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## Adherence to a Strength Training Intervention in Adult Women

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### Abstract

**Background**—The factors influencing exercise adherence are not well characterized in women in their premenopausal years.

**Methods**—The purpose of this report is to provide an analysis of demographic factors contributing to women's adherence to a two-year twice-weekly weight training intervention. Overweight and obese premenopausal women were randomized to a control or intervention group.

**Results**—During the supervised period of the intervention (months 1–4), adherence was significantly lower among those with a higher level of education and among unmarried women with children aged six to twelve compared to married women without children ( $F = 4.83$ ,  $p = 0.004$ ). Overall adherence during the supervised and unsupervised periods was 95.4% and 64.5%, respectively (unadjusted mean). During year 1, white women were significantly more adherent to the intervention (70.3%) than women of color (48.6%). Non-married women with children 13 years or older were significantly less adherent than married women with children 5 years or younger (36.3% vs 75.4%, respectively,  $p < 0.007$ ). Overall adherence was 51.4% in year 2.

**Conclusions**—Interventions and public health recommendations need to further consider how to engage communities to provide effective support for long-term adherence to fitness center based exercise of all women, regardless of demographics.

### Keywords

exercise; physical activity; intervention study; health behavior

### Introduction

Data from the 2004 National Health Interview Survey demonstrate that 21.9% of males and 17.5% of females reported strength training two or more times per week (1), despite recommendations and well documented health benefits of doing so (2,3). Among women, non-Hispanic Whites reported higher levels of strength training (20.4%) than non-Hispanic blacks (11.3%), Hispanics (9.1%), and those classified as “other” (12.9%). Healthy People 2010 set a goal of increasing the proportion of adults who regularly participate in strength training to 30% (4). This health promotion goal is further underscored by the recent publication of the first federal guidelines for physical activity for Americans, which include recommendations that “adults should do muscle-strengthening activities on 2 or more days a week” (5).

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The “Strong, Healthy, and Empowered” (SHE) study was a randomized controlled trial aimed at assessing the efficacy of twice-weekly strength training to avoid increases in percentage body fat and intra-abdominal fat in overweight and obese women aged 25–44 years (6). This was the first study to determine if the body composition benefits from a supervised strength training program could be maintained long term through an unsupervised program in premenopausal women. Another important aspect of the SHE study was the ethnic diversity of the participants. Nearly 40% of participants were women of color.

We previously reported on motivators and barriers to adhering to the SHE study intervention in a sub-sample of SHE study participants who came to focus group meetings to assist us in trying to understand the perceived differences in adherence across race while the study was ongoing (7). Factors contributing to adherence or barriers to participation in regular strength training are understudied, particularly in premenopausal women; therefore, the purpose of this report is to provide a quantitative analysis of demographic factors contributing to adherence to two years of twice-weekly strength training among the 82 women in the treatment group of the SHE study.

## Methods

Between July 2002 and June 2003, 164 premenopausal sedentary women between the ages of 25–44 y and with a body mass index (BMI) of 25–35 kg/m<sup>2</sup> were randomized into the treatment or control group. Randomization was stratified by age (25–34 y *versus* 35–44 y) and percentage body fat (above *versus* below the median for each randomization block). Details about eligibility have been previously described (6). This report focuses on the 82 women randomized to the treatment group. This study was approved by the Institutional Review Board of the University of Minnesota, and all participants provided signed informed consent prior to any study activities.

## Intervention

Subjects randomized into the treatment group were provided with a 24-month membership to the Young Women’s Christian Association (YWCA), which has fitness centers in three central, urban locations of Minneapolis. For the purpose of this report, the 2-year intervention was divided into three periods: supervised period (months 1–4), year 1 unsupervised (months 5–12), and year 2 unsupervised (months 13–24).

The supervised portion of the intervention was delivered by certified fitness trainers who met participants in groups of 2 to 6 twice-weekly for a total of 32 sessions over 4 months. Each session lasted approximately 60–90 minutes and started out with cardiovascular warm-up exercises and “core” exercises to strengthen the abdominal and lower back muscles, followed by 9 common strength training exercises where subjects lifted the most weight they could in 3 sets of 8–10 repetition maximum (RM). After the strength training exercises, the fitness trainer led participants in a 5–10 minute group stretching session. Participants were provided with workout logs kept in a file at the YWCA fitness centers where they recorded the week number, type of exercise, the weight lifted, and the number of repetitions per set. If a participant failed to attend a scheduled workout session, she was contacted by the trainer to schedule a make-up session.

During months 5 through 24 (unsupervised period), participants continued performing the twice-weekly strength exercises on their own or with a friend or other study participant(s). The weight lifted by each participant was progressively increased during year 1. During year 2 participants were allowed but not required to decrease to 2 sets per exercise and the highest weight lifted was maintained. The session length during year two was approximately

45 minutes. Two small group “booster sessions” were held by trainers with each small group of 2–6 participants every 12 weeks to introduce new exercises and to ensure that the exercise prescription was being followed in a safe and effective manner as well as to provide social support to participants and engage them in social-cognitive processes for overcoming barriers. Each participant was entitled to one personal training booster session per month and was responsible for contacting the trainer whenever group booster sessions were missed. Trainers continued to contact participants if more than one session in a row was missed.

## Adherence

Strategies based on social cognitive theory (8) were employed to encourage and support adherence. Table 1 illustrates the different strategies used and respective social cognitive theory concepts addressed.

Adherence to the strength training intervention was calculated from workout logs filled out by participants and reviewed by SHE study staff weekly. In order to calculate adherence, the total number of workout sessions for each participant was divided by 102, which was the total number of possible sessions per year (twice weekly for 52 weeks, with 1 week off per year). Adherence of participants lost to follow-up was calculated by dividing the number of workout sessions attended up to the point of drop from the study by 102 during year 1 and again during year 2. Compliance to strength training was also calculated, and the correlation between adherence and compliance was 0.99. For the purpose of this manuscript, we report adherence only, which can be considered the same as compliance.

## Other study measurements

Details of data collection and measurements of the SHE study have been previously published (6). Of particular interest to this report was the standardized interviewer-administered survey pertaining to demographic variables such as: age, self-reported race or ethnicity, education, marital status, number and ages of children living at home, and work status.

## Statistical Analyses

Descriptive statistics were generated by cross-tabulation for categorical variables and by means for continuous measures. A general linear model was used to evaluate the association between explanatory variables and the dependent variable “adherence percentage”. The explanatory variables were transformed into categorical variables with two levels each, with the exception of “ages of children living at home”, which had four levels. Based on these criteria, the following categorical explanatory variables were created: age (25–34, 35–44 years), race (White, women of color including Black, Asian, and other races), education (with college degree, without college degree), marital status (married or partnered (Marr/Part)), and single, separated, widowed or divorced (SSWD), ages of children living at home (no children, 5 years or younger, 6–12 years, 13 years or older) and work status (full time, less than full time). Statistical significance was established at *p*-value lower than 0.05. All analyses were conducted using SAS (version 9.1, SAS Institute, Cary, NC).

## Results

Table 2 outlines baseline demographic characteristics of participants randomized into the treatment group. Mean age of the participants at baseline was  $36 \pm 5$  yrs. Eleven participants (13.4%) dropped from the study during years 1 and 2, of those, 5 were Black, 4 were White and 2 were of other race or ethnicity. The adjusted means for adherence to the strength training during the 2-year intervention are shown in Table 3. During the supervised period of the intervention (months 1 through 4), there was a significant effect of level of education (*F*

= 4.44,  $p < 0.04$ ) and the interaction between marital status and age of children ( $F = 4.83$ ,  $p = 0.004$ ) on adherence percentage. Even though adherence was higher than 90% during this period, women with college degrees were significantly *less* adherent (90.8%) to the intervention than women without college degrees (97.9%). Married and non-married women with or without children had similar adherence rates during the supervised period (range between 91.2% and 96.9%), with the exception of non-married women with children between the ages of 6 and 12 years, who were significantly less adherent (76.7%). No significant effects of race, age, or work status on adherence were found. Overall, our regression model accounted for 39% of the variance in adherence during the supervised period of the intervention.

Overall adherence during the supervised period of year 1 was 95.4% (unadjusted mean). During the unsupervised period of year 1 (months 5 through 12), overall adherence dropped to 64.5% and there was a significant effect of race ( $F = 7.85$ ,  $p < 0.007$ ) on adherence percentage (Table 3). White women were significantly more adherent to the intervention (70.3%) than women of color (48.6%). Non-married women with children 13 years or older were significantly less adherent than married women with children 5 years or younger (75.4% vs 36.3%, respectively,  $p < 0.007$ ). During this period, 26% of the variance in adherence was accounted for by the regression model.

Overall adherence to the intervention decreased from 64.5% in the unsupervised period of year 1 to 51.4% in year 2 (unadjusted means, data not shown). No significant effects of race, age, level of education, marital status, age of children, or work status on adherence were observed. We also found that the same regression model used for adherence during year 1 accounted for only 11% of the variance in adherence during year 2.

## Discussion

To our knowledge, the SHE study was the first long-term strength training intervention study conducted among ethnically diverse, premenopausal women. As expected, our findings indicated that overall adherence was higher during the supervised period of the intervention, compared to the unsupervised periods. SHE participants had high adherence during the initial supervised months. Though there was an unexpected finding that women with a college degree had lower adherence than women with less than a college degree, all participants were highly adherent during this time period. This finding contrasts with consistent findings from previous studies that physical activity levels are positively associated with education among women aged 20–49 years (9–11). More recently, it was reported that participation in strength training is also positively associated with education in adult Americans (12). We believe that the small difference noted in our study was statistically but not meaningfully different, particularly given that overall adherence during that time period was over 90%. Furthermore, the SHE sample as a whole was well educated; just 5% had less than some college education.

Women with young children living at home have been described as having lower levels of physical activity (9). More broadly, it has been proposed that the physical activity of parents could vary according to the number and ages of children. A Canadian survey of women aged 20–49 years residing in an urban area found parenthood “the most important predictor for women’s exercise participation”, and that parenthood confounded associations of marital and employment status with physical activity levels (13). The authors suggest that parenthood itself, rather than the number and ages of children, marital status and employment status, is a barrier to exercise participation (10,13,14). Some previous research has also suggested that single parenting is associated with lower physical activity levels (15,16). According to a review of 25 studies of parenting and physical activity (17),

however, there are conflicting results on the associations of physical activity with single parenting and with the number and ages of children.

The SHE study offered a means to examine a specific mode of physical activity (strength training) among mothers. We attempted to address potential barriers to exercise adherence by having women complete their workouts at facilities that provided daycare during peak hours for children aged 5 years and younger. While this strategy appears to have contributed to higher adherence of married women with younger children (75.4% adherence), the same effect was not observed in non-married women with younger children (59.4% adherence). Although the use of childcare by participants was not monitored, possible explanations for the disparity in adherence could be that the daycare hours provided at facilities did not fit into the schedules of non-married participants or that non-married parents were less willing to leave their children with these daycare providers.

In the SHE study, marital status alone did not have an effect on adherence of the participants; however, we found an interaction of marital status with age of children living at home. We found that non-married women who had children between the ages of 6–12 years were the least adherent during the supervised period of the intervention. This trend shifted during the unsupervised period of year 1 with non-married women with children older than 13 years being the least adherent compared with married women with children younger than 5 years of age. In this regard, comments from focus group discussions and interviews conducted with a subsample of 49 intervention participants (25 women of color and 24 White women) are relevant. A White woman noted with surprise that she had less time for exercise with her older children than she had anticipated. She said that although her older children no longer required a babysitter, they needed rides to their scheduled activities. Another White woman with children said it had been easier to work out two years before, at the beginning of the study, “when they were younger and I dragged them places -- you know, they didn’t have their own schedules yet.”

Studies on parenthood and physical activity report that parenthood is an important factor associated with physical activity (17). The amount of discretionary time mothers have (8.3 hours per week), as reported in one study, was far lower than that of nonparents (18.7 hours) (14). Mothers indicated a sense of “overload” from their multiple roles of parenting, work and related physical activity (13). Among parents, it is mothers more than fathers whose leisure time activity decreases (9). Parenting is also associated with multiple barriers to physical activity, including lack of time, fatigue, lack of social support, lack of money, childcare needs, commitment to family and other role obligations. If parents have less discretionary time than non-parents, it seems likely that single parents would have even less discretionary time and less flexibility in their schedules, as they lack a partner to share in childcare responsibilities and may have to rely on extended family for childcare. It is worth noting that the studies described above did not include strength training in their definition of physical activity or exercise. Our findings indicate that demographic variables relating to parenting may also be relevant for predicting adherence to strength training.

Change in body composition was the primary outcome in the SHE study and could be considered a potential confounder in explaining adherence. This variable was not included in the data analysis because no differences in body composition were found in relation to any of the socio-demographic variables described here. It is possible that perceptions of body image may have affected adherence(7).

Epidemiologic studies have previously demonstrated that women of color have lower levels of sport and exercise activities than White women (9,18) and higher percentages of inactivity (19). (20)During the non supervised period of year 1 (months 5–12) mean



adherence percentage significantly decreased compared to the supervised period of the SHE study. There was a significant effect of race on adherence percentage; women of color were significantly less adherent than White women, suggesting that the same factors contributing to adherence to aerobic exercise are also involved in adherence to strength training. Findings from focus groups and interviews conducted with a sub-sample of the SHE study intervention participants suggest that, among the women of color in this sub-sample, lack of verbal and/or effective social support from family members or friends may partially explain the lower adherence of these women (7), among whom 52% were single parents. We attempted to address this issue by sending personalized letters or emails to individuals identified by the participants as being supportive of them, focusing on information about the value of the program and suggesting specific behaviors and activities to support the participant. It is possible that factors such as family responsibilities as well as a commitment to family (17), and a related “ethic of care,” as suggested by Eyler et al (21), also played an important role in affecting adherence of women of color to the intervention. Cultural differences in the social acceptability of taking time to care for yourself by going to the gym regularly might explain our findings for some women.

One might also speculate that the gym environment itself could be a deterrent for some participants. Were the fitness centers themselves unwelcoming or culturally unappealing environments for some at the outset, that is, before joining the study? The YWCA locations were in the city of Minneapolis, which had a 32% minority population (17.7% Black) based on the 2000 Census. The YWCA mission is painted on the entrance walls of the facilities: “The YWCA of Minneapolis works to fulfill our mission of eliminating racism and empowering women.” The gym staff and membership, while majority White, reflected the diversity of the area. According to their geographic location, mission statement, staff and membership and course offerings (including hip hop, salsa and African dance, among other courses), the fitness centers did not appear to be unwelcoming to culturally diverse women. While this quantitative study was not designed to answer this question, data gathered in focus group discussions and interviews with a subsample of intervention participants offer some perspective. Several women mentioned having joined the study in order to obtain a free gym membership. Six women of color and 5 White women explained their choice of a gym location and/or time of work out by noting disliking a crowded gym. Three women of color emphasized the gym provided a positive family experience. One said of her children: “They are all girls and I want them to know that working out is a good thing for them and they should find time as they get older.” Another found the gym “open, friendly”. Another woman of color said she had “respect” for the YWCA community, and in part frequented the gym to join that community. Two women of color had difficulties with the day care. While specific responses differed, it seems that most women did not have problems with gym-based exercise per se, but only with specific conditions: many preferred quiet, non crowded spaces.

There were, however, 6 women (2 women of color and 4 White women) who voiced discomfort with or dislike of the environment. Four specifically said they had been “intimidated” by the gym: for one woman of color it was the machines, for two (1 woman of color and 1 White woman) it was the many men working out in the weights area. The women of color noted this sense of discomfort ended once they became familiar with using the machines. A White woman said she would prefer a woman only gym: “it feels very intimidating for a woman, especially someone who’s you know who’s overweight to try and go and use the machines, when these guys are putting on all these weights, it’s just a macho thing... If they weren’t there it would feel so much more welcoming.” Another White woman, who suggested women only time periods, suggested: “women only [gym hours] and it would be like women trying to get into shape, so it wasn’t like all Barbie dolls...I would go because I would know it would be a welcoming environment”. Two White women

voiced their general dislike for being in gyms without elaboration. These responses suggested that at least some women did not want to be in a social atmosphere under observation or in a male-dominated space, or perhaps indoors at all for physical activity. Most focus group responses did not indicate reservations about gym-based exercise. Instead, they emphasized their confidence in their ability to complete strength training correctly, but noted time constraints and issues of convenience.

One limitation of this study was that we did not evaluate the relative impact of the specific strategies listed in Table 1 on promoting adherence. However, based on our findings, we believe that providing daycare during peak hours did contribute to higher adherence of some participants. Another limitation of this study was the only indicators of socioeconomic status used were education and employment. Yet it is well known that socioeconomic status is a complex construct, and in particular, the middle class is an internally diverse group. It could be that additional information on socioeconomic status, such as household income (and lack of a second income), home ownership, flexibility or lack of flexibility in job schedules, availability of reliable, affordable day care, could have allowed us to better identify both the structural factors affecting women's adherence to strength training exercise as well as mediators of them, such as self-efficacy (22). Another limitation is that this study did not gather information on the specific amount of discretionary time in participants' schedules, nor on the time involved in transit to the fitness center. This study did not examine an exhaustive list of potential barriers. Despite these limitations, this study offers novel findings with interesting implications. In this study, we sought to have an understanding of structural, socio-demographic factors affecting adherence over an extended time period. Very few exercise interventions have included such a long term maintenance period. A major finding of this study was the significant variation relating to marital and parenting status during the middle phase of the study (months 5–12). The lack of demographic difference during the second year (months 13–24), when the adherence dropped off for fully half of the participants, is another novel finding of this uniquely long term study. It is well known that people will adopt a health behavior for a limited time frame; far less is known about what factors contribute to incorporating such changes on a long term basis.

We have found that demographic variables associated with adherence to a 2-year twice-weekly strength training intervention in premenopausal women are similar to those associated with participation in other types of physical activity. In addition to variation by race, we also found that parenting may play an important role in determining participation in strength training interventions. Further research is needed among diverse groups of women on the structuring of their days around parenting and work responsibilities to obtain a more accurate and realistic picture of time available for strength training and other recommended physical activities. One possibility that bears in mind time constraints and role overload is to develop strategies for adults to incorporate strength training into existing daily life activities and local environments. The results of this study showing strong commonality in adherence during the initial phase, followed by common declines to 50% adherence in year 2 suggest that interventions and programs for women need to change over time, both to re-inject novelty and additional options (gym-based, lifestyle physical activity or both) and to alter them according to changes in women's busy, ever changing lives. It is well-established that women find social support particularly helpful and motivating. Some overweight women in this age group may prefer a more self-contained, women-only environment. Interventions and public health recommendations need to further consider how to engage communities to provide effective support for strength training across the life span, giving due emphasis on the importance of strength training for health and prevention of disease.

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**Table 1**

Strategies used to support adherence to the SHE study and respective social cognitive theory concepts addressed by each one.

Strategy	Details	Concepts
Supervised intervention	Sixteen weeks of supervised intervention with a qualified fitness professional were provided to increase knowledge and skills for weight training	Behavioral capacity Expectations Self-efficacy
Personal booster sessions	These sessions were designed to provide additional motivation to participants who had difficulties in adhering to the protocol.	Social support Self-efficacy
Phone and email reminders	Participants who did not report completed strength training sessions were reminded via phone or email at least once a week.	Social support Expectations
Social support gatherings	These events were held twice yearly so participants could share successes and challenges and to problem solve obstacles to exercise participation and adherence.	Social support
Incentives	A token incentive item such as a t-shirt or water bottle was given to participants to promote attendance.	Reinforcements
Study website	A study website was created which contained information about meeting other study participants, contact information of study staff, success stories, information on overcoming challenges, facility news and updates, and a bulletin board.	Modeling Expectations
Letters or emails to significant others	Participants were encouraged to identify individuals in their lives who were supportive of them. Based on this information, personalized letters or emails were sent to these individuals focusing on information about the value of the program and suggesting specific behaviors and activities to support the participant.	Social support
Child Care	Child care was provided to participants who had children 5 years of age or younger.	Reinforcements Reciprocal determinism
Gym Membership	Participants randomized to the intervention group were given a 2-year gym membership to the Minneapolis YWCA fitness centers.	Reinforcements

**Table 2**

Characteristics of Participants Randomized into the Treatment Group.

Variable	Baseline ( <i>n</i> = 82)
Age (y)	36 ± 5 <sup>a</sup>
Race [ <i>n</i> (%)]	
Black	24 (29)
Other <sup>b</sup>	10 (12)
White	48 (59)
Education [ <i>n</i> (%)]	
Less than high-school diploma	0 (0)
High-school diploma/GED	1 (1)
Vocational/technical school diploma	3 (4)
Some college	18 (22)
College/University degree	42 (51)
Graduate/Professional degree	18 (22)
Marital Status [ <i>n</i> (%)]	
Never married	30 (37)
Married	35 (43)
Separated	4 (5)
Divorced	7 (8)
Widowed	0 (0)
Relationship/Partner	6 (7)
Children [ <i>n</i> (%)]	
None	35 (43)
≤ 5 years	18 (22)
6–12 years	17 (21)
≥ 13 years	12 (14)
Work [ <i>n</i> (%)]	
Part time	20 (24)
Full time	57 (70)
Not working	5 (6)

<sup>a</sup>Mean ± SD.<sup>b</sup>Includes Asian, Native American, and Pacific Islanders.

Table 3

Adjusted means for adherence to the strength training intervention.

	Supervised Period		Year 1		Year 2	
	1-4 months n = 82 <sup>§</sup>	5-12 months n = 82 <sup>§§</sup>	5-12 months n = 82 <sup>§§</sup>	13-24 months n = 82 <sup>§§§</sup>	%	SE
<b>Race*</b>	%	SE	%	SE	%	SE
Women of color <sup>d</sup>	94.5	2.7	<b>48.6</b>	7.7	36.9	9.6
White	97.6	2.6	<b>70.3</b>	7.3	52.2	9.2
<b>Age (yrs)</b>						
25-34	96.2	2.9	56.4	8.3	40.8	10.3
35-44	95.9	2.3	62.6	6.7	48.3	8.3
<b>Education**</b>						
College degree	<b>93.1</b>	2.3	57.8	6.4	43.1	8.0
No college degree	<b>99.0</b>	3.0	61.1	8.6	46.0	10.7
<b>Marital Status</b>						
Marr/Part <sup>b</sup>	99.5	2.5	66.1	7.1	46.9	8.9
SSWD <sup>c</sup>	92.6	2.8	52.9	8.1	42.2	10.1
<b>Age of Children</b>						
≤ 5 yrs	98.2	3.3	67.4	9.5	48.9	11.8
6-12 yrs	87.6	3.1	56.3	8.8	43.8	11.0
13+ yrs	98.6	3.9	52.2	11.3	32.9	14.1
None	99.8	2.8	62.04	7.9	52.7	9.8
<b>Work Status</b>						
Full time	95.0	1.5	61.5	4.2	47.9	5.2
Less than full time	97.1	4.0	57.5	11.5	41.2	14.3
<b>Marital Status × Age of Children****</b>						
Married						
≤ 5 yrs	100	2.9	<b>75.4</b>	8.2	52.4	10.2
6-12 yrs	98.6	3.7	61.6	10.4	48.0	13.0

	Supervised Period		Year 1		Year 2	
	1-4 months	5-12 months	5-12 months	13-24 months	13-24 months	13-24 months
	<b>n = 82</b> <sup>§</sup>	<b>n = 82</b> <sup>§§</sup>	<b>n = 82</b> <sup>§§§</sup>	<b>n = 82</b> <sup>§§§</sup>	<b>n = 82</b> <sup>§§§</sup>	<b>n = 82</b> <sup>§§§</sup>
	%	SE	%	SE	%	SE
<b>13+ yrs</b>	100	5.7	68.1	16.2	38.8	20.1
<b>None</b>	98.9	3.5	59.1	10.1	53.5	12.6
<b>Not married</b>	96.4	5.6	59.4	16.0	45.4	19.9
<b>≤ 5 yrs</b>	<b>76.7</b>	4.5	50.9	12.8	39.5	16.0
<b>6-12 yrs</b>	96.7	4.3	<b>36.3</b>	12.4	31.9	15.4
<b>13+ yrs</b>	100	3.1	<b>65.0</b>	8.7	51.8	10.9
<b>None</b>						

<sup>§</sup>Overall model  $R^2=0.39$  ( $F=4.14$ ,  $p=0.0001$ )

<sup>§§</sup>Overall model  $R^2=0.26$  ( $F=2.29$ ,  $p<0.02$ )

<sup>§§§</sup>Overall model  $R^2=0.11$  ( $F=0.79$ ,  $p=0.65$ )

<sup>a</sup>The category 'Women of color' includes Black, Asian, and women identified as 'other' race or ethnicity.

<sup>b</sup>Married or partnered (living as married)

<sup>c</sup>Single, separated, widowed or divorced

\* Race yielded a significant effect on participants' adherence during year 1 of strength training ( $p=0.007$ ).

\*\* Level of education yielded a significant effect on adherence during the supervised period of strength training ( $p=0.017$ ).

\*\*\* The interaction between marital status and age of children yielded a significant effect on adherence during the supervised and unsupervised periods of year 1 of strength training ( $p<0.04$ ).