



# Screening for Eating Disorders on College Campuses: a Review of the Recent Literature

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## Abstract

**Purpose of Review** This paper provides a review of the recent literature on screening for eating disorders (EDs) on college campuses, and reports on methodology, prevalence rates, treatment receipt, and ED screening tools.

**Recent Findings** Recent research highlights relatively high prevalence rates of EDs among students on college campuses, with the majority of studies demonstrating elevated prevalence compared to the general population. Among students who screened positive for an ED, approximately 20% or less reported having received treatment for their ED. Findings also revealed various recruitment strategies, methods, ED screening tools, and clinical cutoffs used to study this topic, making it challenging to draw firm conclusions about prevalence of EDs on college campuses.

**Summary** Recent research on ED screening on college campuses reveals that EDs are a significant problem among college students, and there is a marked treatment gap between those who need care and those who receive it. Implications and future research are discussed.

**Keywords** College students · Eating disorders · Screening · Treatment gap · University

## Introduction

Eating disorders (EDs) are serious mental illnesses [1] that are prevalent and often emerge in college-age individuals [2, 3]. Further, concerns about one's weight and shape and the presence of disordered eating behaviors, such as binge eating and compensatory behaviors, are associated with risk of ED onset [4]. As such, screening for EDs and their symptoms on college campuses is of the utmost importance.

Early identification of EDs is particularly important for college students aged 18–24, when mental illnesses account for the largest burden of any disease [5]. Untreated symptoms

can become more frequent, severe, and persistent over time, and without adequate treatment, these disorders can have lasting consequences on students' functioning, physical health, social relationships, and educational attainment [6, 7]. Furthermore, EDs are associated with high levels of psychiatric comorbidity [8] and can affect every organ system [9–12], and mortality from anorexia nervosa (AN) is the highest of all psychiatric disorders [13].

Unfortunately, research indicates that receipt of any treatment for EDs is extremely low, and the treatment gap for these serious mental illnesses is wide, which refers to the large number of people in need of clinical care but who are not receiving services [14••]. In the National Comorbidity Survey Replication, only 16% of those with bulimia nervosa (BN) and 29% of those with binge eating disorder (BED) had received treatment in the past 12 months [8]. Thus, few individuals with EDs receive treatment specifically for their disorder, yet these individuals exhibit elevated health services use and costs compared to those without EDs [15•]. Furthermore, the problem of access to care for EDs is even more dire among individuals from minority backgrounds. For example, individuals from racial/ethnic minority backgrounds with EDs are significantly less likely than their White, non-Hispanic counterparts to be diagnosed with an ED, receive

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care for an ED, or to even be asked by a doctor about ED symptoms [16••, 17, 18••].

Actually receiving treatment for an ED involves a number of steps, including experiencing symptoms, identifying those symptoms as concerning, deciding whether action is needed, identifying options for intervention (e.g., treatment or something else, such as a religious counselor), seeking and actually obtaining treatment if that option is selected, beginning and remaining in treatment as needed, and for recurrent disorders, completing this process or an abbreviated variant again [14••]. A crucial first step in accessing care is thus identifying or learning one's symptoms are of concern and in need of help. In the case of EDs, having the opportunity to learn one's symptoms are of concern is critical given work suggesting less than half of those with EDs recognize they have a problem [19••, 20]. Importantly, self-recognition is associated with help seeking; for example, Gratwick-Sarll et al. [19••] found that almost half of the participants who recognized a problem with their eating had ever sought treatment versus only one in five who did not recognize a problem had sought care. Coupled with the high prevalence of EDs on college campuses and their negative consequences, these factors highlight the importance of screening for EDs in college students, including providing individuals with tailored feedback on their symptoms and concrete suggestions for next steps.

The present review aims to provide an up-to-date review of the literature on screening for EDs on college campuses, with a focus on literature published from 2009 to 2019, given the relative dearth of work in this area in the past 5 years only. First, we will summarize the research on ED screening on college campuses, including reporting on methodology, prevalence rates, and rates of treatment receipt. Next, we will report on screening tools that can be utilized for screening college populations. Finally, we will comment on ongoing ED screening efforts on college campuses and related work, as well as discuss limitations of the current literature and offer suggestions for future research.

## Research on ED Screening on College Campuses

Table 1 summarizes the recent literature on screening for EDs on college campuses identified through a literature search. Inclusion criteria entailed articles published since 2009 that screened college students for ED psychopathology. Because the emphasis of this paper is on screening relatively large populations for eating disorders, large sample size (i.e.,  $N > 1000$ ) was also a criterion for inclusion. In the past 10 years, there have been two main lines of research conducted on ED screening on college campuses. The first one is research conducted on the Healthy Body Image Program (HBI), which is an online platform for screening and delivering tailored

interventions on college campuses [36••]. HBI, which was developed based on programmatic research evaluating tailored online preventive ED interventions [36••, 37], identifies individuals at low risk for, high risk for, or with a possible clinical/subclinical ED via online screening, in particular the Stanford-Washington University ED Screen [38], and offers tailored, evidence-based online interventions or referral to in-person care to address students' risk or clinical status. Jones et al. [25] reported on the first deployment of HBI at two U.S. universities, where different recruitment methods were utilized. At University A, the program was advertised through such efforts as social media advertising, presentations and workshops, providing referrals through student health, and educating staff (e.g., resident assistants, peer health educators) about the opportunity. Students self-selected to participate. At University B, universal screening was utilized whereby the program was heavily advertised to a targeted population of first- and second-year students living in particular residential halls, with all of these students strongly encouraged to participate. In terms of the differences between these recruitment strategies, at University A, the method of recruitment was more reliant on participant self-selection, while at University B, a more population-based screening approach was used. At University A, 425 students completed the HBI screen, with 5.2% of the undergraduate student body completing the screen. Results indicated that 13.6% of respondents screened positive for an ED, with an additional 46.6% screening as high risk for the onset of an ED. At University B, 1133 students completed the screen, which represented 51.2% of the students targeted. Results indicated that 2.2% of respondents screened positive for an ED, with an additional 25.9% screening as high risk for the onset of an ED. Of those screening positive for an ED, only 19.0% at University A and 36.0% at University B reported receiving ED treatment in the past year. Overall, results suggest that different recruitment methods result in differential ED prevalence rates, with methods that rely on participant self-selection resulting in higher ED prevalence versus more population-based screening methods resulting in lower ED prevalence.

Next, Fitzsimmons-Craft et al. [21••] reported on the first state-wide deployment of HBI over the course of 3 years in eight public universities in the state of Missouri in the USA, sponsored by the Missouri EDs Council. In terms of recruitment method, campus-specific strategies were developed and deployed (e.g., email, flyers, presentations, social media, offered in the counseling center) in collaboration with an identified liaison in the counseling/health center. Using this approach, the screen was completed 2454 times, with an average of 2.5% of the undergraduate student body on each campus taking the screen. ED risk level in the participating students was high, with over 56% of students identified as being at high risk for ED onset or having a clinical/subclinical ED.

**Table 1** Papers reporting on efforts to screen college students for eating disorders from 2009 to 2019

Article	N (% female); number of colleges included and location	Recruitment method	Response rate	Mean age (SD); percent undergraduate; percent White (or other relevant information on race/ethnicity)	Measure utilized	Overall prevalence	Prevalence in females	Prevalence in males	Receipt of treatment
<p>Studies from 2014 to 2019</p> <p>Fitzsimmons-Craft et al. [21••]<sup>a</sup></p>	<p>2454 (82.4% female) from 8 public Missouri universities</p>	<p>Partnered with an identified liaison in the counseling/health center to develop campus-specific recruitment strategies (e.g., email, flyers, presentations, social media, offered in the counseling center)</p>	<p>2.5% of the undergraduate student body on each campus took the screen</p>	<p>22.89 (6.59); 82.2% undergraduates; 78.1% White</p>	<p>Stanford-Washington University Eating Disorder Screen (SWED)</p>	<ul style="list-style-type: none"> <li>• 3.7% screened positive for possible anorexia nervosa (AN)</li> <li>• 15.4% screened positive for a clinical/-subclinical ED other than AN</li> <li>• 38.9% screened as high risk for an ED</li> </ul>	–	–	–
<p>Fitzsimmons-Craft et al. [22••]<sup>a</sup></p>	<p>4894 (87.4% female) from 28 U.S. universities</p>	<p>Partnered with an identified liaison in the counseling/health center to develop campus-specific recruitment strategies (e.g., email, flyers, presentations, social media, offered in the counseling center)</p>	<p>1.9% of the undergraduate female student body on each campus took the screen</p>	<p>22.28 (5.75); 76.7% undergraduates; 61.5% White</p>	<p>SWED</p>	<ul style="list-style-type: none"> <li>• 3.7% screened positive for possible AN</li> <li>• 20.3% screened positive for a clinical/-subclinical ED other than AN</li> <li>• 35.7% screened as high risk for an ED</li> </ul>	–	–	–
<p>Kilani [23]</p>	<p>1257 (69% female) from 18 colleges within a university in Jordan</p>	<p>No information given on recruitment method; a representative randomly selected sample of students were asked to participate</p>	<p>3% of the university's population participated in the study</p>	<p>Mean age not reported; all participants between ages 18 and 22; 100% undergraduates; does not specify exact percentage, but primarily Arab sample</p>	<p>40-item Eating Attitudes Test-Jordan Version (EAT-40-JOV) High risk group comprised those who scored at or above 75% above the cutoff point</p>	<p>14.2% screened at risk for developing an ED</p>	<p>Total prevalence of EDs among women = 15.7%</p>	<p>Total prevalence of EDs among men = 10.6%</p>	–
<p>Kronfol et al. [24]<sup>b</sup></p>	<p>1841 (57% female) from 3 Arab universities and 1 U.S. university</p>	<p>Students were selected by simple randomization, and selected students were sent email invitations to participate</p>	<p>University A (Arab): • 29% of targeted students completed the screen</p> <p>University B (Arab):</p>	<p>University A: Mean age not reported; 78.6% between the ages of 18 and 25; 76.7% undergraduates; race not reported</p> <p>University B:</p>	<p>SCOFF (endorsing 3+ items)</p>	<p>Arab universities: • 20.4% screened positive for an ED</p> <p>U.S. universities: • 6.8% screened positive for an ED</p>	–	–	–

**Table 1** (continued)

Article	N (% female); number of colleges included and location	Recruitment method	Response rate	Mean age (SD); percent undergraduate; percent White (or other relevant information on race/ethnicity)	Measure utilized	Overall prevalence	Prevalence in females	Prevalence in males	Receipt of treatment
Jones et al. [25] <sup>a</sup>	2 U.S. universities University A: 425 (78.1% female) University B: 1133 (56.5% female)	University A: solicited screening (i.e., invited, campus-wide screen completion) University B: universal screening (i.e., first- and second-year students living in targeted residential halls)	<ul style="list-style-type: none"> <li>7.2% of targeted students completed the screen</li> <li>University C (Arab): 5.6% of targeted students completed the screen</li> <li>University D (U.S.): 22.2% of targeted students completed the screen</li> <li>University A: 5.2% of the undergraduate student body completed the screen</li> <li>University B: 51.2% of students targeted completed the screen</li> </ul>	<p>Mean age not reported; 80.5% between the ages of 18 and 25; 83.6% undergraduates; race not reported</p> <p>University C: Mean age not reported; 94.8% between the ages of 18 and 25; 93.7% undergraduates; race not reported</p> <p>University D: Mean age not reported; 78% between the ages of 18 and 25; 65.2% undergraduates; race not reported</p> <p>University A: 20.48 (3.7); 84.9% undergraduates; 45.4% White University B: 18.05 (1.6); 100% undergraduates; 60.8% White</p>	SWED	<p>University A: 13.6% screened positive for an ED</p> <p>University B: 2.2% screened positive for an ED</p> <p>University C: 25.9% screened as high risk for an ED</p> <p>University D: 3.3% screened positive for an ED</p>	<p>University A: 16.3% screened positive for an ED</p> <p>University B: 50.0% screened as high risk for an ED</p> <p>University C: 3.3% screened positive for an ED</p> <p>University D: 35.0% screened as high risk for an ED</p>	<p>University A: 4.4% screened positive for an ED</p> <p>University B: 35.2% screened as high risk for an ED</p> <p>University C: 0.8% screened positive for an ED</p> <p>University D: 14.4% screened as high risk for an ED</p>	<p>University A: 19.0% screening positive for an ED received treatment in the past year</p> <p>University B: 36.0% screening positive for an ED received treatment in the past year</p> <p>University C: 3.6% screening positive for an ED received treatment in the past year</p> <p>University D: Among students with positive ED</p>
Lipson et al. [26] <sup>b</sup>	2180 (64.7% female) from 2 U.S.	Population-level survey; each participating school provided a random sample of	18.4% response rate	<p>Mean age not reported; 48.1% undergraduates; 74.9% White</p>	Eating Disorder Examination-Questionnaire (EDE-Q) (scoring > 4) and Weight	29.7% of students screened positive for an ED (EDE-Q > 4)	–	–	–

**Table 1** (continued)

Article	N (% female); number of colleges included and location	Recruitment method	Response rate	Mean age (SD); percent undergraduate; percent White (or other relevant information on race/ethnicity)	Measure utilized (scoring > 47)	Overall prevalence	Prevalence in females	Prevalence in males	Receipt of treatment
Lipson & Someville [27••] <sup>p</sup>	9713 (69.2% female) from 12 U.S. colleges and universities	currently enrolled students who were ≥ 18 years and who were then invited to participate via email	Population-level survey; each participating school provides a random sample of up to 4000 currently enrolled students who are ≥ 18 years and who are then invited to participate via email	Mean age not reported; 67.5% between the ages of 18 and 23; 70.4% undergraduates; 79.0% White	Concerns Scale (WCS) (scoring > 47)	and/or WCS > 47	17.0% scored ≥ 3 on the EDE-Q	5.5% scored ≥ 3 on the EDE-Q	13.5% received treatment in the past year and 5.1% were currently in treatment
			Response rates for the study were 19% in 2013–2014 and 27% in 2014–2015	EDE-Q	11.9% scored ≥ 3 on the EDE-Q	17.0% scored ≥ 3 on the EDE-Q	5.5% scored ≥ 3 on the EDE-Q	–	
				• Scoring ≥ 3	40.2% endorsed 1+ objective binge eating episodes in the past 4 weeks	49.1% endorsed 1+ objective binge eating episodes in the past 4 weeks	30.0% endorsed 1+ objective binge eating episodes in the past 4 weeks		
				• Endorsing 1+ compensatory behavior episodes (i.e., self-induced vomiting; laxatives; diuretics or diet pills; and/or driven exercise) in the past 4 weeks	30.2% endorsed 1+ compensatory behavior episodes in the past 4 weeks	31.2% endorsed 1+ compensatory behavior episodes in the past 4 weeks	29.1% endorsed 1+ compensatory behavior episodes in the past 4 weeks		
Sanchez-Armass et al. [28]	1057 (67% female) from 3 Mexican universities	No information given on recruitment method. Participants given choice to participate in one or both phases of study. In Phase I, students completed self-report questionnaires, and in Phase II, a random sample of Phase I participants were interviewed	Phase I: 43% agreed to be contacted for Phase II Phase II: 50% of those contacted for Phase II participated	Phase I: 21 (3.4), % undergraduate not specified; does not specify exact percentage, but primarily Mexican sample Phase II: 21.25 (4.4), % undergraduate not specified; does not specify exact percentage, but primarily Mexican sample	Phase I: SCOFF (endorsing 2+ items) and the Eating Disorder Inventory-2 (EDI-2; scoring above the 95th percentile on at least two subscales) Phase II: EDE used to assess ED diagnosis	Phase I: SCOFF: 15% screened at risk for an ED • EDI-2: 8% screened at risk for an ED	Phase I: SCOFF: 17% screened at risk for an ED • EDI-2: 8% screened at risk for an ED	Phase I: SCOFF: 10% screened at risk for an ED • EDI-2: 7% screened at risk for an ED	–
					Phase II: identified 25% of Phase II participants as having an ED	Phase II: identified 28% of Phase II	Phase II: identified 18% of Phase II		

**Table 1** (continued)

Article	N (% female); colleges included and location	Recruitment method	Response rate	Mean age (SD); percent undergraduate; percent White (or other relevant information on race/ethnicity)	Measure utilized	Overall prevalence	Prevalence in females	Prevalence in males	Receipt of treatment
Tavolacci et al. [29]	3457 (43% female) from university campuses in Upper Normandy, France	Students were recruited by posters and leaflets on campus or during their mandatory medical survey at the university medical department	Sample comprised almost 10% of students in the Upper Normandy Region of France	20.5 (2.2); % undergraduate not specified; does not specify race breakdown, but likely primarily White given French sample	SCOFF (endorsing 2+ items)	20.5% screened at risk for an ED	26.4% of females screened at risk for an ED	10.3% of males screened at risk for an ED	participants as having an ED
Uehara & Oshima [30]	In 2011: 4182 (% female not reported) from 1 university in Japan In 2012: 4163 (% female not reported) from 1 university in Japan	Students were asked to participate in this mental health screening study as part of their regular medical examination	—	In 2011: 21.3 (2.6); In 2012: 21.3 (2.9) % undergraduate not report; does not specify race breakdown, but likely primarily Asian given data collected in a Japanese university	The E-item (Responding “frequently” or “always” to the question “Have you worried or thought excessively about your food, body weight, or body shape?”)	In 2011: 10.7% of sample responded “frequently” or “always” to the E-item In 2012: 10.8% of sample responded “frequently” or “always” to the E-item	—	—	—
Studies from 2009 to 2013 Eisenberg, Nicklett, Roeder, & Kirz [31]• <sup>b</sup>	2822 (53.0% female) from 1 U.S. university	Population-level survey; school provided a random sample of 5021 currently enrolled students who were ≥ 18 years and who were then invited to participate via email	56.2% response rate	Mean age not reported; 94.0% of undergraduates between the ages of 18 and 22; 41.8% undergraduates; 68.4% of undergraduates White; 55.1% of graduates White	SCOFF (endorsing 3+ items)	9.4% of undergraduate students screened positive for an ED 5.8% of graduate students screened positive for an ED	13.5% of undergraduate females screened positive for an ED 9.3% of graduate females screened positive for an ED	3.6% of undergraduate males screened positive for an ED 3.1% of graduate males screened positive for an ED	Only 21.7% of those with a positive ED reported any treatment in the past year
Fragkos & Frangos [32]	1865 (54.5% female) from post-secondary institutions and public	A randomly selected sample of students who had graduated from at least high school were asked to participate	1978 questionnaires were distributed to the educational institutions,	21.2; 16.3% post-secondary vocational school/college students, 69.8% higher educational institutions, 5.7%	SCOFF (endorsing 2+ items)	39.7% screened at risk for an ED	44.6% screened at risk for an ED	33.9% screened at risk for an ED	—

**Table 1** (continued)

Article	N (% female); number of colleges included and location	Recruitment method	Response rate	Mean age (SD); percent undergraduate; percent White (or other relevant information on race/ethnicity)	Measure utilized	Overall prevalence	Prevalence in females	Prevalence in males	Receipt of treatment
Reyes-Rodriguez et al. [33]	universities in Greece 2163 (66.1% female) from 9 of the 11 campuses that comprise the University of Puerto Rico system	Classrooms systematically sampled and then students within those classes screened	and 113 were excluded due to incomplete data (i.e., 94% complete data) 75.0% response rate	postgraduate studies; does not specify race breakdown, but likely primarily White given Greek sample 18.26 (1.27); 100% undergraduates (all freshmen); 92.9% Puerto Ricans	<ul style="list-style-type: none"> <li>Bulimia Test-Revised (BULIT-R) (scoring <math>\geq 91</math>)</li> <li>Eating Attitudes Test-26 (EAT-26) (scoring <math>\geq 20</math>)</li> </ul>	<ul style="list-style-type: none"> <li>3.2% of students scored at or above the cutoff on the BULIT-R</li> <li>9.6% of students scored at or above the cutoff on the EAT-26</li> </ul>	<ul style="list-style-type: none"> <li>3.8% of women scored at or above the cutoff on the BULIT-R</li> <li>11.8% of women scored at or above the cutoff on the EAT-26</li> </ul>	<ul style="list-style-type: none"> <li>2.2% of men scored at or above the cutoff on the BULIT-R</li> <li>5.1% of men scored at or above the cutoff on the EAT-26</li> </ul>	–
Quick & Byrd-Bredbenner [34]	2488 (63% female) from 3 U.S. universities	Recruited from general health and education courses to complete an online survey	–	19.68 (1.50); 100% undergraduates; 56% White	EDE-Q (scoring $\geq 4$ on the subscales [i.e., restraint, eating concern, shape concern, weight concern] or global score)	–	<ul style="list-style-type: none"> <li>5.4% of women scored in the clinically significant range on restraint</li> <li>2.0% on eating concern</li> <li>18.6% on shape concern</li> <li>13.0% on weight concern</li> <li>6.0% on global</li> </ul>	<ul style="list-style-type: none"> <li>3.0% of men scored in the clinically significant range on restraint</li> <li>0.3% on eating concern</li> <li>6.0% on shape concern</li> <li>2.0% on weight concern</li> <li>1.0% on global</li> </ul>	–
White, Reynolds-Malea-r, & Cordero [35]	1408 (69% female) from 1 U.S. university between	At three points (i.e., 1995, 2002, and 2008), surveys were mailed to a random sample of	1995: 49.3% response rate, which represented 2.9% of	<ul style="list-style-type: none"> <li>1995: 21.1; 100% undergraduates; 66% White</li> <li>2002: 20.9; 100% undergraduates; 72% White</li> </ul>	The Weight Management Questionnaire (WMQ)	<ul style="list-style-type: none"> <li>1995: 18.5% screened positive for an ED</li> <li>2002: 20.4% screened</li> </ul>	<ul style="list-style-type: none"> <li>1995: 23.4% screened positive for an ED</li> <li>2002: 23.6% screened</li> </ul>	<ul style="list-style-type: none"> <li>1995: 7.9% screened positive for an ED</li> <li>2002: 15.8% screened</li> </ul>	–

**Table 1** (continued)

Article	N (% female); number of colleges included and location	Recruitment method	Response rate	Mean age (SD); percent undergraduate; percent White (or other relevant information on race/ethnicity)	Measure utilized	Overall prevalence	Prevalence in females	Prevalence in males	Receipt of treatment
	1995 and 2008	undergraduate students	student population 2002: 18% response rate, which represented 1.5% of student population 2008: 21% response rate, which represented 3.5% of student population	<ul style="list-style-type: none"> <li>2008: 20.4; 100% undergraduates; 62% White</li> </ul>		positive for an ED screened positive for an ED <ul style="list-style-type: none"> <li>2008: 30.5% screened positive for an ED</li> </ul>	positive for an ED screened positive for an ED <ul style="list-style-type: none"> <li>2008: 32.6% screened positive for an ED</li> </ul>	positive for an ED screened positive for an ED <ul style="list-style-type: none"> <li>2008: 25.0% screened positive for an ED</li> </ul>	

<sup>a</sup> Healthy Body Image Program paper

<sup>b</sup> Healthy Minds Study paper

Finally, Fitzsimmons-Craft et al. [22••] reported on deployment of HBI at 28 U.S. universities as part of a randomized controlled trial. Recruitment method was the same as that utilized in Fitzsimmons-Craft et al. [21••] and occurred over the course of 3 years. The screen was completed 4894 times, with an average of 1.9% of the undergraduate female student body on each campus taking the screen. Similar to Fitzsimmons-Craft et al. [21••], ED risk level in the participating students was high, with nearly 60% of students identified as being at high risk for ED onset or having a clinical/subclinical ED.

Overall, most HBI work utilized recruitment methods relying on participant self-selection—University A in Jones et al. [25], as well as Fitzsimmons-Craft et al. [21••] and Fitzsimmons-Craft et al. [22••]. Such an approach resulted in a high proportion of students who participated screening as high risk for ED onset or having a clinical/subclinical ED—about 60%. The finding that ED risk was elevated among those who participated in HBI is important as it suggests that screening approaches that rely on participant self-selection may attract students with elevated ED pathology, thus representing important ED detection tools.

The second main line of work conducted on ED screening on college campuses is research by the Healthy Minds Network, which runs the Healthy Minds Study (HMS). HMS is an annual web-based survey study examining mental health, service utilization, and related issues among undergraduate and graduate students. Since its national launch in 2007, HMS has been conducted at over 180 colleges and universities, with over 200,000 survey respondents (Healthy Minds Network website) [39]. There are a number of published papers on this effort, which provide data on ED prevalence on college campuses. First, Eisenberg, Nicklett, Roeder, and Kirz [31••] reported on 2822 students who completed HMS at 1 U.S. university. All HMS surveys are completed as population-level surveys, with each participating school providing a random sample of currently enrolled students who are then invited to participate via email. This population-level recruitment approach is a notable difference in recruitment strategy, relative to the approach used in most HBI work, as reviewed above, which relies on greater participant self-selection (e.g., potential participant has to see a flyer and independently choose to go to the hyperlink to participate in HBI versus being specifically targeted via email and strongly encouraged to participate in HMS). Among undergraduates, the prevalence of positive screens for an ED was 13.5% for women and 3.6% for men, using the SCOFF ED screen [40]. Among students with positive screens, only 21.7% had received any treatment in the last year [31••]. Second, Lipson et al. [26] reported on 2180 students who completed HMS at 2 U.S. universities. Using different screening measures compared to Eisenberg et al. [31••] (i.e., Eating Disorder Examination-Questionnaire [EDE-Q] [41] and

Weight Concerns Scale [WCS; Killen et al. 1994] [42]), they found that 29.7% of students screened positive for an ED, and among those with positive ED screens, only 13.5% reported receiving treatment in the past year. Third, Lipson and Sonnevile [27••] reported on 9713 students who completed HMS at 12 U.S. colleges and universities. Prevalence of positive ED screens ranged from 11.9 to 40.2% depending on the ED definition utilized (e.g., ED psychopathology, past month binge eating, or past month compensatory behaviors—all derived from the EDE-Q [41]). Finally, Kronfol et al. [24] reported on 1841 students who completed HMS at three Arab and one U.S. universities. Using the same ED screening measure as Eisenberg et al. [31••] (i.e., the SCOFF [40]), they found that 20.4% of students at Arab universities and 6.8% of students at the U.S. university screened positive for an ED. On the whole, across the papers reporting on the HMS study, which was always implemented as a population-level screen, a wide range of prevalence of positive ED screens was reported (6.8–40.2%), with a number of different approaches used to identify ED cases. Results from HMS also shed important light on rates of treatment receipt among college students with EDs, with less than 22% of students with EDs reporting receiving treatment. These data highlight an enormous treatment gap.

Studies on HBI and HMS indicate that, overall, HBI, which utilized recruitment methods relying on participant self-selection, resulted in greater rates of ED pathology than HMS, which utilized a population-based recruitment approach. When choosing which recruitment approach to implement, colleges and universities should consider the following practical issues. First, what is the main priority—detecting students with EDs or generating accurate, population-level data on ED risk at the college? The former approach might suggest utilizing a self-selection recruitment approach while the latter might suggest using a population-based approach. Second, what resources are available for screening implementation? A dedicated person or team is required for implementation of the HBI screening approach (e.g., posting flyers, posting social media advertisements or blurbs, identifying student groups to target for recruitment), while the population-based approach used in HMS requires only the use of direct-to-student emails. The latter approach may be less time-intensive but typically requires high-level administrative support for ED screening and access to student emails.

In addition to these two main lines of work on ED screening on college campuses, a handful of other research studies have investigated ED prevalence rates in college samples using a range of recruitment methods, although notably none report on treatment receipt. Two studies recruited students from classrooms settings [33, 34]. Quick and Byrd-Bredbenner [34] used the EDE-Q [41] to screen participants and found the following rates of clinically significant ED concern in these areas: 5.4% of women and 3.0% of men on

eating restraint; 2.0% of women and 0.3% of men on eating concern; 18.6% of women and 6.0% of men on shape concern; 13.0% of women and 2.0% of men on weight concern; and 6.0% of women and 1.0% of men on global eating pathology. Reyez-Rodríguez et al. [33] used the Bulimia Test-Revised (BULIT-R [43]) and Eating Attitudes Test-26 (EAT-26 [44]) to screen participants and found the percentage of students scoring at or above the cutoff to be 3.2% on the BULIT-R and 9.6% on the EAT-26. Tavalacci et al. [29] and Uehara and Oshima [30] recruited students in university medical departments during their mandatory medical survey or regular medical examination and found ED prevalence rates ranged from 10.7 to 20.5% using the SCOFF [29, 40] and a single-item question assessing ED risk [30]. Three studies that randomly sampled students using the SCOFF [32, 40], the Weight Management Questionnaire [35], and the Eating Attitudes Test-Jordan Version (EAT-40-JOV) [23] found that those who screened at-risk or positive for an ED ranged from 14.2 to 39.7%. Lastly, Sanchez-Armass et al. [28] screened participants for an ED using the SCOFF and the Eating Disorder Inventory-2 (EDI-2 [45]) in Phase I of their study, then in Phase II conducted the Eating Disorder Examination (EDE [46]) with a subsample of the Phase I participants to assess for ED diagnosis. In Phase I, the SCOFF identified 15% of participants who screened at risk for an ED, whereas only 8% screened at risk using the EDI-2. During Phase II, 28% of participants were identified as having an ED.

On the whole, these data suggest elevated prevalence of EDs among college students relative to the general population. Indeed, Hudson et al. [8] found 12-month prevalence of clinical/subclinical EDs in the National Comorbidity Survey Replication in the USA to be 2.1%. However, it is notable that the prevalence rates in the studies reported here vary quite widely. Data also highlight an enormous treatment gap—where treatment receipt was reported, typically about 20% or less of students screening positive for an ED reported having received treatment for their ED. It is also important to note that how screening is implemented greatly affects prevalence rates. The studies reported here utilized a variety of recruitment methods, and as one might expect, studies that utilized self-selection to complete a screening tool generally resulted in higher prevalence of EDs relative to the utilization of population-based screening methods, whereby all students participated or students were randomly sampled.

## Screening Tools

Table 2 describes common assessments used to screen for EDs among college students, including their strengths and weaknesses. Similar to the range of recruitment methods utilized in research on ED screening on college campuses, there have been a variety of measures used to assess ED risk in these

studies. Although others have been used, among the most common measures are the EAT-26 [44], the EDE-Q [41], the SCOFF [40], and the SWED [38].

The EAT-26 [44] is a 26-item assessment of ED attitudes and behaviors. All items are on a 6-point rating scale with a clinical cutoff score of 20. Although the scoring procedure of the EAT-26 is simple, the relative large number of items may make this assessment more time-intensive to administer and score, which may be a barrier in terms of screen completion. The EDE-Q is a 36-item measure of ED psychopathology and behaviors, and includes items on a rating scale as well as open-ended questions to assess frequency of ED behaviors. Responses from the rating scale items produce a global score of ED psychopathology as well as subscales measuring eating concern, shape concern, weight concern, and dietary restraint. A benefit of the EDE-Q is that this measure assesses both frequency of ED behaviors as well as different dimensions of ED psychopathology; however, similar to the EAT-26, the large number of items on this assessment may make it time consuming to administer and score. The SCOFF [40] is a brief 5-item measure with dichotomous (i.e., yes or no) response options, with two or more positive responses representing a likely case of AN or BN. This assessment can be quickly and easily administered and scored; however, the SCOFF was developed specifically to assess AN and BN and therefore may not capture risk for other, more prevalent, EDs, such as BED and Other Specified Feeding or Eating Disorder (i.e., OSFED). Finally, the SWED [38] is a 17-item measure assessing ED behaviors and psychopathology using both rating scale items as well as open-ended questions to determine frequency of ED behaviors. An algorithm, based on DSM-5 criteria, is used to categorize individuals into ED risk categories. Although this algorithm allows for more precise determination of ED risk, this scoring procedure is more complex compared to other measures that determine ED risk using simple scoring technique. Scoring is thus best implemented using a computer program, which can be easily accomplished using widely available online survey software.

The Eating Disorder Diagnostic Scale (EDDS) [47] and a modified brief version of the EDE-Q [48] are two other measures commonly used for ED screening; however, these assessments have not yet been used in large screening studies among college students to date. The EDDS is a 22-item self-report screen used to diagnose AN, BN, and BED. The modified brief version of the EDE-Q is a 7-item assessment, taken from items on the EDE-Q [41] that measures three factors: dietary restraint; shape/weight overvaluation; and body dissatisfaction. These measures should be considered for future large-scale ED screening studies on college campuses. For a comparison of psychometric properties of available screening tools, see Jacobi, Abascal, and Taylor [49].

As described above and in Table 2, there are a number of ED screening tools available that have different strengths and

**Table 2** Common assessments used to screen for eating disorders

Questionnaire	Citation	Construct assessed	Number of items	Scale	Clinical cutoff used in screening work	Strengths	Weaknesses
Eating Attitudes Test-26 (EAT-26)	Garner, Olmsted, Bohr, & Garfinkel [45]	ED attitudes and behaviors	26	6-point scale ranging from never to always	Score of 20 or greater indicates a probable ED	-Simple scoring procedure	-Because of the large number of items, may be time-intensive to administer and score
Eating Disorder Diagnostic Scale (EDDS)	Stice, Telch, & Rizvi [47]	Brief self-report scale for diagnosing AN, BN, and BED	22	7-point rating scale items, yes/no items, and ED behaviors assessed on 0–14 frequency scale	Different scoring instructions according to diagnosis being assessed	-Screens for specific ED diagnoses -Assesses ED behaviors and psychopathology	-Although algorithm not required, moderately complex scoring procedure
Eating Disorder Examination-Questionnaire (EDE-Q)	Fairburn & Beglin [41]	Disordered eating thoughts and behaviors over the past 28 days; 4 subscales are generated (i.e., eating concern, shape concern, weight concern, dietary restraint), as well as a global score and frequencies of ED behaviors, such as binge eating and self-induced vomiting	36	Subscale items assessed on a 0 to 6 scale, with differing anchors, and ED behaviors assessed with a write-in response format	-Scoring $\geq 4$ (although some have used $\geq 3$ [i.e., Lipson & Sonnevile 2017]) on the subscales (i.e., restraint, eating concern, shape concern, weight concern) or global score; -Endorsing 1+ objective binge eating episodes in the past 4 weeks -Endorsing 1+ compensatory behavior episodes (i.e., self-induced vomiting; laxatives; diuretics or diet pills; and/or driven exercise) in the past 4 weeks	-Assesses frequency of ED behaviors, along with presence of ED psychopathology	-Because of the large number of items, may be time-intensive to administer and score
EDE-Q - Modified Brief Version	Grilo, Reas, Hopwood, & Crosby [48]	Modified brief version of the EDE-Q that assess three factors: dietary restraint, shape/weight overvaluation, and body dissatisfaction	7	Assessed on a 0 to 6 scale, with differing anchors	-	-Based on the EDE-Q, which is a well-supported measure of ED psychopathology	-Does not assess for all ED behaviors (e.g., binge eating, purging behaviors, etc.)
SCOFF	Morgan, Reid, & Lacey [40]	Screening questionnaire that addresses the core features of AN and BN	5	Yes/no	Endorsing 2+ items	-Brief -Simple and rapid scoring procedure -Can be administered orally or in written form	-Questions aimed at assessing AN and BN, therefore, may not capture risk for other EDs

**Table 2** (continued)

Questionnaire	Citation	Construct assessed	Number of items	Scale	Clinical cutoff used in screening work	Strengths	Weaknesses
Stanford-Washington University Eating Disorder Scale (SWED)	Graham et al. [38]	ED behaviors, pathology, and impairment in order to categorize individuals in one of four ED risk categories (i.e., possible AN, clinical/subclinical ED other than AN, high risk, low risk)	17	ED pathology and impairment rated on a 5-point scale, and ED behaviors assessed with a write-in response format	Screening algorithm based on DSM-5 criteria	-Assesses frequency of ED behaviors, along with presence of ED psychopathology -Categorizes individuals in varying levels of ED risk	-Computer-based algorithm used to determine outcome instead of simple scoring technique

AN anorexia nervosa, BED binge eating disorder, BN bulimia nervosa, ED eating disorder

weaknesses, which colleges and universities should weigh when considering which tool to utilize in their screening efforts. For example, if the goal is to sort participants into both ED risk and DSM-5 diagnostic categories, then the SWED would be a good fit. However, if the goal is to utilize a measure with a more straightforward scoring procedure that simply categorizes participants into ED risk or not, then the EAT-26 may be a good option. If the number of items must be kept extremely brief, as in the case of ED screening being included with other mental health screening, then the SCOFF may be the best choice. Colleges and universities may also choose to utilize the EDE-Q, which is the most widely used self-report measure of ED psychopathology, when they simply want to generate data on overall ED psychopathology levels and ED behavior frequencies in the population. On the whole, when implementing ED screening, most colleges and universities have the goal of being able to categorize participants into their ED risk and diagnostic categories. For this reason, the SWED may be a good option. The EDDS also sorts participants into ED diagnostic, but not risk, categories but has not yet been used in large screening studies among college students.

### Ongoing ED Screening Efforts on College Campuses and Related Work

In addition to reporting on the research on screening for EDs on the college campuses, it is also important to comment on the availability of ED screening to college students in the “real world.” In response to a large volume of requests on information about ED-related services on college campuses, the National Eating Disorders Association (NEDA), the leading non-profit organization related to EDs in the USA, launched the Collegiate Survey Project, the aim of which was to identify what services and programs, including screening, were available on college and university campuses around the USA for students struggling with, recovering from, or at risk for developing EDs and related body image issues [50]. Data were collected from 165 colleges and universities. Results indicated that ED screening on college campuses is seriously lacking—only 22% of colleges reported offering year-round ED screening opportunities and only 45% offered ED screenings once per year or semester [50]. This is despite the fact that 87% of respondents believed ED screening was important. To our knowledge, these are the most robust data available on the availability of ED screening on college campuses.

We also wish to highlight the ongoing work of NEDA regarding ED screening. Beginning in 2017, NEDA made online screening using a version of the SWED [38] freely available on the NEDA website: <https://www.nationaleatingdisorders.org/screening-tool>. The screening tool has been primarily promoted through media articles, telephone calls, chat messages, and emails to the NEDA

Helpline, Facebook ads, and awareness campaigns, as well as general website traffic. The screening tool is most heavily promoted during National Eating Disorders Awareness Week (NEDAwareness Week) each year. The goal of NEDAwareness Week is to increase public awareness of EDs through social media campaigns, legislative advocacy, and local events, as well as to connect individuals in need with resources [51]. Fitzsimmons-Craft et al. [52•] reported on completion of the NEDA screen over the course of 6 months in 2017. Of 71,362 adult respondents, most (86.3%) screened positive for an ED. In addition, 10.2% screened as high risk for the development of an ED, and only 3.4% screened as not at risk. Of those screening positive for an ED, 85.9% had never received treatment and only 3.0% were currently in treatment [52•]. It is notable that 47.9% of respondents identified as students, suggesting the NEDA screening tool may represent an important resource for screening for EDs among college students and on college campuses. Indeed, NEDAwareness Week is often heavily promoted on college campuses. For example, in 2017, 68 colleges and universities signed on as official NEDAwareness Week partners, and many more hosted events, such as panels, film screenings, and educational presentations, or posted on social media. At these events and through these posts, the online screening tool was often specifically shared [51]. In sum, the NEDA online screen may represent an important, easily accessible ED detection tool for college campuses, as it was completed by > 71,000 adult respondents over just 6 months, including nearly 50% who were students, with the majority screening positive for a clinical/subclinical ED.

### Limitations of the Recent Research and Future Directions

As detailed here, while there has been important work conducted in recent years on screening large samples of college students for EDs, this review highlights a number of key future directions for this line of research. The first issue is regarding the diversity of the samples screened. Importantly, a fair amount of work have conducted screening for EDs outside of the USA [23, 24, 28–30, 32, 33], but when US samples were utilized, they were typically predominantly White. Further, both U.S. and non-U.S. based samples were often predominantly female, particularly when sampling methods that required self-selection were used. Research indicates that EDs do not discriminate and that they affect individuals of all genders, races, and ethnicities [53]. When screening methods rely heavily on students self-selecting to take the screen, it may be that stereotypes about EDs impact who chooses to take the screen [53, 54••]. In the future, screening initiatives on college campuses might be paired with campaigns dedicated to

improving awareness of the occurrence of EDs among individuals from marginalized demographic sectors [55••] to encourage greater participation in screening by individuals from such groups. This is especially important given the lack of provider recognition of EDs in individuals from these backgrounds [18••, 56].

The second major limitation of the current body of literature involves the methodological differences across studies, which limit the ability to compare results and ultimately draw firm conclusions from this work regarding the prevalence of EDs on college campuses. For one, the literature has utilized a wide variety of ED screening measures, and even when the same screening measure was utilized, different definitions were often used to define what constituted as a positive ED screen (e.g., score of 2 or 3 on the SCOFF). Various approaches to ED screening have also been utilized and range from methods that require greater self-selection versus more population-based methods that randomly sample a portion of the student body. Yet, even when “population-based methods” were used, whereby an entire student body or random sample of students was contacted by email to complete an online screen, students who have some level of recognition of their ED concerns may be more likely to follow through with actually completing the screen, thus potentially inflating population prevalence rates among students. Other studies were not entirely clear on the specifics of the recruitment method utilized, which is problematic given that it limits one’s ability to contextualize the prevalence estimates obtained. Future research should aim to use validated ED screening measures, along with well-established scoring cutoffs, and to also provide sufficient information on recruitment for prevalence estimates to be contextualized.

Additionally, relatively little work reported data on treatment receipt, representing a missed opportunity to shed light on the treatment gap for EDs among college students. Where this was reported on, only about 20% or fewer of the students who screened positive for an ED reported receiving treatment for their ED. Future ED screening research on college campuses should report data on treatment receipt wherever possible, to shed additional light on this important issue. The low rate of treatment receipt also highlights important future directions. In particular, future screening initiatives on college campuses should consider pairing online screening with treatment resources, such as in-person therapy at the student counseling center or Internet-based programs for EDs prevention and intervention, as is done in HBI. Internet-based technologies may improve care for EDs on college campuses by overcoming barriers to treatment, offsetting in-person clinical demands, increasing access, and reducing costs [57]. Internet technologies are efficacious for screening, prevention, and treatment of EDs, including among college students [25, 37, 58•, 59]. However, a key challenge is effectively delivering these promising technologies to populations, which could be

done by directly linking screening results to prevention and treatment programs.

Given the seriousness of EDs and the importance of early detection and intervention, colleges and universities should also prioritize making ED screening available on an ongoing basis. If schools do not have the resources or desire to host their own screening, this could be accomplished by referring students to the NEDA online screening tool. This tool could be linked on the college's counseling center or health center website. However, in order to substantially increase reach and ensure that all students have the opportunity to be screened, we would recommend administrative support for annual, mandated ED screening for all students and/or regular student-wide emails advertising the availability of ED screening and would also recommend that screening be linked directly with intervention resources, as detailed above.

Finally, we would like to urge future research and programmatic initiatives on screening for EDs on college campuses to consider the various issues involved in who actually completes online screening and follows through on recommendations, which affect eventual outcomes (e.g., number of individuals for whom their ED is prevented or treated successfully). First is the issue of screening reach, and as detailed here, can be impacted by the methods used to advertise screening as well as self-selection biases, in terms of who chooses to take an online ED screen. Next, when screens are paired with intervention options, there can be differing rates of uptake, which may be influenced by such issues as personalization of the screening feedback and/or recommendations, as well as features associated with the intervention options themselves (e.g., accessibility). There is then the issue of engagement with the intervention, which might also be influenced by such features as accessibility of the intervention option as well as perceived fit, helpfulness, and usability (particularly in the case of digital interventions options). These parameters all influence eventual outcomes and, importantly, can all be monitored and tweaked, which might then result in changes in reach, uptake, and/or engagement, which would affect outcome.

## Conclusions

In sum, recent research highlights the problem of EDs on college campuses, with the vast majority of work indicating elevated prevalence relative to the general population. However, given the variety of ED screening tools utilized, as well as the myriad approaches used to recruit students to complete screening measures, it is difficult to collapse across studies and provide a firm estimate of ED prevalence on college campuses based on this body of work. Future work will need to focus on recruiting more diverse samples, both in terms of gender and race/ethnicity, as well as consistently using established ED screening measures and clinical cutoffs, and

well describing recruitment strategies so as to put prevalence estimates in context. Another key challenge will be linking ED screening directly with accessible options for prevention and intervention, such as those provided by Internet-based programs, and making ED screening more regularly and widely available on college campuses.

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## Compliance with Ethical Standards

**Conflict of Interest** Ellen E. Fitzsimmons-Craft, Anna M. Karam, Grace E. Monterubio, C. Barr Taylor, and Denise E. Wilfley each declare no potential conflicts of interest.

**Human and Animal Rights and Informed Consent** This article does not contain any studies with human or animal subjects performed by any of the authors.

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