 ($\beta = 0.19, SE = 0.06$). Table 2 presents the regression estimates and incidence rate ratios for each model.

Aim 3: Quasi-Explanatory Examination of the Associations Between Stigma Measures and SI

RI-CLPM demonstrated autoregressive associations for barriers to care and SOSS-SF glorification/normalization, whereas perceived stigma, SOSS-SF stigma, SOSS-SF isolation/depression, and help-seeking self-stigma demonstrated autoregressive and cross-lagged associations. T1 DSI-SS was associated with itself at T2 in the barriers to care and SOSS-SF glorification/normalization models ($\beta = 0.31, SE = 0.10$ and $\beta = 0.29, SE = 0.10$, respectively).

Regarding cross-lagged associations, perceived stigma and SOSS-SF stigma at T2 were both negatively associated with DSI-SS at T3 ($\beta = -0.45, SE = 0.27$ and $\beta = -0.45, SE = 0.30$, respectively). DSI-SS at T2 predicted SOSS-SF isolation/depression at T3 ($\beta = 0.25, SE = 0.06$). Finally, help-seeking self-stigma at T1 predicted DSI-SS at T2 ($\beta = 0.23, SE = 0.03$), and DSI-SS at T1 predicted help-seeking self-stigma at T2 ($\beta = 0.18, SE = 0.32$). All results are presented in Table 3. Refer to Figure 1 for a visual representation of the RI-CLPM.

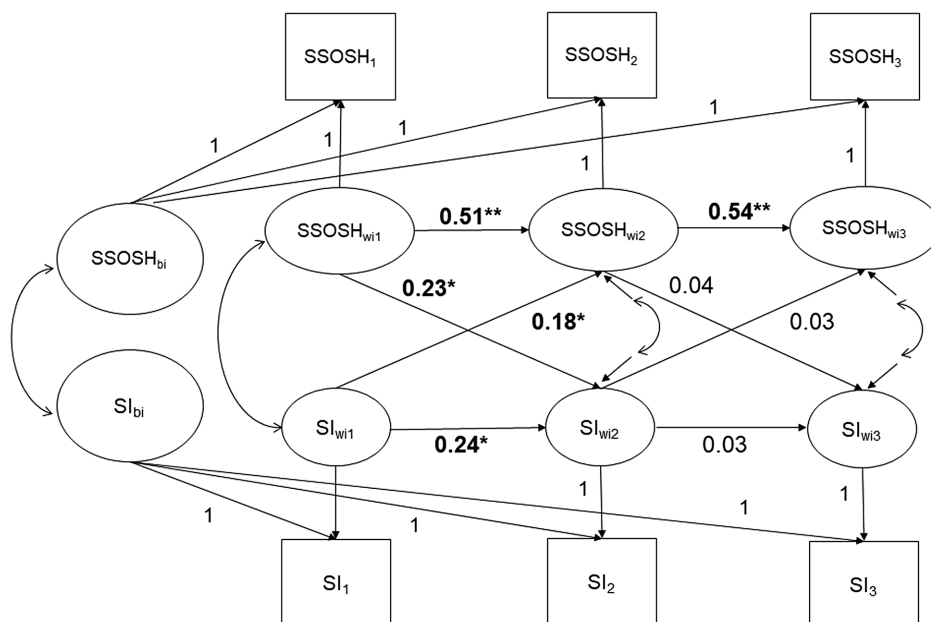
Sensitivity Analyses

The complete case analyses for Aims 1 and 2 indicated comparable results, suggesting that perceived stigma, barriers to care, and SOSS-SF suicide glorification/normalization were associated with DSI-SS. For Aim 3, RI-CLPM complete case analyses showed fewer statistically significant results; cross-lagged paths between SOSS-SF isolation/depression and DSI-SS and help-seeking self-stigma and DSI-SS were null (Supplemental Tables 10a and 10b). When excluding covariates for Aims 1 and 2, associations were similar to the main analyses (Supplemental Table 11).

Discussion

The overarching aim of this article was to examine the relationships between types of mental health-related stigma and SI using two different modeling approaches (predictive using regression models and quasi-explanatory using RI-CLPM) in two samples that varied in SI severity. There were three main findings: (1) there were numerous cross-sectional associations, with perceived stigma, barriers to care, and help-seeking self-stigma predicting SI among both samples and suicide stigma subscales predicting SI in Study 2 (Aim 1); (2) longitudinal regression analyses yielded fewer significant associations for both samples, but notably demonstrated a robust longitudinal relationship between glorification/normalization of suicide beliefs and SI in Study 2 (Aim 2); and (3) quasi-

Figure 1
RI-CLPM Between Self-Stigma of Seeking Help (SSOSH) and DSI-SS (SI) Among the Sample With Recent Suicidal Ideation



Note. We selectively chose one model to present a visual representation of the path coefficients summarized in Table 3. Autoregressive and cross-lagged path coefficients are presented. Statistically significant results are bolded. Please refer to Table 3 for the complete results of all models. RI-CLPM = random-intercept cross-lagged panel models; DSI-SS = Depressive Symptom Inventory-Suicidality Subscale; SI = suicidal ideation; wi = within individual; bi = between individuals.
* $p < .05$. ** $p < .01$.

explanatory models found only a few autoregressive associations in Study 1, whereas Study 2 demonstrated cross-lagged associations for perceived stigma, suicide stigma, isolation/depression beliefs about suicide, and help-seeking self-stigma.

First, numerous significant cross-sectional associations were demonstrated across both studies. Elevations in perceived stigma, barriers to care, and help-seeking self-stigma were associated with elevations in SI cross-sectionally. These results are consistent with prior cross-sectional research demonstrating positive associations between mental health-related stigma and SI (Oexle, Waldmann, et al., 2018). However, suicide stigma measures only demonstrated significant cross-sectional associations in Study 2 (i.e., the higher-risk sample), such that greater glorification/normalization of suicide and attribution of suicide to isolation/depression were associated with greater SI endorsement. Additionally, greater endorsement of stigmatizing beliefs of suicide was associated with lower endorsement of SI cross-sectionally in Study 2. The experiences that may predispose one to SI may also relate to stigmatizing beliefs. For example, mental health symptoms and SI may normalize SI, which appears to predict SI.

In contrast, when analyzing stigma and SI using longitudinal regression models (Aim 2), many associations between stigma measures and SI were rendered null, suggesting that these associations do not persist over longer periods of time (e.g., more than 1 month) or after adjustment for baseline SI, further attesting to the importance of longitudinal designs. As noted, in Study 1, perceived stigma was significantly longitudinally associated with SI between T1 and T2 and barriers to care with SI between T2 and T3. In Study 2, perceived stigma, barriers to care, help-seeking self-stigma, and stigmatizing beliefs of suicide all demonstrated significant longitudinal associations with SI. Glorification/normalization of suicide demonstrated a robust association longitudinally with SI at each time point. These longitudinal analyses extend past research by showing that multiple types of stigma predict SI, which may serve as risk indicators.

Importantly, the associations between suicide stigma measures and SI differed across studies, suggesting that clinical severity and suicide risk level may impact these relationships. The suicide stigma subscales were not significantly associated with SI in the general undergraduate sample. Within the recent SI sample, the measure of suicide glorification/normalization demonstrated robust associations cross-sectionally and longitudinally. Findings from our study extend past research (Batterham et al., 2013) by examining samples of varying severity and demonstrating that greater glorification/normalization of suicide at baseline predicts more severe SI up to 6 months later. It is possible that glorifying or normalizing suicide may be related to viewing suicidal behavior as a viable option to cope with and/or escape from stress (and thereby decreasing self-efficacy to use alternative coping mechanisms) and engaging in mental imagery and rehearsal of suicide. As mentioned in the methods, the measure of suicide stigma did not assess self-stigma. Our results may suggest that individuals with recent SI may be responding differently to the measure than those without recent SI. For example, suicide stigma measures may be predictive specifically among those who have increased SI, potentially through self-referencing and internalization of beliefs. In fact, past research has demonstrated that self-stigma mediated perceived stigma and SI among a sample of those with mental health disorders (Oexle, Müller et al., 2018). For those without recent SI, it may be easier to detach from public perceptions of suicide stigma, such that they do

not predict SI. Additionally, while our analyses found support for associations at the one- or 2-month follow-up, many of our mental health stigma measures were no longer predictive of SI, either two (in Study 1) or 6 months later (in Study 2). This may be due to the transiency of stigmatizing beliefs, the impact of stigmatizing beliefs, and/or SI.

For our third aim, we were interested in examining the associations between stigma and SI across time while removing the effect of stable, between-person factors within the course of the study to approximate the quasi-explanatory association between stigma measures and SI. Results from RI-CLPM suggested that among a general undergraduate sample, there were no cross-lagged associations between stigma and SI. Therefore, when accounting for stable factors that vary between individuals, stigma measures no longer predicted SI.

Among undergraduates with recent SI, however, numerous cross-lagged associations emerged. Perceived stigma and stigmatizing beliefs about suicide both negatively predicted SI. Interestingly, the directionality of perceived stigma reversed between prediction approaches (Aims 1 and 2) and quasi-explanatory approaches (Aim 3). Perceived stigma and stigmatizing beliefs of suicide predicted SI, whereas SI predicted the attribution of suicide to isolation/depression. Finally, a reciprocal association was demonstrated between help-seeking self-stigma and SI. Notably, whereas regression models demonstrated a robust association between glorifying/normalizing suicide and SI in Study 2, no cross-lagged associations between said beliefs and SI were demonstrated in RI-CLPM. The results from the quasi-explanatory approach suggest that the associations between stigma and SI depend on the severity of SI of the sample and the stigma measure. Again, while the suicide stigma measure did not inquire about self-stigmatizing beliefs, it is possible that personal experience with SI influences the interpretation of items, such as the belief that those who die by suicide are more likely to be depressed and isolated because the respondent may be having these experiences. Stigma and SI demonstrated cross-lagged associations among individuals with recent SI, perhaps due to the relevancy of mental health, suicide, and help-seeking stigma among those with SI. It is crucial to empirically test directionality, if possible, within longitudinal contexts. When adjusting for stable, unmeasured confounding, not all mental health-related stigma was associated with SI.

Taken together, associations between stigma and SI varied by methodological approach, which does not negate the benefit of both approaches. Results from prediction models help researchers understand how variables are related to increased SI risk. Quasi-explanatory results help researchers isolate the potential causal effect of a variable after adjusting for confounding factors. Mental-health-related stigma measures may not necessarily be a useful causal factor but may continue to be useful clinically to identify youth who may be at increased risk of SI. For example, endorsement of beliefs that glorify/normalize suicide may be a helpful clinical indicator of SI risk but is unlikely to reduce SI if targeted in intervention.

Clinical Implications

The results attest to the importance of incorporating mental health stigma measures and discussions into treatment, especially among higher-risk groups. Assessment of mental health, suicide, and seeking help stigma and the cultural context of those beliefs are important in providing culturally responsive interventions. While assessing mental

health stigma may be important in predicting future SI, many stigma measures lost statistical significance when predicting at 2 or 6 months out. Therefore, stigma measures may be better treated as tools to predict SI within the course of outpatient care (e.g., 1 or 2 months) but not as a longer-term predictor. The exception is an endorsement of glorification/normalization beliefs of suicide for those with recent SI, which predicted increased risk for SI, speaking to the importance of assessing these beliefs specifically. Simultaneously, these beliefs may not be causally related to SI, therefore opening a broader case conceptualization of how glorifying/normalizing suicide may be functioning for that individual. We look forward to studies examining the mechanistic link between these factors; in reviewing past studies, plausible links may be the internalization of beliefs, low self-worth, and hopelessness (Oexle et al., 2017; Oexle, Waldmann et al., 2018; Xu et al., 2016). We also emphasize the importance of considering cultural beliefs, context, and the role of structural organizations that may influence stigmatizing beliefs and SI (Mueller et al., 2021).

Strengths, Limitations, and Future Directions

This investigation was strengthened by its use of two samples of differing clinical severity, each with two follow-up collection points. Our use of multiple methodological approaches, with particular attention to the RI-CLPM, also represented a significant addition to the current literature. Limitations include the reduced sample size of the third wave of data collection in both samples, reducing statistical power. Attrition also increased across waves, potentially biasing results. Additionally, the sample was restricted to undergraduate students, limiting the conclusions that can be drawn about nonundergraduate groups. College attendance may be a proxy for sociocultural factors, including but not limited to socioeconomic status, racial and ethnic discrimination, and disability discrimination. Specifically for Study 2, participants were excluded if they were seeking or receiving concurrent psychological care at recruitment. Therefore, the degree to which our sample findings may be biased by aversions to receiving psychological care is unclear. The present study also did not explicitly delineate perceived versus self-stigma nor glorification versus normalization of suicide. While two measures examining stigma related to seeking help likely differentiated perceived stigma and self-stigma, it was not the focus of the study to examine the relationship among the stigma measures. We recommend longitudinal research that examines these overlapping constructs and potentially mediational relationships and SI.

Also, a limitation of the RI-CLPM is that it adjusts for stable, between-person factors across the timepoints *under investigation* and, therefore, does not account for time-varying confounding between people nor time-varying confounding within person. Individuals with recent SI may be at elevated risk for various time-varying factors (e.g., other mental health symptoms such as nightmares or a one-time acute stressor) that are not captured as time-invariant confounding (Hamaker et al., 2020). Varying factors within-person, such as depressive symptoms, which may influence stigma beliefs and SI, are also unaccounted for. Thus, the quasi-explanatory effect may be biased by other time-varying factors for which these models cannot account. Finally, we note that we did not model recent SI as a moderating variable; rather, each study was modeled separately. RI-CLPM allows for moderation analyses, although it increases computational complexity, which may be a venue for future research.

Conclusion

This investigation aimed to examine the association between different types of mental health stigma and SI in two samples of varying clinical severity and two methodological approaches. Results suggested that: (a) numerous types of stigma measures predicted SI among both samples; however, suicide stigma, only predicted SI among those with recent SI cross-sectionally; (b) many associations became null within longitudinal analyses, although glorification/normalization of suicide robustly predicted SI among those with recent SI; and (c) the longitudinal associations between stigma and SI when adjusting for time-invariant, unmeasured confounding factors only demonstrated associations among those with recent SI. Clinically, our results suggest that assessing the function of different types of stigma is important in conceptualizing suicide risk.

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