Assessing Gym Intimidation in Female College Students: Understanding This as a Barrier to Physical Activity and Exercise

Emma G. Rendall, BS
University of North Carolina Wilmington

Lisa K. Sprod, PhD, MPH
University of North Carolina Wilmington

John E. Lothes II, EdD, LPA, MA, MPH
University of North Carolina Wilmington

ABSTRACT

Background: Women enrolled in college participate in less physical activity and exercise, specifically resistance training, than men.
Aim: This study measured gym intimidation and assessed factors that may influence intimidation levels in female college students.
Methods: A survey was emailed to female college students at a large, public university in the southeastern United States. Class standing, academic college, major, gym frequency, gym equipment used, and sports participation were assessed. Gym intimidation was measured using the Social Exercise and Anxiety Measure (SEAM) subscales: social exercise self-efficacy (SES: assesses confidence in the ability to exercise in various environments), gym avoidance (GA: assesses gym avoidant behavior), and exercise importance (EI: assesses priority of exercise). Pearson's correlations and ANOVAs identified significant relationships.
Results: Participants included 357 students. Pearson's correlations revealed a relationship ($p < 0.01$) between frequency of gym attendance and all SEAM questions. Mean subscale scores showed moderate gym intimidation: SES (347.41 $\pm$ 103.17) of a possible 500; GA (15.68 $\pm$ 7.66) of 28; EI (15.24 $\pm$ 3.75) of 21. Freshmen (13.55 $\pm$ 7.94) showed significantly higher gym avoidance than sophomores (16.589 $\pm$ 782), F (3,353) = 3.18, $p = 0.007$.
Conclusions: Gym intimidation is prevalent among female college students and is a barrier to exercise participation. Combatting intimidation is critical to this population's health.

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BACKGROUND

Even in the 21st century, exercise participation levels among early adults are lower among women than among men. Elgaddal et al. (2022) found that 41.3% of men aged 18–34 met the physical activity guidelines for aerobic and muscle-strengthening activities compared to only 28.7% of women in the same age range. Being male was one of three significant predictors of regular exercise in Canadian university students (Silver et al., 2019). More specifically, it has been shown that women participate in less weight training than men. The number of women who reported having ever used weight-training equipment was significantly lower than that of men (Salvatore & Marecek, 2010). The difference is most notable in the use of free weights, with 81% of men having ever used free weights, and only 56% of women having done the same.

This causes an issue: most women are not getting the benefits of exercise, specifically from weight/resistance training. On a large scale, Zhao et al. (2020) concluded that those who follow physical activity guidelines have a much-reduced risk of all-cause and cause-specific mortality. More specifically, resistance training has been shown to improve physical performance, movement control, walking speed, functional independence, cognitive abilities, and self-esteem (Westcott, 2012). When done correctly, it may also enhance cardiovascular health, promote bone development, and reduce low back pain. If exercise has so many benefits, then what is keeping women from participating?

Gym intimidation, or "gymtimidation" (as trademarked by Planet Fitness), is a term used to describe the feeling of fear or insecurity caused by a gym environment. Much research has been done on barriers to exercise, many of which can fall under the umbrella of gym intimidation. Wilson et al. (2023) researched barriers to exercise and found three general sets of barriers: (1) built environment, (2) social environment, and (3) intrapersonal factors. The built environment barriers were the location of the facility as well as its layout, equipment, and levels of crowdedness. Social environment barriers included exercising alone and the impact of friends, family, significant others, and male peers. Finally, the intrapersonal barriers were perceived lack of skills/competence/knowledge, lack of confidence, self-consciousness, and body image. The number of barriers listed above strengthens the claim that the barriers to weight training for women, including gym intimidation, appear to outweigh the motivations (Rohloff, 2013).

Furthermore, barriers to exercise adherence include support, time, cost, location, an intimidating gym atmosphere, and a lack of confidence in using the gym equipment (Morgan et al., 2016). Social physique anxiety has been connected to low exercise frequency (Auster-Gussman et al., 2021). Three factors contributed to this anxiety: (1) perceptions of gym-goers' judgments, (2) gym environments, and (3) body concerns. This shows that both external and internal factors can have a large impact on exercise frequency, and in turn, the health and well-being of the general population.

A lack of knowledge was a significant predictor of resistance training behavior among female college students at a large, public university in the Midwest (Hurley et al., 2018). The barrier of a lack of knowledge may be further compounded by the fact that the structure of gyms can create the perception that one is on show and vulnerable to scrutiny (Turnock, 2021). In the Wilson et al. (2023) study, all but one woman mentioned a perceived lack of skills/competence/knowledge as influencing their physical activity and use of the campus recreational facility. Additionally, self-consciousness (primarily from the use of equipment) was mentioned by all but five of the women in the study. One interviewee said,

> The reason I only pretty much do the treadmill, the stair stepper, maybe the elliptical is because I know what I'm doing on those. But I'm not one of those people that can walk up to a new machine and just feel confident

> enough to read the instructions and do it because I always in my head think that I'm doing it wrong and people are judging me. (Wilson et al., 2023, p. 2230)

In the case of this individual, and presumably in many others, it is easier to stick with what one knows rather than attempt to learn something new and risk judgment or failure. This is echoed in Salvatore and Marecek's (2010) study where it was found that 82% of women had used aerobic equipment compared to 77% of men. If women felt more prepared and confident, would they feel less intimidated about weight training?

The prevalence of gendered spaces also plays a strong role in women's experiences of gym intimidation. A study in the United Kingdom aimed to understand the "sharp gender segregation of weights areas and emotional barriers crossing into this 'male space' creates" (Turnock, 2021, p. 1). Gyms are implicitly segregated into gendered spaces. Facilities and social messaging contribute to the stiffening of the figurative wall between the areas. This idea of crossing a divide into another space in which one does not feel as though they belong further illustrates the difficulty that women face in entering a male-dominated area.

Women's experiences of intimidation can interfere with and limit their ability to be physically active (Wilson et al., 2023). Levinson et al. (2012) found that social self-efficacy and exercise importance were positively correlated with exercise frequency while gym avoidance was negatively correlated with exercise frequency. These findings theorize that gym intimidation prevents individuals from participating in exercise as often as they may otherwise.

Instructional physical activity programs (IPAP) teach university students how to engage in physical activity and healthy behaviors. As such, these programs and courses provide an opportunity to promote physical activity and break down barriers to exercise. Reasons for enrollment in IPAP courses as well as their anticipated benefits differ by gender (Lackman et al., 2015). Females reported believing that the course would impact their physical activity levels in the future. Gender-specific course programming may be needed to teach health behaviors more intentionally (Von Bothmer, 2005).

Surveys were administered to evaluate concerns about social exercise and assess gym intimidation in female college students. This study aimed to identify the prevalence and indicators of gym intimidation in female college students. These indicators could serve as areas to target when implementing interventions to combat gym intimidation and promote exercise. Based on findings from previous research (Turnock, 2021), it was expected that those who have been to the student recreation center would have less gym intimidation than those who have not. Since there is scant research on class rank differences and gym intimidation, an exploratory data analysis was conducted to see if there were differences between class ranks and gym intimidation.

Based on previous studies of barriers to exercise (Wilson et al., 2021; Turnock, 2021), it was hypothesized (H1) that gym intimidation would be prevalent in the female college student population. Because lack of knowledge is a barrier to exercise for women (Hurley et al., 2018), it was further hypothesized (H2) that health science students and (H3) exercise science majors would show less gym intimidation as they have more health- and wellness-related education. Consistent with the Salvatore & Marecek (2010) study, it was hypothesized (H4) that more women would report using cardio equipment than strength equipment.

METHODS

Research Design

This descriptive study utilized an online survey to gather data on gym intimidation and potential indicators. The survey quantitatively measured gym intimidation to determine its prevalence in the sample population. Additionally, relationships between participant characteristics and gym intimidations were analyzed.

Participants

A convenience sample was gathered via email recruitment. Emails were sent out to all students in the health sciences college, introductory honors courses, and IPAP classes. Emails were also sent to a few sections of introductory university and math courses. Participants were female-identifying undergraduate students of at least 18 years of age at a large, public university in the southeastern United States. Informed consent was outlined and obtained at the beginning of the survey. Additionally, approval was received from the university's institutional review board.

Procedure

An online survey was created using Qualtrics. The survey involved two main categories: (1) characteristic information and (2) gym intimidation. Upon completion of the survey, the researcher's contact information was provided for participants to reach out with any questions or concerns.

Independent variables included class standing, academic college, major, frequency of gym attendance, gym equipment utilized, use of the student recreation center, and sports participation (high school or college). Dependent variables included gym intimidation as measured using the Social Exercise and Anxiety Measure (SEAM) (Levinson et al., 2012). The SEAM is divided into three subscales: social exercise self-efficacy (SES), gym avoidance (GA), and exercise importance (EI). The SES uses a 0 to 100 scale for each of its 5 items to assess confidence in the ability to exercise in various environments. The GA (4 items) assesses gym-avoidant behavior on a Likert-style scale from 0 to 7. The EI (3 items) uses a similar 0 to 7 scale to assess the priority of exercise and health. The 12 SEAM questions are outlined for reference (Table 1). The SEAM is a "psychometrically strong" measure of SES, GA, and EI (Levinson et al., 2012). The SES and GA showed convergent validity and were correlated with public exercise frequency. SES was also correlated positively with general exercise frequency. EI was correlated positively with exercise commitment and fixation.

Originally, high scores on the SES and EI were associated with lower gym intimidation, while high GA scores are associated with stronger gym intimidation. To align all the subscales, the GA scores were recoded to become the opposite score (scores of 0 became 7, 1 became 6, etc.). Thus, the SEAM has been adjusted so that all low scores reflect strong gym intimidation, while all high scores reflect a high level of confidence in a gym setting.

Table 1

Social Exercise and Anxiety Measure Questions

	Social Exercise Self-Efficacy Scale (SES) - Directions for the SES: Please rate how confident you are, where 0 is not at all and 100 is completely confident, that you can: I am confident…
SES Q1	That I could work out/ exercise at a public gym where strangers also work out
SES Q2	That I could work out/ exercise at a private gym where only me and my close friends work out
SES Q3	That I could work out/exercise with a group of people that I do not know
SES Q4	That I could work out/exercise in a crowded gym
SES Q5	That if I went to the gym I would be successful at attaining my workout goals
	Gym Avoidance Scale (GA) - Directions for GA: The following items are types of behavior. Please think about how much the behavior is typical of you. Please rate the following items on a 1–7 scale where 1 is not like me at all and 7 is completely like me.
GA Q1	I don't go to the gym because I feel like people are looking at me.
GA Q2	I don't go to the gym because I don't want to interact with the people at the gym.
GA Q3	When I go to the gym I think people are judging me.
GA Q4	I wish that I could go to the gym but I am too afraid of what people will think.
	Exercise Importance Scale (EI) - Directions for EI: Please think about how much the following behaviors are important to you. Please rate the following items on a 1–7 scale where 1 is not important to me and 7 very important to me.
EI Q1	How important to you is exercising as a social activity?
EI Q2	How important to you is exercising as an activity to maintain a healthy lifestyle?
EI Q3	How important are exercising and eating healthy in your daily routine?

Note. Q = question.

Data Analysis

The data analysis was done using SPSS and StatView. Pearson's correlations, through SPSS, were used to identify significant relationships between gym frequency and SEAM questions. Pearson's correlations were also used to find significant relationships between the SEAM questions themselves. ANOVAs were used to see if differences in SEAM scores existed between students who had been to the student recreation center before and those who had never been to the student recreation center. ANOVAs were used to see if differences in SEAM scores existed between students who are majors in the College of Health Sciences (HS) and those who are majors in "other" departments. ANOVAs were used to see if differences in SEAM scores existed between students who are exercise science majors and students in other majors. Finally, ANOVAs were used to see if differences in SEAM scores existed between students who had used strength equipment (strength machines and/or free weights) and those who did not. Note that to simplify results, ANOVAs were used to see if differences in SEAM scores existed between students (i.e., regarding academic college, major, gym equipment used, and sports participation) and were adapted from their original answer choices to reflect

one of two binary options (i.e., exercise science major or non-exercise science major). ANOVA tests in StatView were used to find differences in SEAM scores between students of different class standing. An ANOVA was also conducted to see if there were differences in scores based on students' self-reported frequency of gym attendance.

RESULTS

Participants

The survey yielded 388 completed responses out of 453 opened links, an 86% completion rate. A good portion of incomplete surveys is likely due to male students who started the survey but did not meet the target population requirements. Undecided majors (n = 25) and graduate students (n = 6) were dropped from the data set as it was unknown what category they would be in, specifically for class standing, academic college, and major. The final data set included 357 responses. Both academic and exercise-related characteristics of participants were recorded (Tables 2 and 3). The number of responses by class standing was close to evenly split between the four groups. 67% of responses came from students in the HS academic college. Exercise science (EXS) majors made up 46% of the responses. Twenty-seven percent of participants reported going to the gym less than 1x/week. Consistent with H4, 81% of respondents had used cardio equipment compared to the 66% who used free weights and the 64% who used strength machines. Ninety percent of respondents had been to the student recreation center. Finally, 82% of respondents participated in organized sports in either high school or college.

Table 2

Participant Characteristics - Academics

Variable	N (%)
Class Standing	
Fr.	87 (24)
So.	95 (27)
Jr.	95 (27)
Sr.	80 (22)
Academic College	
HS	238 (67)
Non-HS	119 (33)
Major	
EXS	163 (46)
Non-EXS	194 (54)

Note. Fr. = freshman; So. = Sophomore; Jr. = junior; Sr. = senior; HS = health sciences; and EXS = exercise science.

Table 3

Participant Characteristics – Exercise

Variable	N (%)
Gym Frequency	
Never	24 (7)
Rarely (1-3x/mo)	73 (20)
Sometimes (1x/wk)	57 (16)
Often (2-3x/wk)	84 (24)
Very Often (≥3x/wk)	119 (33)
Equipment Use	
Strength Machines	226 (64)
Free Weights	233 (66)
Cardio	285 (81)
Group Fit Classes	119 (34)
None of the Above	19 (5)
Recreation Center	
Visited	37 (10)
Not Visited	320 (90)
Sports	
High School	289 (81)
Intramural	57 (16)
Club	70 (20)
NCAA	28 (8)
None of the Above	63 (18)

Note. NCAA = National Collegiate Athletics Association.

Gym Intimidation

As hypothesized in H1, gym intimidation was prevalent in the population. The overall mean scores of all questions are reported in Table 4. Additionally, sums were taken of each of the subscales. The mean scores were SES (347.41 $\pm$ 103.17) out of a possible 500, GA (15.68 $\pm$ 7.66) of 28, and EI (15.24 $\pm$ 3.75) of 21.

Table 4

Overall Mean the Social Exercise and Anxiety Measure Scores

	SES (out of 100)	GA (out of 7)	EI (out of 7)
Q1	70.0	3.8	3.6
Q2	95.0	4.5	6.2
Q3	57.5	3.1	5.5
Q4	49.6	4.3	N/A
Q5	75.3	N/A	N/A
Total	347.4	15.7	15.2

Note. Q = question; SES = social exercise self-efficacy; GA = gym avoidance; and EI = exercise importance.

Pearson's correlations revealed a significant relationship between frequency of gym attendance and all SEAM questions (Table 5). A strong relationship was found between SES Q5 (r = 0.72) and EI Q2 (r = 0.42) and Q3 (r = 0.41), ($p < 0.01$).

Table 5

Pearson's Correlations for Gym Frequency and Social Exercise and Anxiety Measure Scores Questions

	SES	GA	EI
Q1	0.54**	-0.56**	0.19**
Q2	0.26**	-0.50**	0.51**
Q3	0.42**	-0.38**	0.55**
Q4	0.42**	-0.54**	N/A
Q5	0.56**	N/A	N/A

Note. Q = question; SES = social exercise self-efficacy; GA = gym avoidance; and EI = exercise importance. Correlations were run with pre-recoding GA scores, thus the negative r-values.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

Consistent with H2, ANOVAs revealed that between HS students and non-HS students, there were significant differences in all SEAM scores except SES Q2 and EI Q1 (Tables 6, 7, and 8). In addition, significant differences ($p < 0.01$) were found for all SEAM scores between EXS majors and non-EXS majors, as predicted in H3. Significant differences ($p < 0.01$) were also found for all SEAM scores between those who use strength equipment and those who do not.

Table 6

ANOVA Social Exercise Self-Efficacy for Health Science vs Non-Health Science

	HS	Non-HS	F	p	d
	Mean (SD)	Mean (SD)			
Q1	72.88 (26.68)	64.20 (28.91)	7.93	0.0051**	0.31
Q2	95.29 (12.58)	94.45 (13.54)	0.34	0.5623	0.06
Q3	60.40 (29.93)	51.72 (29.87)	6.68	0.0102*	0.29
Q4	52.42 (32.13)	44.12 (30.82)	5.44	0.0203*	0.26
Q5	78.28 (23.44)	69.20 (25.29)	11.28	0.0009**	0.37
Total	71.19 (20.45)	61.49 (19.76)	11.82	<.0007**	0.48

Note. HS = health science; and Q = question.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

Table 7

ANOVA Gym Avoidance for Health Science vs Non-Health Science

	HS	Non-HS	F	p	d
Q1	4.22 (2.09)	3.06 (2.30)	23.10	<.0001***	0.53
Q2	2.20 (1.88)	3.18 (2.29)	18.58	<.0001***	0.47
Q3	4.80 (1.88)	3.82 (2.29)	18.58	<.0001***	0.47
Q4	3.65 (2.19)	4.44 (2.18)	10.24	0.0015*	0.36
Total	3.35 (2.19)	2.56 (2.18)	10.24	0.0015*	0.36

Note. HS = health science; and Q = question.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

Table 8

ANOVA Exercise Importance for Health Science vs Non-Health Science

	HS	Non-HS	F	p	d
Q1	2.36 (2.12)	3.44 (2.44)	18.43	<.0001***	0.47
Q2	4.64 (2.12)	3.56 (2.44)	18.43	<.0001***	0.47
Q3	3.68 (2.05)	3.32 (1.92)	2.57	0.1096	0.18
Total	6.35 (1.13)	5.87 (1.36)	12.28	0.0005**	0.38

Note. HS = health science; and Q = question.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

For those who had been to the student recreation center compared to those who had not, there were significant differences in SES Q1, Q3, and Q4 as well as all GA scores and EI Q1 and Q2 (Tables 9, 10, and 11). Respondents who had participated in sports had a significant difference compared to those who had not in SES Q1, Q2, Q3, and Q4 as well as EI Q3, but none for GA (Tables 12 and 13).

Table 9

ANOVA Social Exercise Self-Efficacy for Student Recreation Center vs No Student Recreation Center

	Visited	Not Visited	F	P	d
Q1	71.25 (27.36)	59.05 (28.60)	6.53	0.01**	0.44
Q2	95.02 (13.36)	95.00 (7.91)	4.86	0.99	0.002
Q3	58.66 (29.93)	47.57 (30.54)	4.53	0.034*	0.37
Q4	51.13 (31.85)	36.86 (29.82)	6.71	0.01**	0.46
Q5	75.66 (24.37)	71.76 (24.87)	0.85	0.36	0.16
Total	70.34 (20.79)	62.05 (17.78)	13.29	0.0003***	0.43

Note. Q = question.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

Table 10

ANOVA Gym Avoidance for Student Recreation Center vs No Student Recreation Center

	Visited	Not Visited	F	p	d
Q1	3.98 (2.17)	2.60 (2.36)	13.29	<.0003***	0.61
Q2	2.44 (1.99)	3.22 (2.58)	4.66	0.03*	0.34
Q3	4.56 (1.99)	3.78 (2.58)	4.66	0.03*	0.34
Q4	3.79 (2.19)	4.97 (2.17)	9.68	0.002**	0.54
Total	3.21 (2.19)	2.03 (2.17)	9.68	0.002**	0.54

Note. Q = question.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

Table 11

ANOVA Exercise Importance for Student Recreation Center vs No Student Recreation Center

	Visited	Not Visited	F	P	d
Q1	2.59 (2.21)	3.84 (2.62)	10.13	0.002**	0.52
Q2	4.41 (2.21)	3.16 (2.62)	10.13	0.002**	0.52
Q3	3.62 (2.02)	3.05 (1.91)	2.63	0.11	0.29
Total	6.21 (1.23)	6.05 (1.25)	0.51	0.48	0.13

Note. Q = question.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

Table 12

ANOVA Social Exercise Self-Efficacy for Sports vs No Sports

	Sports	No Sports	F	p	d
Q1	71.79 (27.30)	61.59 (28.27)	7.15	0.0078**	0.37
Q2	96.04 (11.02)	90.24 (18.76)	10.79	0.0011**	0.38
Q3	60.66 (29.38)	42.78 (29.52)	19.20	<.0001***	0.61
Q4	51.19 (31.61)	42.46 (32.50)	3.92	0.049*	0.27
Q5	76.29 (24.29)	70.40 (24.60)	3.04	0.082	0.24
Total	71.19 (20.45)	61.49 (19.76)	11.82	0.0007**	0.48

Note. Q = question.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

Table 13

ANOVA Exercise Importance for Sports vs No Sports

	Sports	No Sports	F	p	d
Q1	2.64 (2.25)	3.10 (2.45)	2.07	0.15	0.20
Q2	4.32 (2.25)	3.91 (2.45)	2.07	0.15	0.17
Q3	3.67 (2.00)	3.06 (2.00)	4.72	0.03*	0.31
Total	6.28 (1.19)	5.76 (1.29)	9.57	0.002**	0.42

Note. Q = question.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

ANOVA tests found significant differences in SES Q3, about exercising with a group of strangers, between freshmen (51.61 $\pm$ 30.38) and sophomores (60.58 $\pm$ 28.94), F (3,353) = 2.27, $p = 0.045$, d = 0.30, as well as freshmen and seniors (62.38 $\pm$ 27.65), F (3,353) = 2.27, $p = 0.021$, d = 0.37. Similarly, significant differences were found in SES Q4, about exercising in a crowded gym, between freshmen (42.07 $\pm$ 31.83) and sophomores (53.95 $\pm$ 32.26), F (3,353) = 5.44, $p = 0.012$, d = 0.37, as well as freshmen and juniors (51.47$\pm$31.59), $p = 0.047$, d = 0.30. Significant differences were found in GA total scores between freshmen and all three other class standings: freshmen (13.55$\pm$7.94) and sophomores (16.589 $\pm$ 7.82), F (3,353) = 3.18, $p = 0.007$, d = 0.39; freshmen and juniors (15.91 $\pm$ 7.41), $p = 0.038$, d = 0.31; and freshmen and seniors (16.64 $\pm$ 7.15), $p = 0.009$, d = 0.41. Individually, the questions with the most significant differences were GA Q3 and Q4 in freshmen compared to the other classes. GA Q3, about perceived judgment from others, had differences between freshmen (2.37 $\pm$ 2.11) and sophomores (3.52 $\pm$ 2.20), F (3,353) = 4.70, $p = 0.0004$, d = 0.53; freshmen and juniors (3.12 $\pm$ 2.14), $p = 0.0214$, d = 0.35; freshmen and seniors (3.33 $\pm$ 2.28), $p = 0.0049$, d = 0.44. GA Q4, about fear of what people will think, showed differences between freshmen (3.56 $\pm$ 2.46) and sophomores (4.41 $\pm$ 2.27), F (3,353) = 4.06, $p = 0.012$, d= 0.40; freshmen and juniors (4.48 $\pm$ 2.20), $p = 0.006$, d = 0.39; freshmen and seniors (4.66 $\pm$ 2.07), $p = 0.002$, d = 0.48.

ANOVA tests also found significant differences between gym frequencies and all SEAM questions (Tables 14, 15, and 16). Furthermore, SES Q1 and Q5 showed significant differences between all gym frequencies.

Table 14

Social Exercise Self-Efficacy for Gym Frequency

	Low	Low to Mod	Mod	Mod to High	High	F	p	d
Q1	40.21 (28.72)	52.40 (26.98)	64.04 (25.43)	73.93 (23.32)	86.85 (18.28)	37.10	<.0001***	1.94
Q2	82.71 (26.29)	91.58 (14.55)	95.70 (10.37)	96.79 (8.42)	98.03 (9.33)	9.69	<.0001***	0.77
Q3	33.75 (26.26)	42.53 (27.09)	52.98 (37.09)	56.79 (29.07)	74.16 (26.13)	21.76	<.0001***	1.54
Q4	27.50 (29.64)	34.38 (27.21)	38.95 (24.64)	53.16 (31.93)	66.13 (29.32)	20.59	<.0001***	1.31
Q5	46.67 (27.57)	59.93 (25.60)	67.46 (23.28)	81.43 (18.64)	89.79 (12.96)	42.00	<.0001***	2.00
Total	46.17 (21.23)	56.16 (18.71)	63.83 (16.99)	72.42 (17.54)	82.99 (14.28)	43.65	<.0001***	2.04

Note. Q = question; Low = Never; Low to Mod = Rarely (1-3 times per month); Mod = Sometimes (once per week); Mod to High = Often (2-3 times per week); High = Very Often (3+ times per week). Effect sizes were calculated between Low and High.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

Table 15

Gym Avoidance for Gym Frequency

	Low	Low to Mod	Mod	Mod to High	High	F	p	d
Q1	1.67 (2.01)	2.41 (1.99)	2.77 (1.99)	4.31 (1.76)	5.32 (1.58)	46.29	<.0001***	2.02
Q2	2.92 (2.39)	3.10 (1.97)	3.97 (2.08)	4.73 (1.79)	5.71 (1.34)	30.92	<.0001***	1.44
Q3	1.58 (1.98)	2.15 (2.00)	2.21 (1.85)	3.29 (2.09)	4.24 (2.04)	20.09	<.0001***	1.32
Q4	2.04 (2.22)	2.80 (2.27)	3.37 (2.08)	7.80 (1.89)	5.71 (1.42)	41.49	<.0001***	1.97
Total	8.21 (7.05)	10.45 (6.84)	12.32 (6.50)	17.12 (6.08)	20.98 (5.43)	49.21	<.0001***	2.03

Note. Q = question; Low = Never; Low to Mod = Rarely (1-3 times per month); Mod = Sometimes (once per week); Mod to High = Often (2-3 times per week); High = Very Often (3+ times per week). Effect sizes were calculated between Low and High.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

Table 16

Exercise Importance for Gym Frequency

	Low	Low to Mod	Mod	Mod to High	High	F	p	d
Q1	2.92 (1.64)	3.14 (1.64)	3.21 (1.84)	3.66 (2.19)	4.05 (2.13)	3.78	0.005**	0.59
Q2	5.25 (1.36)	5.43 (1.40)	5.61 (1.47)	6.54 (0.80)	6.88 (0.47)	34.27	<.0001***	1.60
Q3	4.29 (1.71)	4.48 (1.50)	4.72 (1.56)	5.82 (1.28)	6.49 (0.83)	40.85	<.0001***	1.64
Total	12.46 (3.78)	13.04 (3.36)	13.54 (3.74)	16.01 (3.35)	17.42 (2.67)	31.35	<.0001***	1.52

Note. Q = question; Low = Never; Low to Mod = Rarely (1-3 times per month); Mod = Sometimes (once per week); Mod to High = Often (2-3 times per week); High = Very Often (3+ times per week).Effect sizes were calculated between Low and High.

*$p < 0.05$. **$p < 0$. ***$p < 0.001$.

DISCUSSION

The results of this study showed that gym intimidation is prevalent in the population of female college students, especially for non-HS students. The results also showed that those who attended the gym less frequently had higher levels of gym intimidation. This indicates that gym intimidation plays a role in gym nonattendance. The prevalence of gym avoidance contributes to the lower levels of regular exercise among female university students, as compared to their male counterparts (Silver et al., 2019). It would be wise for IPAP faculty to be aware of what components of these classes may be intimidating to female students, thus limiting enrollment in these types of classes. Also, offering detailed class descriptions on how some of these barriers could be overcome (Wilson et al., 2023) may be beneficial to increase enrollment in resistance training classes.

The lowest overall mean GA score was for Q3, indicating that perceived judgment from others is the strongest reason for gym avoidance. Congruently, self-consciousness was found to be an extremely common influence on gym use (Wilson et al., 2023). This coincides with the findings that the perception of gym-goers' judgments contribute to social physique anxiety and, consequently, to low exercise frequency (Auster-Gussman et al., 2021).

On the EI, Q1 had the lowest overall mean score, while those for Q2 and Q3 were notably higher. Q1 relates to exercising as a social activity. Q2 and Q3 relate to living healthfully through exercise and diet. This finding suggests that the sample population placed low importance on the social aspect of exercise and instead placed the highest importance on maintaining a healthy lifestyle. This is seemingly inconsistent with the finding that the social environment, including exercising alone, is a barrier to exercise for college students (Wilson et al., 2023). Perhaps the social environment is indeed a factor but simply has less of an influence compared to the built environment and intrapersonal barriers.

EXS majors showed lower gym intimidation levels than non-EXS majors, showing that specific knowledge about exercise may decrease gym intimidation. This is consistent with perceived lack of skill/competence/knowledge and lack of confidence in using gym equipment being listed as barriers to exercise (Morgan et al., 2016; Wilson et al., 2023). Similarly, this connects to the Hurley et al. (2018) study which specifically studied female university students at a large Midwestern university and found lack of knowledge to be a significant predictor of resistance training behavior. Furthermore, HS students showed lower gym intimidation than non-HS students, suggesting that education on health and wellness may encourage exercise and help diffuse potential intimidation. Given this, universities and their recreation centers might consider offering programs that educate students on gym basics such as creating a workout. Additionally, universities and their recreation centers might consider having certified personal trainers to run these programs and be available to help students who would benefit from a smaller group or one-on-one setting. These trainers should be novice-friendly, educated on gym intimidation, and able to properly educate and encourage clients who may be experiencing gym intimidation. IPAP faculty need to also consider these factors when offering different IPAP classes and how gym intimation may be a limiting factor in enrollment by some students. Offering introductory courses, such as "Intro to Resistance Training" or "Resistance Training Basics," may help to reduce gym intimidation and increase female enrollment in these types of courses.

Those who used strength equipment showed lower gym intimidation than those who did not. This could be due to higher levels of skill, competence, and knowledge about movements and equipment. The current study also found that more students had used the cardio equipment than strength equipment. These findings are consistent with one interviewee mentioning that strength equipment is not as self-explanatory as cardio equipment (Wilson et al., 2023). This is also consistent with the finding that fewer women than men report having ever used weight-training equipment (Salvatore & Marecek, 2010). This said, SRCs could offer workshops on performing certain exercises with proper technique. Again, having friendly personal trainers who are sensitive to novices and eager to build self-efficacy in their clients and workshop participants is of great importance. This may also be a good opportunity to involve exercise science students in some hands-on gym experience through offering workshops on exercise technique and other gym-related skills. Through this, they can practice cueing and education skills that they may need in the field while also providing a service and promoting healthy behaviors to fellow students on their campus.

Those who had been to the student recreation center showed higher SES and lower GA, but no differences in EI as a whole. This suggests that the importance placed on exercise does not have a strong influence on one's choice to use the SRC. However, offering gym tours for new members or students may be a good technique for gyms and recreation centers to get patrons in the doors. Additionally, having IPAP classes go on tours of recreation centers on campus, or having IPAP faculty try to work synergistically with recreation center staff could prove beneficial. These developments would serve to educate students on appropriate use of the equipment and potentially reduce gym intimidation. This allows patrons to first familiarize themselves with the facility without the pressure to workout, thus diffusing the barrier of exercising in an unfamiliar space. As for sports participation, results signify that it may have a positive impact on self-efficacy and increase the importance placed on exercise but does not affect gym avoidance levels.

Results showed that confidence in exercising "with a group of people that I do not know" and "in a crowded gym" increases significantly after freshman year but stays relatively steady from sophomore through senior year. This could be due to acclimatization to the new and large groups of people that young people experience for the first time

in a university setting. Similarly, GA, specifically because of perceived judgment, showed the same trend in freshmen compared to the other three classes – starting higher and then leveling off.

Logically, results confirmed that those who attend the gym more frequently have lower gym intimidation levels, while those who attend less have higher levels. These differences were most significant on the questions about exercising "at a public gym where strangers also work out" and about being successful at attaining workout goals. Supplementarily, correlations showed that self-predicted success at the gym is correlated with the ability to use a public gym and EI. This follows, as those who attend the gym frequently have proven to themselves that they can workout at a gym and that they can meet their goals. Offering "Intro to Weight/Resistance Training" or "Foundations of Weight/Resistance Training" IPAP classes can help students gain confidence in their ability to work out.

Social media, whether actively or through "passive exposure" is a common source of health information for young adults (Lim et al., 2022). There is limited literature on how much of the health information available on social media is credible. Still, it can be assumed that though young adults have more access to health information, they also have more access to misinformation. One fitness myth that has given many women the concern that weightlifting will make them look bulky or manly (Dworkin, 2003). This and other fitness myths may be perpetuated further by social media. It will be important for the introductory courses to address identifying credible health information on social media.

Limitations

This study was limited to a small convenience sample at a single university. Researchers had the most convenient access to students within the college of HS, which yielded a disproportionate number of responses compared to other academic colleges. Furthermore, data were collected at a predominantly White university and, thus, lacks racial diversity. With participation being voluntary, there could be other lurking variables that were not caught in the characteristic questions. Further research with a larger and more diverse sample is suggested.

CONCLUSIONS

Gym intimidation is prevalent in the sample population and is stronger in freshmen, those with less education in health and exercise sciences, and those with less sports and exercise experience. Larger studies with randomized sampling should be done to determine if these results are generalizable to a larger population. Studies should expand to include male, transgender, and non-binary participants. Comparing across gender identity would identify differences in prevalence and indicators. These would give health and fitness professionals information on where to focus their interventions and whether there should be differences in intervention strategies based on gender identity. Furthermore, interventions to decrease gym intimidation in female college students should be studied. IPAP classes specifically could be one very effective avenue to help reduce gym intimidation in students if delivered effectively and with clear course descriptions. Interventions should aim to increase confidence and self-efficacy in female college students. Interventions should also aim to decrease participants' concerns over perceived judgments of others in the gym setting.

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Address author correspondence to:

Emma Rendall

emmagrendall@gmail.com

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