Building strength: Strength training attitudes and behaviors of all-women's and coed gym exercisers

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Abstract

Research suggests varied reasons why women may avoid engaging in a regular strength training routine at the gym in favor of performing cardiovascular exercise (e.g., Harne & Bixby, 2005). However, there has been little research focused on the potential role of the gym environment itself, specifically in terms of the presence of men. The current study compared women members of all-women's and coed fitness facilities on their attitudes toward different exercise activities as well as their exercise choices within the gym. A community sample of women from the Northeast US, who attended either an all-women's or coed gym (N = 635), filled out a series of online questionnaires. We hypothesized that all-women gym members would report more positive attitudes towards strength training and would report attitudes towards strength training and cardio that were more similar in favorability compared with coed gym members. In addition, we expected all-women exercisers to engage in strength training activities (e.g., weight machine or free weights) more frequently than coed exercisers, especially if they also reported higher body dissatisfaction. Results were mixed and hypotheses received only partial support. Although all-women members rated strength training more positively and more similarly in magnitude to cardio compared with coed members, little differences were found between groups on strength training behaviors. Null findings are discussed in light of existing socio-cultural beauty and exercise norms that may deter women from engaging in strength training irrespective of male presence within the gym environment. More research is needed to explore the potential positive and negative consequences of same-sex and mixed-sex fitness settings for women's physical and mental health.

Keywords

women, exercise, strength training, weight lifting, fitness, gender norms

Introduction

Strength training offers health benefits beyond cardiovascular training alone (e.g., Pereira et al., 2013) and is related to decreased risk of various diseases and mental health issues such as: hypertension, diabetes, and depression (Ciccolo, Carr, Krupel, & Longval, 2010). Importantly, strength training also provides specific health advantages to women as they age. Women can begin to lose muscle mass and bone density as early as their thirties, placing them at higher risk of developing Osteoporosis (Bemben,

Fetters, Bemben, Nabavi, & Koh, 2000; Evans, 1995; Lindle et al., 1997). Health experts have recommended that adults initiate a strength training routine early in life in order to achieve peak bone mass before age-related decline begins (e.g., Petranick & Berg, 1997). There are also benefits to introducing strength training activities during pre and postmenopausal years. Increased muscle mass and bone density can support the ability to carry out activities of daily living and reduce the likelihood of falls associated with muscle imbalances (Bassuk & Manson, 2014; de Kam, Smulders, Weerdesteyn, & Smits-Engelsman, 2009).

The US 2008 federal physical activity guidelines suggest that adults engage in a minimum of 150 minutes of moderate-intensity aerobic activity, or 75 minutes of vigorous-intensity aerobic activity per week; as well as, strength train all major muscle groups on two or more days per week at a moderate or high-intensity level (US Department of Health & Human Services, 2008). According to data collected in 2013, only 20.4% of US adults met the recommended guidelines for both aerobic (i.e., cardiovascular activity) and muscle-strength training activities (National Center for Health Statistics, 2015). Men strength train in greater numbers than women, and a much higher percentage of women meet standards set for cardiovascular activity, (hereafter referred to as cardio), compared with strength training (50% vs. 24%).

Women represent a substantial and important segment of gym users (Maguire, 2008). Gym facilities, thus, provide a seemingly optimal setting for many adult women to work on increasing and promoting muscle health and development. Unfortunately, however, data suggest that in addition to the fact that the majority of women do not reach recommended levels of strength training (National Center for Health Statistics, 2015), they also may be actively avoiding weights and weight machines in gym environments (e.g., Dworkin, 2001). Given the documented health benefits of strength training specific to women, greater attention must be devoted to exploring the factors that encourage or impede muscle-building activities in gym settings. We designed the current study to examine differences in the exercise behaviors and attitudes of women attending all-women and coed gyms.

Studies provide a number of reasons why many women tend to avoid strength training exercises in the gym, despite often being aware of the health benefits (e.g., Harne & Bixby, 2005). Time management, competing family and social obligations, sore muscles, inexperience with proper form and lifting techniques, fear of bulking up, and lack of social support have all been identified as common barriers (Dworkin, 2001; Harne & Bixby, 2005; O'Dougherty et al., 2008; Terre, 2010). Some of these barriers could be addressed with relatively simple and cost-effective strategies, such as educating women about the myth of bulking up, offering support to encourage the use of free weights and weight machines, and/or teaching proper form and technique. Indeed, many fitness facilities offer complimentary instructional sessions on how to use weight equipment as well as group exercise classes dedicated to weight training (Terre, 2010). However, these strategies do not necessarily address the broader social and cultural forces that have shaped gender norms within the gym environment, including the contemporary cultural pressure in Western society to achieve a slender female form.

The gendered nature of gym settings is visibly reflected in the physical areas that men and women tend to occupy. Men often dominate weight or strength training areas

whereas women gravitate towards cardio equipment and aerobics classes (Dworkin, 2001; Simpson et al., 2003). Given the historical roots of weightlifting as a male activity, it is perhaps not surprising that women report discomfort with using weights and associate weight-related activities with masculinity (Collins, 2002; Dworkin, 2001; Salvatore & Marecek, 2010; Stern, 2008). Salvatore and Maracek (2010) showed that women were more likely to view using weight lifting equipment (i.e., bench press) as a male activity and using cardio equipment (i.e., Stairmaster) as a female activity. These women also reported using the Stairmaster more often than the bench press, and predicted they would experience greater negative evaluation from others while using a bench press compared with a Stairmaster. This is consistent with the societal pressure placed on women to strive for thinness (Tiggemann, 2011). Unlike cardiovascular exercise, building muscle through strength training is not typically seen as compatible with female beauty norms that prescribe thinness and femininity (see Dworkin, 2001). Women associate cardiovascular activity with burning fat which presumably brings them closer to reaching the slender body ideal promoted by US culture (Dworkin, 2001; Salvatore & Marecek, 2010). Some research suggests that when women do undertake a regular weight training routine, they are careful to avoid lifting too heavy or too often in order to maintain femininity (Dworkin, 2001).

In addition to the fact that women may be reluctant to engage in activities associated with masculinity, appearance, and body image concerns may also discourage women from entering male-dominated gym spaces. Yin (2001) showed that women who reported higher social physique anxiety (i.e., perceived anxiety over others' evaluation of one's physique), higher body size dissatisfaction, and higher body mass index were more likely to work out exclusively in women-only areas of a coed gym and felt more positively about designated workout areas for women than their more body satisfied counterparts. Furthermore, Kruisselbrink, Dodge, Swanburg, and MacLeod (2004), found that the intended duration of a typical workout decreased when women participants imagined themselves working out among all men compared with a setting comprised of mixed-sex or all-female exercisers. The all-male exercise scenario also led to the highest level of social physique anxiety while the all-female scenario led to the lowest level of social physique anxiety. Although neither study specifically addressed the impact of male presence on the strength-related exercise choices of women, the findings suggest that women would be less likely to seek out male-dominated weight training areas of coed gyms, especially when they possess higher levels of body dissatisfaction.

Although, Yin (2001) and Kruisselbrink et al.'s (2004) research alludes to potential benefits of all-women's exercise facilities for strength training, very few researchers have directly considered how coed and all-women's gym environments may differentially relate to women's exercise attitudes and behaviors, particularly with respect to strength training. It may be that for some women, an all-women's setting is important for overcoming psychological and social barriers to exercise in general and perhaps to strength training in particular; however, this hypothesis has not been tested empirically.

The Present Study

In sum, the previous works of Kruisselbrink et al. (2004), Salvatore & Marecek (2010), and Yin (2001) all suggest that ap-

pearance concerns and body dissatisfaction issues) might act as deterrents to strength training in coed gym settings. A coed exercise environment may also lead to heightened awareness of violating perceived gender norms when engaging in strength training activities (Salvatore & Marecek, 2010). The primary goal of the current study was to compare exercise attitudes and behaviors of all-women and coed gym members. Specifically, we examined differences in strength training and cardio attitudes, strength training and cardio time per week, and the frequency of free weight and weight machine use per week. We hypothesized the following:

1. Women-only gym members would report more positive attitudes towards strength training and more total time strength training per week than coed gym members.

2. Women-only gym members would report using free weights and weight machines on more days per week than coed gym members.

3. Due to cultural beauty norms which encourage a thin body ideal in women (Strahan, Wilson, Cressman, & Buote, 2006), women attending both gym types would report more positive attitudes toward cardio than strength training; however, we expected the magnitude of the difference between cardio and strength attitudes for women-only members to be smaller than for coed members.

4. Yin (2001) and Kruisselbrink et al.'s (2004) works, suggested that exercise activities in a coed setting might be particularly challenging for women with negative body image, so, we also explored whether the relation between gym setting (all-women vs. coed) and strength training outcomes was stronger for women with greater body weight discrepancy. We expected coed gym exercisers with greater body weight discrepancy to feel less positively about strength training, and to strength train less often than all-women gym exercisers with greater body weight discrepancy.

Method

Participants

Female participants over the age of 18 (N = 635) were recruited from all-women (n = 308) and coed gym facilities (n = 327) and invited to take part in a study about exercise habits and health. Ages ranged from 18 to 71, with a mean age of 32 (SD = 10.58). The majority of participants were Caucasian (535, 85%). Other ethnic groups included East/South/Southeast Asian (7%), Hispanic (3%), Mixed (3%), and Other (2%). The mean BMI of the sample fell at the upper end of what is considered a healthy weight (M = 23.91, SD = 4.29). Of those who provided information on household income, approximately 5% (n = 30) of the sample reported making less than $20,000, while 9.9% ($n$ = 59) earned between $20,000 and $34,999, 17.8% ($n$ = 106) earned between $35,000 and $49,999, 22.4% ($n$ = 133) earned between $50,000 and $74,999, 15% ($n$ = 88) earned between $75,000 and $99,999, 14.8% ($n$ = 89) earned between $100,000 and $149,999, and 15.1% ($n$ = 90) earned $150,000 or more.

Measures

Gym type and gym membership length.

Participants reported the name and location of their gym. We used information posted on gym websites to determine whether a facility served only women or coed patrons; then, we classified participants accordingly into one of the two gym types, all-women or coed. This served as our primary inde-

pendent variable. At the end of the survey, we asked participants to report whether they currently attended both, a coed gym and women-only gym, so that we could identify and exclude individuals who were working out in both settings simultaneously. In addition, participants provided the number of months and years of gym membership for their current gym. This question was used to calculate the total months that each individual belonged to their gym.

Gym frequency and exercise habits. We assessed the frequency of gym workouts by asking participants how many days per week they worked out at their gym. Participants then answered a series of questions designed to assess their weekly gym habits for both cardio and strength training. In order to facilitate comparisons between cardio and strength training activities, we asked similar questions for each category, in terms of both time per gym session and days per week. To assess cardio activity, we asked the following questions: "How many days per week do you spend doing cardio at the gym running on a treadmill, riding a stationary bike, or taking cardio classes designed to raise your heart rate?"; "During a typical gym session, how much time (in minutes) do you generally spend doing cardio [such as] running on a treadmill, riding a stationary bike, [or] taking cardio classes designed to raise your heart rate?" We estimated a total cardio time per week variable that represented the total minutes participants typically spent doing cardio each week. This was calculated by multiplying the number of days spent doing cardio each week by the minutes of a typical cardio session.

To assess strength-related activity we asked the following questions: "How many days per week do you typically strength train at the gym [using]free weights, weight machines, or take an exercise class primarily focused on building muscle"; "During a typical gym session, how much time (in minutes) do you generally spend strength training [using] free weights, weight machines, [or] take an exercise class primarily focused on building muscle?"; "How many days per week do you typically use free weights?" We repeated this last question substituting *free weights* with *weight machines*. We estimated a total strength time per week variable that represented the total minutes participants typically spent doing strength-related activities each week. This was calculated by multiplying the number of strength training days each week by the minutes of a typical strength workout.

Strength training attitudes and cardio attitudes. Participants rated their level of agreement with a series of cognitive and affective statements about strength training and cardio, respectively. We created the measure for the purposes of the current study and developed the items through examination and interpretation of previous literature addressing psychological barriers to strength training and cardio from the collective works of Dworkin (2001), Harne & Bixby (2002), Salvatore & Marecek(2010), and Yin(2001). The statements read as follows:

- I feel comfortable when strength training.
- I feel anxious when strength training.
- I feel competent when strength train ing.
- I feel intimidated when strength training.
- I feel self-conscious when strength training.
- I feel that others are judging me when strength training.

Participants rated each item on a scale from 1 (strongly disagree) to 5 (strongly agree). We calculated a mean score by summing across items and dividing by six. Items were scored

such that a higher mean represented more positive strength training attitudes. Cardio attitudes were assessed using the same statements and response scale described for strength training. The word *cardio* was substituted in place of the words *strength training* (e.g., I feel comfortable while doing cardio). Items were scored such that a higher mean represented more positive cardio attitudes. The alpha coefficients for strength training and cardio attitudes were .89 and .82, respectively.

Body weight discrepancy. Body weight discrepancy was calculated by subtracting participants' ideal weight from their current weight. A positive score indicated the desire to o lose weight.

Background information. Participants provided demographic information such as age, marital status, ethnicity, and income level. Income was assessed by asking participants to check off the category that best reflected their total household income (less than $20,000, between $20,000 and $34,999, between $35,000 and $49,999, between $50,000 and $74,999, $75,000 and $99,999, $100,000 and $149,999, and $150,000 or more).

Procedure & Design

We recruited a convenience sample of women from various gyms in and around an urban area of the Northeastern United States to take part in a study about exercise behavior and women's health. Recruitment efforts took place during the spring of 2012, and our research team contacted approximately 25 gyms. Participating gyms (N = 15) varied in physical size, available amenities, and membership fees. The most expensive gym membership cost approximately $120 per month while the least expensive cost $20 per month. Some of the facilities had multiple locations. We verified that all of the gyms had basic weight training equipment such as: multiple sets of free weights, body bars, and weight machines, as well as, a designated weight training area.

We requested that each facility email a short, prepared description of the study purpose and link to their members, post our link on their Facebook page, and/or allow us to post flyers in strategic locations and high traffic areas. Approximately 60% of gyms either emailed the study link or posted the study link on Facebook. Research assistants visited all gyms in person to post flyers. In addition, we attempted to recruit participants using Facebook ads. However, the Facebook ads accounted for only 11 participants in the total sample. To incentivize participation, we offered the chance to win one of four $25 gift-cards to Starbucks.

English-speaking adult women, over the age of 18, who belonged to a gym facility were invited to participate. We utilized surveymonkey.com, an online data collection website, to record participant responses. The first page of the survey was an information sheet where participants read about the purpose of the study. Participants had to indicate that they met the eligibility criteria before progressing to the first set of questions; although, there was no way to verify if participants were being truthful.

We first asked for the name and location of participants' current gym(s), and next presented the questionnaires. Participants were only allowed to move forward through the survey, and all participants saw the questionnaires in the same sequence, as we were unable to randomize the order using our data collection tools. Questions assessing exercise habits and attitudes appeared first; the questions that followed requested height, current weight, and ideal weight. Demographic information was collected at the end. A final

survey page contained additional study details and contact information in the event participants had questions or concerns. All study procedures and recruitment materials received Institutional Review Board approval and followed ethical guidelines set forth by the American Psychological Association.

Data analytic strategy. In order to facilitate analyses relevant to our primary study goals, we restricted the sample in a number of ways. We removed participants that reported working out at both gym types (n = 3), as well as, those who did not provide a gym name that we could use to determine gym type (n = 17). We also excluded participants that belonged only to a specialized fitness facility like Curves, or a sport-specific gym (e.g., boxing) (n = 86), as these settings are not comparable to typical gym environments. We further restricted the sample by eliminating participants that skipped the question about gym frequency (n = 241), or that indicated their gym frequency was zero days per week (n = 7). The rationale behind this decision was to ensure a focus on women who reported working out in coed or all-women's gym environments. For those with missing data on this question, it was impossible to determine the extent to which they exposed themselves to the gym environments that we were interested in studying. In sum, we chose to concentrate on women who self-reported going to a more traditional gym (all-women or coed, but not both) at least 1 day per week (N = 635).

Results

We first examined whether coed and all-women gym members differed on any demographic variables. Coed members (M = 30, SD = 9.31) were significantly younger than all-women members (M = 34, SD = 11.29), t (571) = 5.06, p < .001, d = .38, and were more likely to fall into a lower income bracket, $\chi 2$ (6, N = 635)15.23, p < .05, Cramer's V = .16, p < .05. In addition, all-women members reported an average gym membership length that was approximately 11 months longer than coed members, M = 36.14(SD = 40.51) vs. M = 25.11 (SD = 51.96), t(633) = 2.89, p < .01, d = .23. A small but statistically significant difference between groups emerged for gym visits per week, with coed members reporting a slightly higher mean number of days than all-women members, M = 3.88(SD = 1.34) vs. M = 3.63(SD = 1.28), t(633) = -2.37, p < .01, d = .19.

Table 1 provides the descriptive statistics for the entire sample, and separately by gym type, for cardio and strength training attitudes, cardio and strength training time per week, free weight use, weight machine use, and weight discrepancy.

Table 2 provides correlations among all continuous main study variables. Key study variables were then correlated with gym membership length, gym visits per week, BMI, SES, and age to assess the need to add control variables into the main analyses. The majority of these correlations were either nonsignificant or very weakly correlated (i.e., most r's ranging in absolute value from .08 to .16). However, there were a number of small to moderately significant correlations between some of the dependent variables (i.e., strength training time, cardio time, strength training attitudes, and free weight use) and background information (i.e., age, gym visits per week, and gym membership length). Total strength training time per week was positively correlated with gym membership length, r(633) =.16, p < .001, and gym visits per week, r(633) = .39, p < .01. Total cardio time per week was also positively associated with gym visits per week, r(633) = .57, p < .01. Strength training attitudes was positive-

Table 1

Descriptive Statistics for Exercise Attitudes and Gym Behaviors for the Entire Sample and Separately by Gym Type

Variables	All Participants (N = 635)		Gym Type: All-women (n = 308)		Gym Type: Coed (n = 327)	
	M(SD)	Range	M(SD)	Range	M(SD)	Range
Cardio Attitudes	4.26(.68)	1-5	4.26(.71)	1.17-5	4.27(.65)	1.67-5
Cardio Time (min./week)	130(77.9)	0-840	121(98)	0-840	138(95)	0-840
Strength training Attitudes	3.76(.95)	1-5	3.90(.87)	1-5	3.62(.99)	1-5
Strength Time (min./week)	78.71(68.7)	0-540	81.49(58)	0-300	76.09(76)	0-540
Free weight Use (days/week)	1.55(1.3)	0-6	1.51(1.2)	0-5	1.59(1.48)	0-6
Weight Machine Use (days/week)	1.17(1.3)	0-6	.92(1.15)	0-6	1.41(1.43)	0-6
Weight Discrepancy	13.4(17.1)	-13-200	13.66(17)	-13-160	13.21(17)	-5.97-200

Table 2

Intercorrelations among Exercise Attitudes, Exercise Behaviors, and Weight Discrepancy (N=635)

Variables	1	2	3	4	5	6	7
1. Cardio Attitudes	--						
2. Cardio Time (min./week)	.21**	--					
3. Strength Training Attitudes	.44**	.03	--				
4. Strength Time (min./week)	.06	.07	.41**	--			
5. Free Weight Use (days/week)	.14**	.11**	.30**	.53**	--		
6. Weight Machine Use (days/week)	.04	.12**	.10*	.27**	.33**	--	
7. Weight Discrepancy	-.15**	-.05	-.17**	-.14**	-.16**	-.03	--

Note. $^{*}p < .05$. $^{**}p < .01$

ly correlated with age, $r(633) = .26$, $p < .01$ and with gym membership length, $r(633) = .26$, $p < .01$. Free weight use (days/week) was positively related to gym visits per week, $r(633) = .29$, $p < .01$. In our main analyses, we controlled for any background variables that were correlated with our dependent variables.

To test Hypothesis 1, we conducted two separate regressions, one with strength training attitudes as the outcome and the other with total strength training time (min/week) as the outcome. Controlling for age and gym membership length, gym type was significantly related to strength training attitudes such that all-women members reported more positive attitudes than coed members (see *Table 3*). However, controlling for gym visits and gym membership length, there was no significant relationship between gym type and strength training time.

The dependent variables specified in Hypothesis 2 (i.e., number of days per week using free weights and number of days per week using weight machines) are considered discrete variables. Models with discrete outcomes generally require the use of either Poisson regression or negative binomial regression (Gardener, Mulvey, & Shaw, 1995). We chose negative binomial regression due to the detection of slight over dispersion in each model. Controlling for gym visits per week, gym type was not related to the number of days per week participants used free weights (see *Table 3*). However, gym type was related to the number of days participants used weight machines per week, Wald Chi Square = 18.23, $p < .001$. Coed members used weight machines more frequently than all-women members. Specifically, the mean number of days that women-only members used weight machines was only 60% of the mean number of days that coed members used weight machines (see *Table 3*).

Consistent with our third hypothesis, the results of two paired sample t-tests showed that members of both gym types reported more positive attitudes toward cardio than strength training. All-women members reported a mean attitude score of 4.26 for cardio and 3.90 for strength, $t(307) = 7.14$ $p < .000$, 95% CI [.26, .45], $dz = .41$. Coed members reported a mean attitudes score of 4.27 for cardio and 3.63 for strength training, $t(326) = 12.87$, $p < .000$, 95% CI [.54, .74], $dz = .71$. In order to test whether the magnitude of the difference between cardio and strength attitudes was smaller for all-women members, we first calculated a difference score by subtracting strength attitudes from cardio attitudes. Then we conducted an independent samples t-test with the difference score as the dependent variable and gym type as the independent variable. All women members ($M = .35$, $SD = .87$) had a significantly smaller mean difference in attitudes relative to coed members ($M = .64$, $SD = .89$), $t(633) = -4.11$, $p < .000$, 95% CI [-.47, -.76], $d = -.32$.

Finally, we conducted a series of regressions using either ordinary least squares or maximum likelihood estimation depending on the nature of the dependent variable (i.e., continuous or discrete, respectively) in order to test Hypothesis 4. Gym type, weight discrepancy, and the interaction between the two variables served as our independent variables. Strength training attitudes, total strength training time per week, free weight use (days per week), and weight machine use (days per week) were each tested separately as dependent variables. For each model, we controlled for any background variables that were correlated with our dependent variables. The interaction term in each of the four models was nonsignificant, providing no support for our last hypothesis (see *Table 4).*

Table 3

Results of Regression Modeling for Strength Training Outcomes

Results of Regression Modeling for Strength Training Outcomes

Variable	Strength Training Attitudes			
	B	*SE*	β	95% CI
Gym Type	0.18	0.07	-.09*	[-.32, -.029]
Age	0.01	0.004	.15**	[.006, .021]
Gym Membership Length	0.003	0.001	.17**	[.002, .005]
R^2			.10***	
F			22.18	
Variable	Strength Training Time Per Week			
	B	SE	β	95% CI
Gym Type	-8.14	5.03	-0.06	[-18.037, 1.755]
Gym Visits (days/week)	19.95	1.89	.39***	[16.224, 23.673]
Gym Membership Length	0.194	0.054	.132**	[.088, .299]
R^2			.16***	
F			43.24	
	Free Weight Use (days/week)			
	Wald Chi Square	Exp(B)	95% Wald CI	95% Wald CI for Exp(B)
Gym Type	0.01	1.01	[-.20, .23]	[.82, 1.25]
Gym Visits (days/week)	25.47***	1.24	[.13, .29]	[1.14, 1.34]
LR Chi Square			26.37***	
Variable	Weight Machine Use (days/week)			
	Wald Chi Square	Exp(B)	95% Wald CI	95% Wald CI for Exp(B)
Gym Type	18.23***	0.6	[-.74, -.28]	[.48, .76]
LR Chi Square			18.36***	

Note. ***$p < .001$.

Table 4

Regression Results Testing the Interaction between Gym Type and Weight Discrepency on Strength Outcomes

Variable	Strength Training Attitudes			
	B	SE	β	95% CI
Gym Type	-0.16	0.09	-0.08	[-.34, .02]
Weight Discrepancy	-0.004	0.007	-0.08	[-.02, .009]
Gym Type X Weight Discrepancy	-0.003	0.004	-0.09	[-.01, .02]
Age	0.02	0.004	.16***	[.006, .02]
Gym Membership Length	0.003	0.001	.16***	[.001, .005]
R^2		0.12		
F		17.38***		
Variable	Strength Training Time Per Week			
	B	SE	β	95% CI
Gym Type	-8.37	6.34	-0.06	[-20.82, 4.07]
Weight Discrepancy	-0.38	0.47	-0.1	[-1.32, .52]
Gym Type X Weight Discrepancy	0.02	0.29	0.002	[-.57, .58]
Gym Visits (days/week)	19.61	1.89	.38***	[15.80, 23.25]
Gym Membership Length	0.2	0.05	.13***	[.09, .30]
R^2		0.19		
F		27.92***		
Variable	Free Weight Use (days/week)			
	Wald Chi Square	Exp(B)	95% Wald CI	95% Wald CI for Exp(B)
Gym Type	0.01	1.01	[-.20, .23]	[.82, 1.25]
Gym Visits (days/week)	25.47***	1.24	[.13, .29]	[1.14, 1.34]
LR Chi Square		26.37***		
Variable	Weight Machine Use (days/week)			
	Wald Chi Square	Exp(B)	95% Wald CI	95% Wald CI for Exp(B)
Gym Type	18.23***	0.6	[-.74, -.28]	[.48, .76]
LR Chi Square		18.30***		

Note. ***p < .001. CI = Confidence interval.

Discussion

We explored differences in exercise attitudes and behavior between members of women-only and coed gym facilities in a community sample of women exercisers. Consistent with our prediction, all-women gym exercisers reported more positive attitudes toward strength training than their mixed-sex counterparts. In addition, participants across the two gym types reported more favorable views towards cardio than strength training, which is consistent with stereotypic notions of cardio as more appropriate exercise for women, and the perception of its importance for achieving a thin body ideal (Dworkin, 2001; Salvatore & Marecek, 2010; Strahan, Wilson, Cressman, & Buote, 2006). However, as we suspected, the magnitude of the difference between cardio and strength attitudes was smaller for the all-women's group. The all-women's group reported strength attitudes that were significantly more similar to cardio attitudes in favorability than the coed group. One possible interpretation of this finding is that an all-women's environment may reduce the negative thoughts and feelings that some women have about strength training which results in more comparable cardio and strength attitudes. However, other explanations are also possible such as: women with more positive attitudes toward strength training are drawn to all-women's gym environments. More work is needed to better understand this result.

Unfortunately, more positive attitudes towards strength training did not seem to translate into greater strength training behavior for all-women gym members. Based on Yin (2001) and Kruisselbrink et al.'s (2004) research, we speculated that an all-women's gym facility might provide a more comfortable setting for women to engage in strength training, particularly for women who are further from their ideal shape and size, and who might want to avoid situations where they could be scrutinized by members of the opposite sex. However, inconsistent with our hypotheses, no group differences emerged in total strength training time or free weight use. We did find differences in weight machine use between groups, but it was not in the expected direction; coed members reported using weight machines on slightly more days per week than all-women members.

Highly ingrained exercise and appearance norms may help account for the nonsignificant differences between groups on strength training activities. Although previous work does suggest that the presence of men may deter some women from strength training (Salvatore & Marecek, 2010). Dworkin (2001) and Salvatore & Marecek's (2010) research efforts also suggest that women perceive strength training as less compatible with achieving the slender body type prescribed by Western beauty ideals, while cardio is associated with calorie burning and weight loss. Moreover, Prichard & Tiggemann's (2008) research supports the idea that fitness environments are objectifying in nature, which may also promote an increased focus on appearance and weight. Consequently, the absence of men in all-women's gyms may not necessarily compel female exercisers to spend more time strength training. The pressure to lose weight and the perception that weight loss is best achieved primarily through cardio and not strength exercises might lead women to focus less on strength training, irrespective of the gym setting (Dworkin 2001; Terre, 2010). The fact that many women associate cardio, and not strength training, with weight loss is interesting to note, because

in this sample, participants who strength trained more perceived themselves closer to their ideal body weight, while cardio time had no such relationship. These data do not support the notion held by some women that doing more cardio and limiting strength training is optimal for weight goals. Ciccolo et al (2010), Winett & Carpinelli's (2001) past studies have demonstrated the benefit of strength training for both overall health and weight management, but misperceptions and misinformation about the effects of cardio versus strength training on body weight and muscle development may contribute to women's tendencies to limit or avoid strength training in favor of cardio.

There are a number of methodological limitations of the study that deserve consideration, and that suggest caution in drawing any strong conclusions based on these data. The study design was cross-sectional and conducted on women exercisers attending a relatively small number of gyms (N = 15) in an urban area in the Northeast US. Participants also self-selected into our study and were mostly Caucasian, younger adults who fell within a healthy weight range. Thus, in addition to being unable to assess causal links or directionality among variables, the generalizability of the findings to women attending these gyms, but who chose not to participate, to women attending other types of gyms, as well as, to women falling into other demographic groups is unclear. It would be important to examine if the patterns we found in this study emerge in older women, in women of color, and in women from different socioeconomic levels. It is entirely possible that women with different demographic profiles have very different psychological experiences when working out. This could translate into exercise patterns and attitudes that are distinct from the results seen here. The self-reported nature of the data is also a serious concern due to possible recall bias and tendencies towards socially desirable responses. Observational research designs would be a useful approach to assessing actual exercise behavior of women in gym settings, without the concern of social desirability.

Other problems concerned the measurement of some of the key variables of interest. According to the U.S. Department of Health & Human Services (2008), strength training recommendations for American adults is defined as training all major muscle groups on two or more days per week at a moderate or high intensity level. Unfortunately, we did not consider the intensity level or measure the extent to which exercisers were training all major muscle groups. Finally, we also did not assess women's exercise activities outside of the gym. It is possible that women who belonged to both gym types were engaging in additional forms of cardio and strength training (e.g. running outside or taking yoga classes). More precise measurement of these behaviors would provide a more complete picture of the totality of women's exercise activities, and allow for more accurate assessment of their engagement in cardio and strength training activities. Addressing these measurement issues will benefit future examinations of women's exercise behaviors.

In a number of our regression models, gym visits per week and gym membership length were positively related to strength training attitudes and strength training behavior. This may suggest that the total time spent in the gym environment, as opposed to who is in the gym environment, might be more important in the types of exercise choices that women make in these settings. Nevertheless, additional research, examining how same-sex and mixed-sex gym environments affect women's exercise attitudes and habits is needed, especially longitudinal and

experimental designs which would afford clearer interpretations of the data. Moreover, researchers should further explore whether all-women's gyms might provide other kinds of health benefits for women that a coed gym might not be able to provide (e.g., enhanced social support or decreased exercise-related anxiety). Constructing an environment which encourages female exercisers to both value and engage in strength training may require effort beyond simply offering the option of an all-women's exercise facility. Given that exercise appears to be a particularly gendered activity, these additional efforts will likely involve redefining and broadening traditional constructions of femininity and beauty so that more women develop the mental flexibility to engage in exercises that are currently considered more masculine. Greater attention must also be given to understanding the factors that allow some women to embrace more traditionally masculine forms of exercise like weight training or boxing ■

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