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Original Research

Practices, Perceived Benefits, and Barriers to Resistance Training Among Women Enrolled in College

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ABSTRACT

International Journal of Exercise Science 11(5): 226-238, 2018. The American College of Sports Medicine (ACSM) has recommended that resistance training be performed at least twice per week, with 8-12 repetitions of 8-10 exercises targeting all major muscle groups (1). However, Kruger, Carlson, and Kohl (18) reported that women were participating less than the U.S. population on the whole, as only 20% of women were engaging in resistance training two or more times per week. In order to better understand why only 1 in 5 women participate regularly in this form of physical activity, this study investigated current resistance training practices, perceived benefits, and barriers to resistance training among college women. One-hundred and sixteen women college students from a large, public, Midwestern university participated in this study. Correlation and hierarchical multiple regression analyses were used to identify the strongest predictors of resistance training behaviors. The predictors in the regression model included demographic characteristics in block one, perceived barriers to resistance training in block two, and perceived benefits of resistance training in block three. Results indicated that the level of perceived "time/effort" barriers significantly predicted resistance training behavior. Findings in this area may help researchers, university recreation programmers, personal trainers, and other health and fitness professionals better understand the attitudes and actions of college women regarding resistance training, toward the goal of promoting fitness center environments that college women find more inviting.

KEY WORDS: Weight-lifting, gym, barriers, exercise, motivation

INTRODUCTION

As a means of maintaining the health of the musculoskeletal system throughout the lifespan, the American College of Sports Medicine (ACSM) recommends that adults participate in resistance training at least twice per week (1). However, Kruger and colleagues (18) highlight that only 20% of women were resistance training two or more times per week, and this percentage is lower than the goal of 24% targeted in Healthy People 2020 (21). The strength training trends reported by Kruger et al., further highlighted that wide gender disparities are evident in resistance training participation levels, as men are engaging in this activity

approximately 30% more frequently than are women (18). This gap is further supported by findings from Haines and colleagues (14), who noted that for every woman utilizing the free weight section of the gym, there were approximately 27 men using this same equipment (27/1 ratio). Such documented disparities present challenges for fostering musculoskeletal health for women throughout the lifespan.

The ACSM defines *resistance training* for health and fitness as "a form of physical activity that is designed to improve muscular fitness by exercising a muscle or muscle group against external resistance" (2). Resistance or strength training is widely performed in contemporary health and fitness environments through the use of equipment like free weights, weight-selectorized machines, plate loaded machines, weighted balls, resistance bands, and body weight resistance equipment. This particular form of exercise is instrumental in building and maintaining lean muscle mass, which is necessary for the completion of many functional tasks, as well as for sport and recreational activities. It is widely known that lean muscle mass decreases as individuals age and this is linked to many medical conditions and lesser measures of quality of life and/or function, prompting professional health organizations such as the ACSM to advocate for the inclusion of regular resistance exercise into comprehensive health and wellness programming.

Within this context of disease prevention and health promotion, researchers are intrigued by the sizeable evidence indicating substantially fewer women utilize resistance-specific training modalities when compared to men. This evidence regarding participation is contrary to the considerable research literature that highlights the numerous physical, psychological, and social benefits for women who regularly complete resistance training regimens (3, 7, 8, 11, 12). The most apparent health-related benefits of resistance training include improved muscle definition, strength, body composition, metabolic efficiency, and bone density (9, 10, 12, 16, 19, 25).

In addition to physiological health, improved psychological and social health domains also have been positively linked to regular resistance training (7, 11, 17, 27). Such psychological health benefits have been shown to be especially important in college-aged women, as the transition from being a teenager to an adult can be exceptionally difficult when living away from home for the first time (13). Furthermore, college women have reported "increased feelings of vigor, physical self-concept, self-esteem, and self-efficacy, as well as decreased total mood disturbance" following regular resistance training workouts (27). As a means of more fully understanding the social health benefits of regular resistance training, (5) college-age and middle-age women were surveyed to better understand their preference for resistance training atmosphere. Results indicated that women overall preferred a structured resistance training class as they reported that they received a better workout, tended to be more committed and were more likely to be encouraged by others in such an environment. Such positive psychological and social health outcomes with resistance training have been consistently supported in the literature; yet, few young women engage in the resistance training necessary for optimal health. These disparities suggest that further research is warranted to better understand such exercise behaviors within women.

Such disparities in regular resistance training between men and women (6, 11, 14) suggest that an examination of potential barriers may be valuable. One such obstacle may be the general tendency of many women to spend the majority of their exercise time using cardiovascular machines rather than lifting weights (11), perhaps believing that cardiovascular exercise results in more benefits to health and/or body appearance. To illustrate, Dworkin (11) noted that roughly 70% of patrons using cardiovascular machines in fitness centers tended to be female. This behavior is supported by Velija and Kumar (28) and Wachs (29), who suggested that females may be socialized at a young age to avoid perceived "masculine" areas (e.g., weight rooms) and are likely encouraged to pursue activities perceived as more "feminine" (e.g., dance aerobics). A strong gender-based stigma also still exists for resistance training, as many women report concerns that they would "bulk up" or look "manly" if they participated in ongoing resistance training (11). Such mismatches in perceptions pertaining to exercise modality present challenges toward fostering the benefits of resistance training among women throughout the lifespan. Similarly, the Transtheoretical Model (23) describes the stages of change and decisional balance in respect to engaging in behaviors on a long-term basis, and it is widely used in clinical environments to gauge readiness – as well as to promote – client readiness to engage in healthful behaviors. As such this and other models may prove valuable in understanding the disparities in resistance training exhibited by men and women.

Nonetheless, research literature is scant examining perceptions of benefits and barriers to exercise among college women. Harne and Bixby's (15) research remains one of the few peer-reviewed examinations of perceptions of benefits and barriers to resistance training within college women. As a means of best describing potential barriers to resistance training, past research has divided such barriers into four different categories (i.e., time-effort, physical, social, and specific), based on Myers and Roth's (20) conceptualization of the benefits and barriers for exercise. To illustrate, the number one reason women reported for not participating in resistance training in Harne and Bixby's (15) study was a perceived lack of time. This is a commonly noted barrier, particularly among women, that has been mentioned in previous studies (7, 10, 14). Myers and Roth (20) classified this issue within the *time-effort* category, grouping it with other reasons such as being too busy, lacking the desire or discipline, and feeling that the activity is boring. They described the second category, *physical*, as pertaining to the physical aspect of weight lifting or how one might be perceived by others while engaging in the activity; this includes barriers such as not having the desire to sweat or have an athletic physique, being uncoordinated, feeling uncomfortable or intimidated, and having a lack of knowledge. Myers and Roth (20) described the third category, *social*, as barriers pertaining to social settings such as not liking to exercise alone and not having family or friends who encourage or take part in resistance training. They described the last category of barriers, *specific*, as explicit barriers falling outside of the first three categories, such as bad weather, no convenient locations, medical problems, family obligations, and interference with other activities. In summary, Harne and Bixby (15) in 2005 modified these domains first described by Myers and Roth so as to specifically address perceived benefits and barriers to resistance training, yet this topic has received little attention since that time.

Thus, given the incongruity between the research literature demonstrating that regular resistance training fosters musculoskeletal health and the evidence that women participate in this activity substantially less often than men, this study examined underlying motives (i.e., benefits and barriers) to resistance training experienced by college women. In this vein, little is known regarding demographic variables such as age, grade point average (GPA), number of years in school, full or part-time status, housing status, or other variables may influence perceived benefits or barriers to regular resistance training. The purpose of this study, then, was to assess behaviors, perceived benefits, and barriers to resistance training among college women. More specifically, the study sought to answer the following questions: 1) What percentage of college women are currently using free weights in fitness centers?; 2) What are the relationships between descriptive variables, benefits, and barriers to resistance training?; and 3) Which benefits, barriers, and/or demographic variables predict resistance training activity of women in a fitness center?

METHODS

Participants

Upon clearance from the university's Institutional Review Board (IRB), 116 women students from a large, public Midwestern university participated in this study. The age of the participants ranged from 19 to 56 (mean age = 27.07 ± 8.79 years), with 87% of the population responding that they were Caucasian (n = 101). In addition, graduate students made up 57.6% of the respondents, with the remaining 19% designated as juniors, 10.3% as seniors, 7.8% as sophomores, and 4.3% as freshmen. Students were mostly full time status (75.8%), lived off-campus within a five-mile radius (44%), had a mean GPA of 3.56 ±.46), and were on campus an average of 3.7± 2.6 days per week. See Table 1 for a complete list of frequencies for descriptive variables.

Protocol

Instrumentation: Two different questionnaires were utilized to determine the benefits and barriers that influence the decision to engage in resistance training among college women.

Demographics and Exercise History Questionnaire (DEHQ): The demographic and exercise history questionnaire consisted of 18 self-report items designed to assess college students' participation in sedentary and non-sedentary activities. Demographic variables were recorded as follows: age, race, year in school, GPA, class load, living situation, campus recreation center eligibility, self-report knowledge/comfort level (1 = not knowledgeable to 5 = extremely knowledgeable) of six resistance training modalities (i.e., selectorized machines, plate-loaded machines, free weights, dumbbells, resistance bands, and body resistance), likelihood to use a women's only facility if provided on campus (five response categories of *very likely, more likely, likely, possibly likely,* and *not likely*), and exercise participation assessed via reported information regarding general patterns of exercise and specific resistance training activity in college and previously in high school. These activities were assessed for frequency per month and per week to more accurately capture exercise patterns, location of resistance training, minutes

spent resistance training per daily session, and percentage of time spent on the above-mentioned six resistance modalities.

Table 1. Frequencies of Demographic Variables

Demographic Variable	Frequency n (%)
Race	
White	101 (87)
Black	7 (6)
Asian	2 (2)
Hispanic/Latina	1 (.08)
Other	5 (4)
Class Standing	
Freshman	5 (4)
Sophomore	9 (8)
Junior	23 (20)
Senior	12 (10)
Graduate	67 (58)
Full Time Student Status	88 (76)
Location of Residence	
On Campus	20 (17%)
Off Campus within 5 miles	51 (44%)
Off Campus more than 5 miles	45 (39%)
Eligible for Fitness Center Membership	92 (79%)

Benefits and Barriers to Strength Training Questionnaire: Perceived benefits and barriers to resistance training were assessed using the Benefits and Barriers to Strength Training Questionnaire (BBSTQ) developed by Harne and Bixby (15). The BBSTQ is a modified version of The Benefits and Barriers to Exercise (BBE) Questionnaire originally created by Myers and Roth (20). Myers and Roth originally reported the reliability of the total benefit score for the BBE questionnaire was .88, and the reliability of the total barrier score was .68, as well as test-rest reliabilities of individual benefit and barrier scores ranging from .60 to .86. Each of the individual categories for the specific resistance training questionnaire test-retest reliability ranged from .60 to .86. In a confirmatory factor analysis with the original BBE questionnaire, Harne and Bixby found that the BBE modified to deal specifically with resistance training issues identified significant differences across the eight subscales for college-age women who were classified as strength trainers (ST) and non-strength trainers (15). Given this range of reliability scores reported previously in the literature, this research team analyzed reliability within the current sample. Cronbach's alphas were calculated for all scales of the BBSTQ, and all were found to be acceptable: total benefit (.78), psychological (.91), body image (.89), social (.79), health (.74), barrier total (.86), physical (.82), time/effort (.85), social (.76), and specific (.75).

The BBSTQ used in this study contained 55 Likert-style items regarding various benefits and barriers rated from 1 (*not important*) to 5 (*extremely important*). A high score in any of the

subcategories would suggest participants perceive high benefits or barriers to resistance training in that particular category. The benefits section consists of 24 items measuring 4 different subscales: psychological (9 items), social (4 items), body image (6 items), and health (5 items). Psychological items include benefits related to having *a lift in one's spirits* and an *improved attitude towards life*. Examples of social items include *providing a way to meet people* and *building companionship with others*. Items for the body image factors include *an improvement in one's appearance* and *its ability to help one stay in shape*. The final category, health factors, includes items about improved health and strength. The barriers section consists of 31 questions grouped into 4 different subscales: time-effort (10 items), physical effects (8 items), social (6 items), and specific obstacles (7 items). Examples of time-effort items include *too much work* and *too tired*, while physical items include *looking silly* and *muscle soreness.* Social factor items include *a lack of encouragement from friends* and *not liking to exercise alone*. The specific obstacles factor consists of items that are outside of the other three categories, such as *a lack of convenient locations to exercise* and *its interference with school*.

A recruitment e-mail was sent out through the university communication center to current female students on two separate occasions, initially at the end of the spring semester and a second at the beginning of the summer term. To ensure anonymity, online survey software was used to collect questionnaire responses. Participants were first prompted to agree to the consent form, which included information about the main purpose of the study and the individual's rights to participation. Once the participant had given her consent, she was administered the questionnaire, which took about 10-15 minutes to complete.

Statistical Analysis

Data collected from the administration of the DEHQ and the BBSTQ were entered into a data analysis software program (Excel, Microsoft, Redmond WA, USA). Code numbers were used to further de-identify the participants, and all data collected within this study used standardized methods to ensure their confidentiality. Statistical analysis was conducted using SPSS 24.0 (IBM SPSS, Armonk, NY, USA). To address the first research question regarding the use of free weights in fitness centers, demographic variables were assessed and reported as percentages. Pearson correlations were calculated regarding benefits and barriers and the type and degree of relationship between these constructs to address the second research question. To address the third research question regarding prediction of resistance training in college women, a three-block hierarchical regression was calculated by entering demographic characteristics in *Block 1*, barriers to strength training in *Block 2,* and benefits of resistance training in *Block 3*. Statistical significance was set at the customary level ($p \leq 0.05$).

RESULTS

Analysis was completed on the collected data, assessing it for statistical significance and practical meaningfulness. Descriptive statistics of demographic variables were used to evaluate the first research question (see Tables 2 and 3). Of the participants sampled in this study, 39.6% met the suggested amount of resistance exercise for general health set forth by professional organizations such as the ACSM; however, 34.2% reported that they did not

resistance train at all. Nonetheless, the percentage of women who reported engaging in resistance training exceeded the Healthy People 2020 targeted goal of 24% (21).

Table 2. Frequencies of exercise history variables.

Exercise History Variable	Frequency n (%)
Stage of Change	
Pre-contemplation	12 (10%)
Contemplation	34 (29%)
Preparation	21 (18%)
Action	17 (15%)
Maintenance	32 (28%)
Resistance Training Location	
University Fitness Center	45 (39%)
Home	27 (23%)
Community Fitness Center	22 (19%)
Other	6 (5%)
None	16 (14%)
No history with Resistance Training in sport	65 (56%)
Likelihood of Utilizing a Women's Only Area	
Very Likely	34 (29%)
More Likely	27 (23%)
Likely	21 (18%)
Possibly Likely	9 (8%)
Not likely	25 (22%)

Table 3. Means and standard deviations of exercise history variables.

Exercise History Variable	*M*	*SD*
Exercise History		
Sessions per month during college	12.88	8.25
Sessions per week during college	3.09	2.04
Sessions per month before college	16.36	12.05
Sessions per week before college	4.07	3.39
Resistance Training History		
Sessions per month during college	5.97	6.98
Sessions per week during college	1.46	1.53
Minutes spent on Resistance Training routine	24.95	24.23
Knowledge Levels with Resistance Training (1 = not knowledgeable to 5 = extremely knowledgeable)		
Selectorized	3.74	1.20
Plate Loaded	3.39	1.27
Free Weights	3.45	1.31
Dumbbells	3.80	1.16
Resistance Bands	3.22	1.28
Body Resistance	3.97	1.05

The second question was evaluated using Pearson correlations. Although no *a priori* hypotheses were formulated for strength or direction of relationships, several significant bivariate associations were found. Some of the descriptive variables were significantly related to barriers and benefits. For example, older individuals perceived fewer social barriers (r = -.214, p = *.032*) and lower body image benefits (r = -.224, p = *.019*). Women with higher GPA also reported lower perceived social barriers (r = -.252, p = *.012*) and lower social benefits (r = -.208, p = *.030*). While no significant correlations were found between any of the barriers and benefits subscales pertaining to resistance exercise, there were significant relationships among the four barriers subscales and the four benefits subscales. Two strong relationships were revealed with Barrier Time/Effect, as women who perceived greater time barriers perceived greater physical (r = .731, p < *.01*) and specific barriers (r = .757, p < *.01*). All other barrier subcategories showed moderate, positive relationships. All benefit subcategories also indicated significant associations. Greater perceived psychological benefits were associated with higher body image benefits (r = .677, p < *.01*), higher social benefits (r = .527, p < *.01*), and higher health benefits (r = .679, p < *.01*). Women who had higher perceived body image benefits had higher health (r = .717, p < *.01*) and higher social benefits (r = .292, p = *.003*). Women who reported higher social benefits also reported higher health benefits (r = .325, p = *.001*).

Table 4. Hierarchical multiple regression –model 2.

	Coefficient	Standard Error	Sig.	R^2	R^2 Change	Sig. R^2 Chg.	P	F
Age	-.264	.114	.023*	.309	.252	.000	.001	3.061
Class Standing	.331	1.936	.865					
GPA	1.691	1.775	.353					
Status	-.682	2.416	.779					
Housing Location	.824	2.222	.712					
Days on Campus	.314	.491	.525					
Fitness Center Eligible	-1.244	2.322	.594					
SprtRqST	-.291	1.568	.853					
BarPhysical	.331	.195	.093					
BarTimeEffort	-.583	.145	.000**					
BarSocial	-.280	.195	.154					
BarSpecific	.224	.206	.282					

**. Significant at p<.01 (2-tailed); *. Significant at p<.05 (2-tailed). SprtRqST = Sport-required strength training, BarPhysical = physical effects' barriers, BarTimeEffort = time/effort barriers, BarSocial = social barriers, BarSpecfic = specific obstacles/barriers

The third research question of examining predictors of resistance training activity was assessed using a hierarchical regression. With the dependent variable set at resistance training sessions per month, *Block 1* of the hierarchical regression included the demographic characteristics of interest (i.e. age, year in school, GPA, part- or full-time status, living location, days on campus, eligibility to use the university student recreation center, their past involvement with sport). *Block 2* included the perceived barrier subscales (i.e. physical, time/effort, social, and specific) based on the literature that suggests barriers to physical

activity are more predictive of behavior adoption. *Block 3* included the perceived benefits subscales (i.e. psychological, body image, social, and health). Results of the hierarchical regression found models 2 and 3 to be significant (F = 3.061, $p<.001$ and F = 2.64, $p< .002$, respectively; see Table 4); however, the inclusion of *block 3* (benefits) did not show a significant increase in R^2 from *Block 2* (R^2 change = .042, Sig. F change = .292). Model 2, which included demographic questions and barriers, was the best fitting model and accounted for 31 percent of the variance in resistance training participation (R^2 = .309). Because *Block 3* did not significantly add to the variance explained, the focus of interpretation will be on model 2 (which included *Block 1* and *Block 2* only). Barriers of time/effort were found to significantly predict resistance training behaviors of college aged women (β = -.583, t=-4.011, $p=.000$). The more women endorsed the perceived time/effort barrier, the less likely they were report regularly participating in resistance training. Age also emerged as significant and in the expected direction; older age participants engaged in fewer resistance training sessions. All other predictors were found to be non-significant.

DISCUSSION

Previous research has shown the importance of resistance training for women's physiological, psychological, and social health; however, most women are not reaching suggested participation levels for resistance training. Thus, the purpose of this study was to assess resistance training practices and perceived benefits and barriers to resistance training among women enrolled in a mid-size university. The most positive finding of the present study was that the women in this study reported participating in resistance training at rates exceeding those targeted in Healthy People 2020. Nonetheless, a substantial percentage of women in this study (~ 60%) were not performing any resistance training activities or were training less than the two sessions per week recommended by the ACSM (1).

Results from analyses yielded mixed levels of support for the *a priori* research questions. The first question examining the demographic characteristics of college women who engage in resistance training revealed that these individuals were predominately white, with a mean age of 27 years. Much of the past quantitative research examining college student behavioral trends has been completed with college student participants with a more limited age range than participants in this study (3, 6, 15, 20, 26). A higher percentage of graduate students than undergraduate responded to this research survey, thus a higher mean age emerged for this sample than previous research with college age populations. Additionally, age emerged as a predictor of resistance training frequency, with older age predicting lower resistance training frequencies. This finding is also supported by previous statistics with women and resistance training (6, 21, 22).

Negative relationships were not found between the benefit and barrier variables (i.e., higher perceived benefits, lower perceived barriers). This finding is counter to the decisional balance concept forwarded in some models of behavior change, which states that if individuals perceive high benefits to a health behavior, they would also perceive low barriers, and vice versa (23, 24). However, it was found in the present study that benefit subscales were

significantly correlated to one another, suggesting that as individuals acknowledge benefits to resistance training in one of the subscales, they are more likely to recognize other benefits as well. Similarly, the barrier subscales were also found to be highly correlated to one another. This association may create a challenge for health behavior practitioners to target specific barriers in intervention strategies while also emphasizing the importance of providing multi-level support to overcome the large variety of perceived barriers. It is also possible that there are other variables not captured in this study that are actually more influential in one's resistance training participation than perceived benefits or barriers. A larger sample size or alternative instruments might shed further light on this issue.

In the analysis of the variables deemed most valuable for predicting resistance training participation (i.e., history of resistance training, recognition of physical and psychological health benefits, perceived barriers of time or effort and lack of knowledge), only the perceived barriers linked with time/effort emerged as significant predictors of resistance training behavior. That is, individuals reporting higher levels of perceived time/effort barriers reported lower engagement in resistance training activity. Barriers in this category included being too busy, lack of desire, and too much discipline required to continuously take part in a regular resistance training program. This finding is consistent with previous research (15, 20) that also found this variable to be the only significant predictor of resistance training and exercise participation. Perceptions of time is relative and highly personal, so perhaps collecting information on activities that are perceived to be higher priority or more important may reveal more specifics about how this population decides to manage time priorities. The Transtheoretical Model (23), a stage of change and decisional balance model, may also be useful to explain adoption of and adherence to resistance training on a long-term basis. Capturing the process of increased perceived benefits and decreased perception of barriers, as well as increased intrinsic motivation to engage in resistance training, may help to identify other variables that may contribute to that shift in perceptions and motivation.

A women's weight lifting class or women's only area of a fitness center may decrease women's perceptions of barriers, thus increasing motivation to move forward to the "Action Stage" of the Transtheoretical Model. Given the findings of this study, future interventions seeking to increase the resistance training habits of women should focus on overcoming time/effort barriers and increasing self-efficacy for weight and/or strength training, utilizing behavior change, and motivation theories as frameworks to test resistance training interventions. Patterson, Umstattd Meyer, and Beville (22) tested the Integrated Behavioral Model for examining college-age women's resistance training engagement and found support for multiple resistance training intervention targets (i.e., attitudes, perceived norm, personal agency) within their sample of college women. Enhancement of psychological skills such as goal-setting, time-management, and positive social interactions also link closely with motivation and behavior adoption and adherence may be a factor in gaining a better understanding of the resistance training habits of college women.

Additional educational offerings may help to lessen perceived barriers to resistance training as well as align with motivation and behavior change theoretical frameworks. Knowledge of

resistance training protocols may be more helpful than just educating women on the physical and psychological health benefits of resistance training. Many universities offer wellness programming for students and require wellness education for all students. Perhaps these courses can be targets for applied resistance training knowledge, not just for those courses specific to strength and conditioning but also for other physical activity or personal fitness courses such as walking, running, yoga, aerobics, and swimming. Buckworth and Nigg (4) found a significant relationship between moderate to vigorous physical activity and engagement in resistance training among college women. This relationship is particularly encouraging since college women tend to engage in more cardiovascular fitness activities and classes than do men (11). Perhaps university student recreation services can promote this practice in highly attended fitness courses.

Certain limitations were found within the current study. The participant pool was limited to one midsize, public Midwestern university with a sample of predominantly Caucasian women, so generalizability to other races, ethnicities, or other regions of the United States is cautioned, as is generalizing to similar-aged women who live and work beyond a university environment. Similarly, there may have been some inherent bias introduced into this sample based upon the chance that individuals who were regularly working out may have been more inclined to complete the study; in such a context, it stands to reason that a general college population of women might likely have a lower percentage of women working out generally, engaging in resistance training specifically, possess differing views on the perceived barriers and benefits to regular resistance exercise, and so on. While the current research found some similarities to past research, the small sample size also decreases generalizability of the findings. These factors may have contributed to the relatively limited significant findings throughout this research (i.e. non-significant regression coefficients). All measures were self-report in nature and subject to recall. Additionally, other variables may be impacting participants' perceptions regarding resistance training that were not captured with the existing measures. Limitations of the current research have been noted and should be taken into consideration when applying the findings.

In conjunction with the limitations mentioned above, it is suggested that future researchers utilize a larger, more diverse sample that is more representative of the entire United States population. Additionally, if employing qualitative study techniques, focus groups or personal interviews would be helpful as it would allow the researcher to gain more information by following up on responses that were insightful. The findings of the current research suggest that a main barrier to resistance training for college women is the perception of a lack of time or effort. Additionally, campus recreation centers should look to the possibility of offering workshops to increase knowledge or women's only areas to lower feelings of intimidation and judgment. University fitness center directors could also further investigate the recruiting of the undergraduate population to use resistance training facilities. As lack of knowledge regarding free weights and other forms of resistance exercise may be the simplest perceived barriers to increasing resistance training participation among college women, college recreation centers might simply implement a women's weight lifting course to increase the knowledge base of free weight among women participants. Such a class would not only likely help women feel

more confident in their ability to perform free weight exercises, but it may also lower their feelings of intimidation, as they will feel more comfortable in more traditional weight lifting atmospheres.

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