


# Suicide Ideation and Self-Harm Behaviors in First-Year Dormitory Students at a Public Midwestern University: A Pilot Study

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Hillary Sandra Klonoff-Cohen, PhD, MS<sup>1</sup> , Auroraleigh Cohen, BS<sup>1</sup>, Robyn L. Gobin, PhD, MS<sup>1</sup>, Mounika Polavarapu, PhD, MPH<sup>2</sup>, Ryan Allen, BS<sup>3</sup>, Swetha Reddy, MS<sup>1</sup>, and Chandana Vuyyuru, MPH<sup>4</sup>

## Abstract

**Purpose:** Currently, 1 in 5 college students struggle with suicidal ideation while 7% to 44% engage in nonsuicidal self-injury. Illinois has one of the highest teenage and college student suicide rates in the United States. This pilot study assessed suicide ideation and self-harm behaviors at a public Illinois university. This is the first study to use 5 standardized psychological instruments to investigate these 2 crises in freshmen college students who are all required to reside in dormitories. The main hypothesis was to determine if the independent effects of freshmen students' depression, Five-Factor Model, and Reasons for Living affected the dependent variables, self-harm behaviors and suicide ideation. **Methods:** Forty first-year college dormitory students completed the Beck Depression Inventory-II, Scale of Suicidal Ideation, Five-Factor Model, Inventory of Statements About Self-Injury, and Reasons for Living Scale in person. **Results:** Participants were 18 to 19 years old, predominantly female (65%), and non-White (62%). Forty percent reported self-harm behaviors and 19% reported suicidal ideation. The top reasons for contemplated suicide attempts included the inability to solve problems (33%) and attention/revenge (28%). Students experienced high levels of anxiety (55%), self-consciousness (43%), and depression (18%). Depression was associated with suicide ideation ( $\beta = 0.05$ ,  $P = .006$ ), while neuroticism and openness were associated with self-harm behaviors ( $aOR = 3.36$ ,  $P = .02$ ,  $aOR = 0.48$ ,  $P = .047$ , respectively). Ninety-five percent reported "responsibility to family" as a Reason for Living. **Conclusions:** Preliminary evidence necessitates an examination of self-harm and suicide ideation among all freshmen, investigating both risk and protective factors. In the future, a prevention intervention should be implemented campus-wide (and eventually nationwide) for all first-year dormitory students to enhance their mental well-being.

## Keywords

suicide ideation, self-harm, college students, first-year students, depression, reasons for living

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## Introduction

There are over 21 million students attending public and private US colleges and universities annually.<sup>1</sup> Suicide is currently the second most common cause of death among college students, with over 1000 college students dying by suicide each year.<sup>2,3</sup> Remarkably, 53% of college students report they have not received information on suicide prevention.<sup>4</sup>

In 2022, nearly 1 in 5 students have struggled with suicidal ideation during college.<sup>5</sup> Equally concerning is the significant increase in the percentage of students who purposely engage in self-harm, including cutting, hitting, burning, and hair-pulling, without intending to kill themselves.<sup>6</sup> Alarming, around 17% of first-year college students have

engaged in nonsuicidal self-injury (NSSI) during their lifetime.<sup>7</sup> NSSI heightens the risk of suicide in college students.<sup>6</sup>

<sup>1</sup>Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, Champaign, IL, USA

<sup>2</sup>School of Population Health, The University of Toledo, Toledo, OH, USA

<sup>3</sup>Midwestern University Chicago College of Osteopathic Medicine, Downers Grove, IL, USA

<sup>4</sup>Radiology Partners, Lombard, IL, USA

### Corresponding author:

Hillary Sandra Klonoff-Cohen, Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, 1206 S Fourth St, Khan Annex, Room 3006, Champaign, IL 61820, USA.  
Email: klonoffc@illinois.edu



These 2 crises suggest that a substantial number of students feel overwhelmed and unable to cope, which impacts all areas of their university life.

There are several stressors that afflict first-year college students because it is a period of significant transition.<sup>8</sup> They move away from home, parents, and friends for the first time, and are far from their support systems.<sup>9,10</sup> Additionally, students are frequently under intense pressure, with disrupted sleeping, eating, and exercise patterns.<sup>9,10</sup> They have academic, social, financial, and personal pressures,<sup>10</sup> and are often apprehensive, especially if they are first-generation or low socioeconomic status students.<sup>11</sup> Until age 25, the ability to regulate emotions and impulses is still developing.<sup>12</sup> Sexual orientation or gender identity also complicates students' lives.<sup>10</sup> Social perfectionism, or the attempt to live up to extremely high student standards, is also damaging.<sup>13</sup> Furthermore, lifestyle choices, including experimenting with substances, can significantly impact students' mental health, resulting in depressive symptoms, anxiety, and suicidal ideation.<sup>12</sup> According to the Association of American Universities (AAU),<sup>14</sup> 16.1% of undergraduate women experience nonconsensual sexual contact by physical force or inability to consent while in their first year of college. Finally, students live in an increasingly digital world that replaces face-to-face connections, which can greatly contribute to loneliness and isolation.<sup>15</sup> These factors, coupled with acclimating to a new environment, make college students more vulnerable to mental health problems.<sup>12</sup>

It is evident that the United States is facing a national mental health crisis,<sup>16</sup> and colleges reflect what is going on in society at large.<sup>17</sup> Thus, colleges are uniquely positioned to help young adults.<sup>18</sup> They are self-selected, intentional communities with an abundance of medical resources that function at the forefront of enlightened attitudes toward community involvement and the use of psychotherapy.<sup>19</sup> Nevertheless, colleges have been the scene of surprisingly few systematic efforts to lower rates of suicide.

Currently, there is a profound heterogeneity in approaches to tackling suicide ideation and self-harm behaviors taken across campuses. In practice, effective prevention is difficult to implement because it must extend beyond campus counseling centers into such areas as residence life services, administration, and campus police. Suicide, self-harm, and funding priorities vary from campus to campus. Hiring counselors, offering mental health services, leading prevention training, and rolling out initiatives that promote wellness and connectedness require substantial financial resources. Campuses vary regarding suicide prevention strategies including implementing support peer groups, running gatekeeper training programs with faculty, staff, and student leaders, and making mental health services on and off campus more accessible and culturally appropriate.<sup>20</sup> Although this variability is inevitable given the diversity of

campuses, the result is a lack of a "gold standard" for treating and preventing suicidality in students.<sup>21,22</sup>

The current pilot study was conducted at a large public university in Illinois which set records for enrollment, diversity, and first-generation students. We chose a college setting with representation of diverse racial/ethnic groups, gender identities, and sexual orientations. In Fall 2021, the total undergraduate population was 34 559 and first-generation students comprised 20.1% among freshmen.<sup>23</sup> First-year dorm students were extremely diverse (26.2% Asian, 13.3% Hispanic, 5.4% Black, 4.2% multiracial, and 35.6% White).<sup>24</sup> A further 13.6% of first-year dorm students were international students.<sup>24</sup>

In both Illinois (Illinois Department of Public Health)<sup>25</sup> as well as the United States (National Institute of Mental Health),<sup>26</sup> suicide is the 11th leading cause of annual deaths. Illinois has one of the highest teenage and college student suicide rates in the United States. Suicide is the leading cause of death in this state for ages 10 to 14 years (compared to the second leading cause in the United States), and the third leading cause of death for ages 12 to 22.<sup>27</sup>

The causes of suicidal and self-harm thoughts and behaviors remain unclear). Greater consideration of the interrelationship between various psychological factors may elucidate solutions to preventing self-harm and suicidal ideation in the future. Hence, the purpose of our pilot study was to explore the prevalence of suicidality and self-harm in the population of interest and examine self-harm and suicide ideation in a sample of freshmen students attending a large public university in Illinois, with the assistance of university leadership, including University Housing, Office of the Emergency Deans of Students, and the campus health center.

The main hypothesis of this pilot study was to determine if the independent effects of freshmen students' depression, five-factor personality traits, and reasons/motivators for a living (negatively or positively) affect the dependent variables, self-harm behaviors, and suicide ideation. This research is distinguished by its employment of 5 standardized psychological instruments, making it the first study to apply this targeted approach to study self-harm and suicide ideation within a freshman college population. It attempts to dissect the interplay of psychological and demographic factors that may possibly influence freshmen's suicidal intent and self-harm behaviors. By elucidating these potential relationships, we aspire to ultimately inform the development of preventive interventions aimed at mitigating these critical issues.

## Methods

### Participants

The inclusion criteria consisted of individuals who were at least 18 years old, and enrolled as freshmen at the university.

As per this institutional policy, all freshmen students are required to reside in university dormitories for the entire first year. Unlike previous studies, this is the first study to include participants who were not exclusively high-risk students. Rather, they encompassed the continuum, from those with no mental health issues to those who sometimes experienced mental health problems to those at higher risk (eg, none, low, medium, and high). Exclusion criteria consisted of students who transferred from local community colleges.

This was a convenience sample consisting of students who willingly chose to participate in the study. We collected data on suicide behavior (eg, ideation and attempts) and self-harm, depression, 5 broad personality trait dimensions, and motivations for living in first-year college students residing at 2 dormitories from February 2017 to April 2019.

### Recruitment

There were several methodological challenges for recruitment that resulted in the small sample size. First, it was exceedingly difficult to obtain approval for this pilot study on self-harm and suicide ideation from the Office for Protection of Research Subjects (OPRS). Human subjects' approval was obtained from the institution's OPRS after a 1.5-year stringent review.

Informed consent was always obtained before administering the survey, and the procedures for obtaining informed consent and protecting human participants were in practice with the requirements of the college's institutional review board and with national regulations about the protection of personal data.

The initial protocol for enrollment consisted of attending monthly dormitory meetings where the study was presented by the Principal Investigator, and interested students could sign up for the research project. The presentations at the various dormitories were overseen by the Dean of Housing as required by IRB. This method of recruitment was unsuccessful for the first 6 months, thereby necessitating the research team to approach IRB with a revised plan. Hence, dormitory meetings were no longer used for recruitment.

We determined that tabling (ie, setting up a table at high-traffic locations on the campus) was an easy and successful way to educate students about our project and goals. In order to attract students, we made a professional and visually interesting display at the table. Students were (i) introduced to the study by 2 friendly and knowledgeable research assistants, (ii) given the opportunity to ask questions and receive flyers/brochures with takeaway information, and (iii) offered the opportunity to complete sign-up sheets where students provided contact information if they were interested in learning more about the study. All students who approached the table were provided with a list of campus resources, community and national resources, and 24-hour emergency crisis resources for mental health, suicide, and self-harm prevention. Tabling was a more effective approach to educating

and engaging the campus community than recruiting freshmen students through monthly dormitory meetings.

As per IRB requirements, recruitment was halted one week before, during, and one week after midterm and final exams. No recruitment was performed during winter and spring breaks. No information was available on the nonrespondents.

The study sample consisted of students volunteering from a host of majors. Almost 100% of participants were recruited through tabling events. Interested students were contacted less than 7 days later via email or phone to answer introduce the study, resolve any further questions, and schedule in-person appointments.

Two faculty members (a clinical psychologist and the PI) were required to be present during the completion of the 5 instruments. There were safeguards implemented for distressed students. During these appointments, the surveys were completed in one pre-selected room (which was approved by the IRB), consisting of 2 internally locked doors that prevented students from entering prematurely and seeing other participants. The second door permitted the research team to escort distressed students to the Counseling Center or campus Health Center as well as being accessible to an ambulance. Finally, the emergency dean on campus was always notified prior to students completing their surveys, in the event of an adverse event. If a student refused help, the Student Assistance Center was notified, and a faculty member and student waited for a dispatched Crisis Intervention Team officer.

### Measures

We used a multidimensional comprehensive approach with a battery of tests. After receiving written informed consent, students completed 5 paper-based in-depth instruments in-person including the (i) Beck Depression Inventory (BDI), (ii) Scale of Suicidal Ideation (SSI), (iii) Five-Factor Personality Scale, (iv) Inventory of Statements About Self-Injury (ISAS), and (v) Linehan's Reasons for Living (RFL-48) scale. These instruments were chosen to examine depression symptoms, suicide ideation, suicide and self-harm behaviors, personality traits, and motivators (RFL) for this student population.

### Rationale for Choosing the Measures

Suicidal ideation/behavior is multifactorial. Currently, there is no single characteristic that accurately predicts a person's suicide risk, nor one tool that is sensitive or specific enough to definitively predict suicide.<sup>28</sup> There is a significant need for instruments that are both thorough and efficient when assessing suicide risk. Research has consistently shown that the accuracy of any risk assessment can improve by utilizing a multimethod approach consisting of the use of multiple standardized measures.

The college period also carries a high risk for the onset of NSSI and is a growing public health concern on campuses.<sup>29</sup> However, NSSI has rarely been included as a part of mental health problem risk assessment on college campuses.<sup>29</sup>

Significant consideration was invested in regarding the choice of our instruments. The psychologist and principal investigator considered the validity and reliability, standardization and norms, mode of administration and scoring, timing for completion of the instrument, and cultural considerations when reviewing instruments that were appropriate for freshmen college students. Based on these criteria, these instruments were ranked in order to make informed decisions about the final instruments. We aimed to ensure that the instruments were accurate, fair, and appropriate for the freshmen students being assessed. All 5 instruments have been previously validated in college populations.<sup>30-37</sup> Additionally, thought was devoted to the order of the survey tools, and we decided to end with the RFL scale, to connect/reinforce participants to positive aspects of life.

### Description of the Measures

*Scale for Suicide Ideation (SSI):* The SSI was chosen because it is a self-reported questionnaire that has been widely used to assess current suicide ideation in both inpatient and outpatient settings for adolescents and adults with demonstrated good reliability and validity.<sup>38</sup> It examines the duration and frequency of suicidal ideation in the past year, the sense of control over an attempt, the number of deterrents, and the amount of planning involved in a contemplated attempt.<sup>39</sup> It is appropriate for ages 17 years or older and takes 5 to 10 minutes to complete. It is also a reliable and valid instrument to assess the severity of suicide ideation in college students<sup>30,31</sup> with a cutoff threshold value of  $\geq 4$  of the total SSI score being appropriate for detecting significant suicidal ideation.<sup>38</sup>

This scale was designed for college students and consists of 10 suicidal ideas. SSI is a 19-item instrument with each item consisting of 3 options graded according to the intention of the suicidality and rated on a 3-point scale from 0 to 2. The total score ranges from 0 to 38, with a higher score representing a higher intention of suicidality.<sup>31</sup>

*Inventory of Statements About Self-Injury (ISAS):* The college period carries a high risk for the onset of NSSI and is a growing public health concern on campuses.<sup>29</sup> However, NSSI has rarely been included as a part of mental health problem risk assessment on college campuses.<sup>29</sup>

The first section of the ISAS assesses the lifetime frequency of 12 behaviors performed intentionally and without suicidal intent (NSSI): “banging/hitting, biting, burning, carving, cutting, wound picking, needle-sticking, pinching, hair pulling, rubbing skin against rough surfaces, severe scratching, and swallowing chemicals.”<sup>32</sup> Participants are asked to estimate the number of times they have performed each behavior. The scale also assesses the

age of onset, the experience of pain during NSSI, whether it is performed alone or around others, the time between the urge to self-injure and the act, and whether the individual wants to stop self-injuring.<sup>32</sup>

The ISAS has strong psychometric characteristics and is one of the most common tools used in both scientific research and everyday practice.<sup>32</sup> We dichotomized the self-harm variable as “yes” or “no” based on whether the participants ever engaged in any of the 12 self-harm behaviors.

*Beck Depression Inventory-II (BDI-II):* The BDI-II was chosen because it assesses feelings and behaviors over the previous 2 weeks and can be used to track depressive symptom severity.<sup>40</sup> The BDI-II scale is the most common tool for the assessment of depression that has been validated among adolescents and adults.<sup>40</sup>

This is a universal self-reporting instrument used in assessing and screening depression in individuals ages  $\geq 13$  in clinical and nonclinical settings.<sup>33</sup> This scale consists of 21 items assessing the affective, cognitive, somatic, and vegetative symptoms of major depression on a 4-point scale from 0 (absence of symptom) to 3 (severe symptoms).<sup>33</sup> The completion of this questionnaire takes about 5 to 10 minutes. The scores of 0 to 13 indicate minimal depression, 14 to 19 indicate mild depression, 20 to 28 indicate moderate depression, and 29 to 63 indicate severe depression.<sup>33</sup> This instrument has a favorable Cronbach’s alpha of 0.93 among college students,<sup>33</sup> which compares favorably with other studies.<sup>34-36</sup>

*Five-Factor Personality Scale:* This scale was included as one of the instruments to assess the variability in individuals’ personalities using only a small set of trait dimensions.<sup>41</sup> Many personality psychologists concur that the 5 domains within this scale explain the most important and basic differences in personality traits.<sup>41</sup> Furthermore, it has been repeatedly used by college students.<sup>37,42,43</sup>

The Five-Factor Model uses 30 items: (i) conscientiousness versus undependability, (ii) agreeableness versus antagonism, (iii) openness versus closedness to one’s own experience, (iv) extraversion versus introversion, and (v) neuroticism versus emotional stability.<sup>44</sup> Each item is rated on a 1 to 5 scale, where 1 is extremely low, 2 is low, 3 is neither high nor low, 4 is high, and 5 is extremely high. The Cronbach’s alpha values for the individual domains ranged from 0.63 (openness to experience) to 0.80 (conscientiousness), with a median of 0.72.<sup>45</sup> A composite variable for the overall Five-Factor Model was created, and the potential range was 30 to 150, with higher scores representing positive personality traits.

*RFL scale:* The RFL scale was selected because this suicide risk assessment takes a positive approach focusing on an individual’s reasons for not committing suicide.<sup>46</sup> It has also been tested on college students.<sup>47</sup> The respondents identify personal strengths and RFL with prompting that may be unthinkable otherwise.<sup>48</sup>

This inventory assesses the strength of a person's RFL in various categories, including responsibilities to family and fear of death.<sup>46</sup> It measures the individual's expectancies about the consequences of living versus killing oneself and assesses the importance of various reasons for living.<sup>46</sup> It has 6 subscales: survival and coping beliefs, responsibility to family, child-related concerns, fear of suicide, fear of social disapproval, and moral objections. This 48-item self-administered questionnaire is scored on a 6-point scale ranging from 1 "not at all important" to 6 "extremely important." A total score for this scale was calculated, ranging from 48 to 288, with higher scores reflecting greater importance for living.

### Data Collection

The surveys were administered individually and distributed in a paper format. Data collection was de-identified, with no names or contact information captured on the surveys. The instruments took ~ 45 to 60 minutes to complete. For individuals identified as high-risk based on their survey responses, the data collection process took longer (2 hours) due to time dedicated to connecting them to appropriate counseling resources.

Survey responses were reviewed by the PI and a clinical psychologist to identify high-risk students. Special attention was devoted to responses on (i) the BDI-II, where totals of  $\geq 30$  were indicative of someone who needs a professional psychiatric assessment, and (ii) SSI, where scores  $> 3$  indicated greater suicidal ideation. Furthermore, any positive response on ISAS merited investigation, particularly for question #3, which recorded the "most recent" act of self-harm, and question #7, which inquired if the respondent would like to stop self-harming. With regards to participant remuneration, all study participants received a \$10 gift card for completion of the questionnaires.

### Statistical Analysis

Data were analyzed using SPSS version 21.0.<sup>49</sup> Cronbach's alpha and correlations of individual items with total scores were calculated to give an orientation for the internal consistency of items. Descriptive statistics, consisting of frequencies, percentages, and mean values with standard deviations, were used to describe the data. All items underwent exploratory analysis to confirm the number of factors explaining the variance for self-injury, depression, suicide ideation, and the Five-Factor Model. Finally, regression models for suicide ideation and intentional self-harm were performed to identify which standardized tests predicted these behaviors. We performed a post-hoc power calculation for the regression model for suicide ideation with a fixed sample size of 40, based on the main hypothesis.

**Table 1.** Post Hoc Factor Analysis.

Instrument	Cronbach's alpha	Number of factors	Variance explained
Scale for Suicidal Ideation	0.79	5	91.44%
Inventory of Statements About Self-Injury	0.80	1	85.88%
Beck Depression Inventory-II	0.90	5	84.60%
Five-Factor Personality Scale	0.73	1	72.37%
Reasons for Living	0.89	13	84.79%

## Results

Prior to the data analysis, a post-hoc factor analysis was performed to assess the internal reliability of the selected instruments using Cronbach's alpha. Table 1 summarizes the key findings from the factor analysis conducted to explore the underlying dimensions of each instrument among the participating first-year dormitory students. A factor loading cutoff of 0.40 was employed to determine the optimal combination of factors.<sup>50</sup> This table also outlined the number of factors extracted and the percentage of variance explained by those factors.

### Descriptive Results

The sample ( $n = 40$ ) ranged in age from 18 to 19 years and was comprised of 33% male, 65% female, and 3% transgender. The racial/ethnic breakdown was 18% Hispanic, 23% Asian, 38% White, 13% Black, and 3% Native Indian. A total of 58% of freshmen were enrolled as science majors, 25% as arts majors, and 18% were undecided.

### Suicidal Ideation

A total of 19% of the sample reported suicidal ideation. The total score for the sample ranged from 0 to 4, and the mean was 0.475 ( $SD = 0.987$ ). It did not differ by gender and race, as presented in Table 1.

### Self-Harm

The study participants began indulging in self-harm behaviors at an average age of 12.5 years. Forty percent of the study sample reported self-harm behaviors. The most common forms of self-harm behavior reported by first-year dorm student participants were "interfering with wound healing (40%)," followed by banging and hitting self (25%), "pinching (25%)," and "pulling hair (22.5%)." The number of participants who indulged in at least one self-harm behavior did not differ by gender ( $P = .692$ ) or race ( $P = .213$ ).

**Table 2.** Total Scores for Beck Depression Inventory-II, Scale for Suicide Ideation, and Five-Factor Personality Scale by Race and Gender.

	N	Beck Depression Inventory-II			Scale for Suicide Ideation			Five-Factor Personality Scale		
		Mean total score	St Dev <sup>a</sup>	P value	Mean total score	St Dev <sup>a</sup>	P value	Mean total score	St Dev <sup>a</sup>	P value
Race				.794			.310			.196
White	14	12.36	8.89		0.86	1.46		101.14	5.83	
Black	5	12.40	5.27		0.20	0.45		108.40	9.07	
Asian	11	8.82	6.65		0.55	0.69		98.64	7.62	
Hispanic	8	10	9.81		0.00	0.00		103.25	8.84	
Multiple Race	2	14	11.31		0.00	0.00		102.00	4.24	
Gender				.922			.317			.656
Female	26	10.65	8.25		0.35	0.977		102.54	6.94	
Male	13	11.85	8.05		0.77	1.013		100.77	9.19	
Transgender	1	9			0.00			97.00		

<sup>a</sup>St Dev, standard deviation.

### Depression

A total of 25% of the study participants exhibited some level of depression, specifically, 7.5% with mild (scores 14-19), 15% with moderate (scores 20-28), and 2.5% with severe (scores 29-63) depression, whereas the remaining 75% of the sample exhibited minimal range depression (scores 0-13). The mean total BDI-II scores were not different with respect to race or gender (Table 2).

### Five-Factor Personality Scale

The mean and standard deviation for the 5 factors were neuroticism 15.28 ( $SD = 0.62$ ), extraversion 20.77 ( $SD = 0.67$ ), openness 21.41 ( $SD = 0.52$ ), agreeableness 21.95 ( $SD = 0.44$ ), and conscientiousness 22.31 ( $SD = 0.67$ ), respectively.

### Reasons for Living

A total of 95% of participants reported “family” as a RFL. The top 3 RFLs were, “I want to experience all that life has to offer, and there are many experiences I haven’t had yet which I want to have” (67.5%), “It would hurt my family too much, and I would not want them to suffer” (67.5%), and “I would not want my family to feel guilty afterwards” (67.5%).

### Inferential Results

The preliminary nature of the findings should be emphasized while interpreting the results.

### Determinants of Suicide Ideation

Multiple linear regression analysis was used to test if the 3 individual predictors in the same model, BDI-II, RFL, and Five-Factor Model predicted students’ ratings of suicide ideation (measured on a continuous scale). The results of

the regression analysis indicated that the full model explained 45.04% of the variance ( $R^2 = .45$ ,  $R^2$  adjusted = .29,  $F [9, 30] = 2.73$ ,  $P = .02$ ) of suicide ideation (Table 3). In the model, only depression scores from BDI-II ( $t = 3.07$ ,  $P = .005$ ) were a significant predictor of suicide ideation, while adjusting for gender and race. There were no differences among racial groups reporting suicide ideation.

**Post-Hoc Analysis of Power.** The post-hoc analysis for the suicide ideation model, using a fixed sample size of 40 subjects, an alpha of 0.05, an eta-squared value of 0.45, and 5 predictors, revealed 87.46% power.

### Determinants of Self-Harm

Additionally, a logistic regression model was used to assess the odds of self-harm behaviors using the gender, race, BDI-II, RFL scales, and Five-Factor Model (Table 4). For the Five-Factor Model, this was entered into the logistic regression model as a total score which was nonsignificant. The Five-Factor Model was subsequently added as 5 individual domains along with the other covariates, as reported in Table 4. This overall binary logistic regression model was statistically significant in predicting the risk of self-harm behaviors ( $\chi^2 [12] = 28.31$ ,  $P < .005$ ). The model explained 69.6% (Nagelkerke  $R^2$ ) of variance in self-harm behaviors. Specifically, Black individuals, compared to White, had slightly lower odds of reporting self-harm behavior ( $aOR = 0.005$ , 95% CI: 0.0004-0.79). In the model, neuroticism was associated with 3 times the risk ( $aOR = 3.36$ , 95% CI: 1.21-9.35), while openness was protective ( $aOR = 0.48$ , 95% CI: 0.24-0.98), with 52% less likelihood of self-harm behaviors, after adjusting for gender and race (Table 4). The area under the receiver operating characteristic curve for predicting self-harm behaviors was 0.929.

**Table 3.** Multiple Linear Regression Model for Suicide Ideation.

SSI total	Coefficient	Std. Err.	t	P> t	Standardized coefficient
Gender					
Female	Reference				
Male	0.24	0.30	0.81	.424	0.12
Transgender	-0.64	0.89	-0.73	.472	-0.10
Race					
White	Reference				
Black	-0.61	0.47	-1.31	.200	-0.21
Asian	-0.03	0.37	-0.08	.933	-0.01
Hispanic	-0.76	0.38	-2.01	.054	-0.31
Other	-1.08	0.65	-1.68	.104	-0.24
RFL total score	-0.01	0.01	-1.89	.068	-0.28
BDI-II total score	0.05	0.02	3.07	.005 <sup>a</sup>	0.43
Five-Factor total score	0.01	0.02	0.33	.747	0.05
Constant	1.31	2.11	0.62	.542	

Abbreviations: BDI-II, Beck Depression Inventory-II; SSI, Scale for Suicide Ideation; RFL, Reasons for Living.

<sup>a</sup>Statistically significant at 0.05.

**Table 4.** Logistic Regression Model for Intentional Self-Harm Behavior.

Intentional self-harm	Odds ratio	Std. Err.	z	P> z	95% confidence interval	
Gender						
Female	Reference					
Male	4.35	6.70	0.95	.341	0.21	89.37
Race						
White	Reference					
Black	0.01 <sup>b</sup>	0.01	-2.05	.040 <sup>a</sup>	0.00	0.79
Asian	0.16	0.29	-1.01	.312	0.00	5.55
Hispanic	0.39	0.79	-0.46	.643	0.01	21.11
Other	3.05	10.73	0.32	.752	0.00	30.32
Reasons for Living Total Score	1.03	0.02	1.44	.151	0.99	1.08
Beck Depression Inventory-II total score	0.90	0.11	-0.87	.386	0.71	1.14
Neuroticism	3.36	1.75	2.32	.020 <sup>a</sup>	1.21	9.35
Extraversion	1.36	0.30	1.40	.160	2.08	2.08
Openness	0.48	0.18	-1.99	.047 <sup>a</sup>	0.24	0.98
Agreeableness	1.43	0.59	0.88	.380	0.64	3.19
Conscientiousness	0.85	0.18	-0.76	.448	0.57	1.28
Constant	$8.26 \times 10^{-8}$	$1.09 \times 10^{-6}$	-1.24	.215	$5.16 \times 10^{-19}$	13 200.66

<sup>a</sup>Statistically significant at 0.05.

<sup>b</sup>These results were rounded to 2 decimal points and appear as 0.05 throughout the text.

## Discussion

The conditions that contribute to suicide and self-harm risk in young adults often go unrecognized, undiagnosed, and untreated.<sup>51</sup> To date, this is the first study to employ a battery of 5 instruments to independently gauge self-harm and suicide behaviors (ie, ideation and attempts) in a sample of 40 first-year college students residing in dormitories. Our sample consisted of students with a continuum of mental health problems (from none, to low, medium, or high) compared to previous studies that only targeted high-risk students.<sup>52,53</sup> The IRB required the researchers to have

a very stringent plan of action for high-risk students and this was elaborated in the “Methods” section. A total of 2 high-risk students were referred for additional counseling. However, due to HIPAA regulations, the researchers were not privy to the students’ outcomes.

In this pilot study, the average age that students reported beginning to engage in self-harm behaviors was 12.5 years. A total of 60% of the sample reported one or more forms of self-harm behaviors, most commonly “interfering with wound healing,” followed by banging and hitting self,” “pinching,” and “pulling hair.” Our results were similar to a randomized clinical study of 459 college students

conducted in a Midwestern university by Batejan et al,<sup>54</sup> who reported wound picking as the most commonly endorsed method (37.3%) of self-harm, followed by cutting (20%), banging/hitting (18.4%), pinching (13.7%), hair pulling (13.6%), and scratching (9.9%). A second study which had consistent results with ours, randomly selected 680 college students from different colleges in Turkey.<sup>55</sup> The most pervasive types of self-injurious behaviors reported were “preventing the healing of wounds (peeling the scabs),” “hitting oneself on a tough surface or self-hitting,” and “scratching letters, texts, shapes on skin.”<sup>55</sup> Sex differences in self-injurious behaviors were observed in the Turkish study<sup>55</sup> but were not identified in our sample or Batejan’s study.<sup>54</sup> Our results are in agreement with studies performed in the United States and Europe, which reveal that self-injury is a widespread phenomenon among young adults.

In our study, Black individuals, compared to White, had slightly lower odds of self-harm behavior. Additionally, there were no differences among racial/ethnic groups reporting suicide ideation in our study. We compared our findings with national and international studies. Our results were in direct contrast to the American College Health Association-National College Health Assessment (ACHA-NCHA), a national research survey that provides data about students’ health habits, behaviors, and perceptions.

The Spring 2017 ACHA-NCHA II Reference Group revealed that Black students were at the greatest risk for exhibiting suicide intent ( $OR = 3.61$ ,  $P < .0001$ ) and attempted suicide ( $OR = 4.10$ ,  $P = .003$ ) compared to White students. For self-harm, no significant differences were observed across race/ethnicity groups in the ACHA-NCHAI.<sup>56</sup>

We used standardized instruments for self-harm (ISAS) and suicide ideation (the SSI), whereas the ACHA-NCHAI used only one item for self-harm, “Have you ever intentionally cut, burned, bruised, or otherwise injured yourself?” and one question for suicide ideation, “Have you ever seriously considered suicide?”<sup>56</sup>

In the future, studies on self-harm and suicide should embrace comprehensive standardized psychological instruments in national and international samples for accurate and generalizable results. Additionally, prevalence rates of suicidal intent and self-harm remain unclear and may tend to disproportionately impact minorities. More research testing interventions in diverse populations is needed.<sup>57</sup>

College students’ mental health, specifically in the first year has also been investigated by the WHO World Mental Health International College Student (WMH-ICS) initiative.<sup>58</sup> The WHO WMH-ICS initiative is based on the largest and continuously growing epidemiological dataset ever collected from college students, involving 28 countries and over 200 000 respondents. It aims at improving prevention and early interventions for mental health problems among college students. The first element of the WMH-ICS consists of a web-based survey to assess the magnitude and nature of emotional problems (eg, attitude barriers-handling problems themselves or

with friends).<sup>58</sup> All first-year students in participating colleges are invited to participate. The second element tests internet-based interventions aimed at the prevention and early intervention of mental health problems. The third element is based on the dissemination and quality improvement of the evidence-based interventions developed in WMH-ICS. The 6 core disorders assessed in the surveys are major depressive disorder, mania/hypomania, generalized anxiety disorder, panic disorder, alcohol use disorder, and substance use disorder. The WMH-ICS surveys also measure several other characteristics, including suicidal thoughts and behaviors,<sup>59</sup> and sociodemographic characteristics (gender, ethnicity, and socioeconomic status).<sup>60</sup> Overall, the WMH-ICS NSSI lifetime and 12-month prevalence were 17.7% and 8.4%<sup>7</sup> which was almost identical to our results of 17.2% during freshmen students’ lifetime.

A total of 17.5% of our participants reported moderate or severe depression using the BDI-II. The multivariate analysis in our study showed that the psychological factor, depression, from the BDI was significantly associated with suicide ideation ( $\beta = 0.05$ ,  $P = .005$ ). The relationship between depression (as measured by BDI-II) and suicide ideation has been confirmed in the literature for the past few decades.<sup>61-63</sup>

There was no relationship between suicidal ideation and the five-factor model in our study. Similarly, a recent study reported no relationship between the five-factor model and lifetime suicidal ideation and attempts in 154 college students.<sup>64</sup> In contrast, a large cross-sectional study conducted in 13 colleges ( $n = 69\,790$ ) in China reported that impulsivity, aggression, psychoticism, and neuroticism from the five-factor model were positively associated with suicidal ideation.<sup>65</sup>

In our study, with regards to personality traits, neuroticism was significantly associated with 3 times the risk of self-harm behaviors ( $aOR = 3.36$ , 95% CI: 1.21-9.35), whereas openness was protective ( $aOR = 0.48$ , 95% CI: 0.24-0.98). Other studies determined that both neuroticism and openness negatively affected self-harm. For example, secondary high school students who were repetitive or episodic self-injurers compared to noninjurers reported higher levels of neuroticism and openness.<sup>66</sup> Additionally, undergraduate college students ages 18 to 24 years who reported a history of deliberate self-harm had significantly higher levels of neuroticism and openness.<sup>67</sup> Finally, family was cited as the most important factor in RFL for suicidal ideation in our study. Only one study cited a general tendency toward lower levels of RFL, especially with Responsibility to Family and Friends in Asian American and European American students in South Korea possibly as a result of observed cultural differences.<sup>68</sup>

This is a pilot study and our results should be interpreted in the context of several limitations. First, the sample size was small despite the fact that a great deal of information was gleaned from each of the participants. Hence, we are cautious about overstating/over-interpreting our findings. This preparatory pilot study tested the measures, recruitment procedures, and outcome prevalence rates that were under



consideration for the development and design of a subsequent campus-wide intervention study.

Second, we were not able to adjust for other demographic factors that may impact suicide ideation and self-harm, including first-generation college students, lower socioeconomic status students, and academic performance. Anxiety, drug and alcohol use, and stressful life events (eg, family problems and peer conflicts) were not queried in our study. Socioeconomic and academic statuses were not collected after discussions with the IRB and student groups. They felt these questions were intrusive and as such may prevent students from completing the psychological instruments. There is also the potential for social desirability bias regarding mental health and the stigma surrounding it, particularly with topics such as suicide ideation and self-harm behaviors. Additionally, repeated assessments over time were missing because this was a cross-sectional study. Finally, because of the potential for biased sampling strategies, comparisons with other studies may not be appropriate/accurate. We conducted our research with a group of participants

who did accurately represent the freshmen population; however, the sample was very small; albeit, it had a fair representation of gender, majors, and race/ethnicity among all freshmen attending a large public university in Illinois. There was no comparison made to Illinois or US freshmen. We did focus on the participants who completed the survey but did not collect characteristics of nonparticipants which may bias our research. This study was based on convenience sampling where every student happened to be on campus, walking by the table, with an open schedule, and who was agreeable to provide contact information. However, “due to its nonrandom nature, the method is highly susceptible to biases, and the results are not generalizable and lacking in their application to the real world.”<sup>69</sup>

### *Implications of Study Results for Suicide Prevention Programs for College Students*

We successfully demonstrated a thorough evaluation of suicide ideation and self-harm behaviors using standardized

**Table 5.** Proposed Interventions for Enhancing Mental Health and Preventing Suicide Ideation and Self-Harm Behaviors Among Freshman College Students.

Intervention	Specifics	Deliverer	Frequency/duration
For freshman starting college with a pre-existing mental health condition create a college transition plan <sup>a</sup>	One-time communication with prior therapist, counseling sessions on campus, treatment continuity when on campus, referrals to mental health services off campus if necessary	Families in conjunction with the university	After admission and 3-month follow-up after university begins
Suicide and self-harm awareness activities <sup>a</sup>	Yoga sessions, therapy dogs, self-care kits, arts and crafts events, and music therapy	Registered student organizations (ie, RSOs or clubs)	1-3 months during the school year
Promote social networks and connectedness <sup>a</sup>	Emphasize inclusiveness, identify and reach out to isolated students, and support connectedness among traditionally marginalized to high-risk student groups <sup>a</sup>	University communications, dormitories, fraternities, sororities, and RSOs	3-4 times throughout the academic year
Increase student's help-seeking behavior and reduce the stigma associated with mental health problems <sup>a</sup>	Education at freshman orientation and online mental health resource packages for students and families	Campus administrators, undergraduate faculty, staff, and parent organizations	Twice for an academic year
Improve student access to mental health services <sup>a</sup>	Hiring additional counselors at student health centers <sup>a</sup>	Campus administrators	
Promote mental health awareness <sup>a</sup>	Mental health awareness day and resource fair	Campus administrators	Once an academic year
Offer mandatory online suicide and self-harm prevention programs	All student majors are on campus.	Campus administrators	Once an academic year
Train dormitory resident advisors as gatekeepers	Recognize at-risk students residing in dormitories who are engaging in self-harm behaviors and suicide ideation	Campus would hire professionals in the areas of self-harm behaviors and suicide ideation	Once an academic year
Develop life skills education <sup>a</sup>	Online training to cope with life stressors, make healthy lifestyle choices, foster resilience, and achieve academic success	Campus administrators, Student Health Centers, Department of Psychology, Emergency Deans	Twice for freshmen and once an academic year for sophomores, juniors, and seniors

<sup>a</sup>MacPhee and Ponte.<sup>73</sup>

psychological instruments collected from a small sample of freshmen students at varying levels of self-reported mental health.

The major hurdles in our study were gaining acceptance of the research protocol from the IRB and determining how to best recruit students. In the future, attracting the buy-in of campus administrators, student deans, resident directors, mental health counselors, and the OPRS or IRB could greatly enrich the study sample and the ultimate success of a study. Tabling was identified as a superior means for recruiting freshmen students. The next step would be to recruit a much larger sample of freshmen students using tabling as the primary means of recruitment.

Our results ultimately determined the necessity for an in-depth examination of self-harm and suicide ideation among all freshmen, investigating both risk and protective factors. In the future, a prevention intervention should be implemented campus-wide, and eventually nationwide, for all first-year dormitory students to enhance their mental well-being.

### Areas for Future Research

A comprehensive approach to preventing suicide and self-harm in colleges and universities and enhancing mental health involves improving access to mental health services on and off campus, identifying and assisting students at risk for suicide and self-harm, and being prepared to respond to suicide or self-harm when it occurs (Suicide Prevention Resource Center).<sup>70</sup>

Beyond our results of a small pilot study, there are several areas for improvement that could transform the realities of what currently exists on college campuses. Research on continued positive/healthy involvement of families (based on RFL) throughout the students' 4 years of college could be an important avenue of research that could possibly prevent self-harm and suicide ideation in college students. Additionally, exploring parenting styles based on personality traits such as neuroticism<sup>71</sup> and openness may have an impact on college students' self-harm and suicide ideation rates. Exploring specific interventions to diminish depression such as by improving social connections via university communications, dormitories, fraternities, sororities, and RSOs could be advantageous. With the drain on campus resources, investigating technology-enabled mental health services, including online and apps could be used to increase treatment and decrease mental health barriers.<sup>72</sup> Finally, and perhaps most importantly, involving student deans, resident directors, mental health counselors, and registered student organizations in the prevention and early intervention for the entire freshmen student body, including none to low to medium risk students, could prevent them from ever transitioning to high-risk suicide ideation or self-harm in college.

In summary, in Table 5, we have provided proposed interventions (denoted as a \* for MacPhee and Ponte<sup>73</sup> suggestions) as well as described our specifics about the

intervention, who should deliver it on campus, and the frequency and duration for each.

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### ORCID iD

Hillary Sandra Klonoff-Cohen  <https://orcid.org/0000-0002-2592-5582>

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