

# Exercise and Mental Health Team

## Examining the Effect of Strength Training on Positive Body Image



BASS  
CONNECTIONS

Kim McNally, Ed D.<sup>1</sup>, Nancy Zucker, PhD<sup>2</sup>, Valerie Adams,  
Collean Trotter, Christina Williams, Kira Panzer

Bass Connections in  
Education & Human Development

<sup>1</sup>Duke Dept. of Health, Wellness & PE, <sup>2</sup>Duke Center for Eating Disorders

### Background

Exercise is consistently associated with lower body image disturbance and body dissatisfaction<sup>1-3</sup>. The current study examines exercise and the emerging concept of positive body image (PBI) which includes the constructs of body appreciation, satisfaction with the body's capabilities, and internal body orientation. Research on exercise and PBI may provide insights to improve resilience to body image related disorders such as eating disorders, depression, and anxiety<sup>4</sup>. Intervention research is needed to clarify the directionality of the relationship between exercise and PBI. Specifically, does exercise increase PBI, or are individuals with PBI more likely to exercise? Additionally, research is needed to examine the effects of strength training on body image, as previous literature primarily considers aerobic training; and examine participant and exercise factors that are associated with improved body image<sup>5,6</sup>. Accordingly, the purposes of the study were 1) to assess the effects of an 8-week strength training intervention on PBI, and 2) to examine factors that may be associated with greater improvement in PBI. Based on previous literature, it is hypothesized that strength training will improve PBI<sup>1-3</sup>, with a larger improvement for women due to a lower baseline<sup>1</sup>; and that higher weight management and appearance motivations will be associated with less improvement in PBI<sup>5</sup>.

### Methods

#### Participants

Participants were male (n = 12) and female (n = 26) students (ages 18-25) who were previously inactive (<60 minutes of exercise/week in previous 2 months) with no exercise limitations.

#### Measures

The following measures were completed at pretest and posttest:

##### *Exercise Motivations Inventory-2 (EMI-2)*

The EMI-2 is a self-report measure of the various motivations to exercise. The exercise motivations examined in the current study were: Health, Weight Management, Appearance, and Strength and Endurance. Internal consistency of subscales range from 0.63-0.90; test-retest reliability coefficients ranged from 0.59-0.88. The EMI-2 has been validated among males and females and exercisers and non-exercisers<sup>7,8</sup>.

##### *Body Appreciation Scale (BAS)*

Regarded as the most comprehensive measure of PBI<sup>9</sup>, the BAS assessed participants' acceptance of and appreciation for their bodies. BAS scores have strong internal consistency and 3-week test-retest reliability<sup>10</sup>. Higher scores indicate more positive body image.

##### *Functional Satisfaction Scale (FSS)*

The FSS of the Embodied Image Scale<sup>10</sup> measures an individuals' feelings about his/her body's capabilities. This subscale has demonstrated internally consistent scores and validity among adolescents<sup>11</sup>. Higher scores indicate more positive body image.

##### *Body Surveillance Subscale (BSS)*

A subscale of the Objectified Body Consciousness Scale, the BSS measures the extent to which an individual defines his or her body by how it looks from an observer's perspective and against cultural ideals, as opposed to how it feels. Lower BSS scores reflect less body surveillance and an internal body orientation, which is indicative of positive body image.<sup>12</sup>

##### *Zone Rep Strength Test*

Participants performed zone rep strength tests for the chest press, leg press, and lat pulldown machines. This protocol has participants lift as many reps as possible of a standardized weight (percentage of their body weight) to measure upper and lower body muscular strength<sup>13</sup>.

#### Strength Training Intervention

Participants completed an 8 week strength training program that included 3 full body workouts/week and alternated biweekly between a traditional (free weight exercises) and functional workout (body weight and balance exercises). Participants progressed from 2 to 3 sets of 8-12 reps, and increased the weight for an exercise once they achieved 3 sets of 12 reps. These parameters reflect the current American College of Sports Medicine (ACSM) position stand titled *Progression Models in Resistance Training for Healthy Adults*<sup>14</sup>.

### Results

#### Purpose #1

The first analysis evaluated the effect of strength training on 3 measures of PBI: BAS, FSS, and BSS. The 2 (Gender) X 2 (Time) general linear model (GLM) MANOVA revealed a significant main effect for Time,  $F(3, 34) = 6.394, p < .001$  but no main effect for Gender,  $F(3, 34) = .393, p = .759$ , or Gender X Time interaction,  $F(3, 34) = .901, P < .451$ . The main effect for Time was evidenced on BAS,  $F(1,36) = 9.865, p = .003$ , partial  $\eta^2 = 0.215$  (Figure 1.) and FSS,  $F(1,36) = 19.060, p = .000$ , partial  $\eta^2 = 0.345$  (Figure 1.), but not BSS,  $F(1,36) = .855, p = .361$ .

A nonparametric Wilcoxon Signed Rank test was also conducted on median scores because the measures contained Likert scales which cannot be assumed to represent continuous data. Again, results demonstrated a statistically significant main effect for time on the BAS ( $z = 2.728, p = .006$ ) and FSS ( $z = 3.645, p = .000$ ).

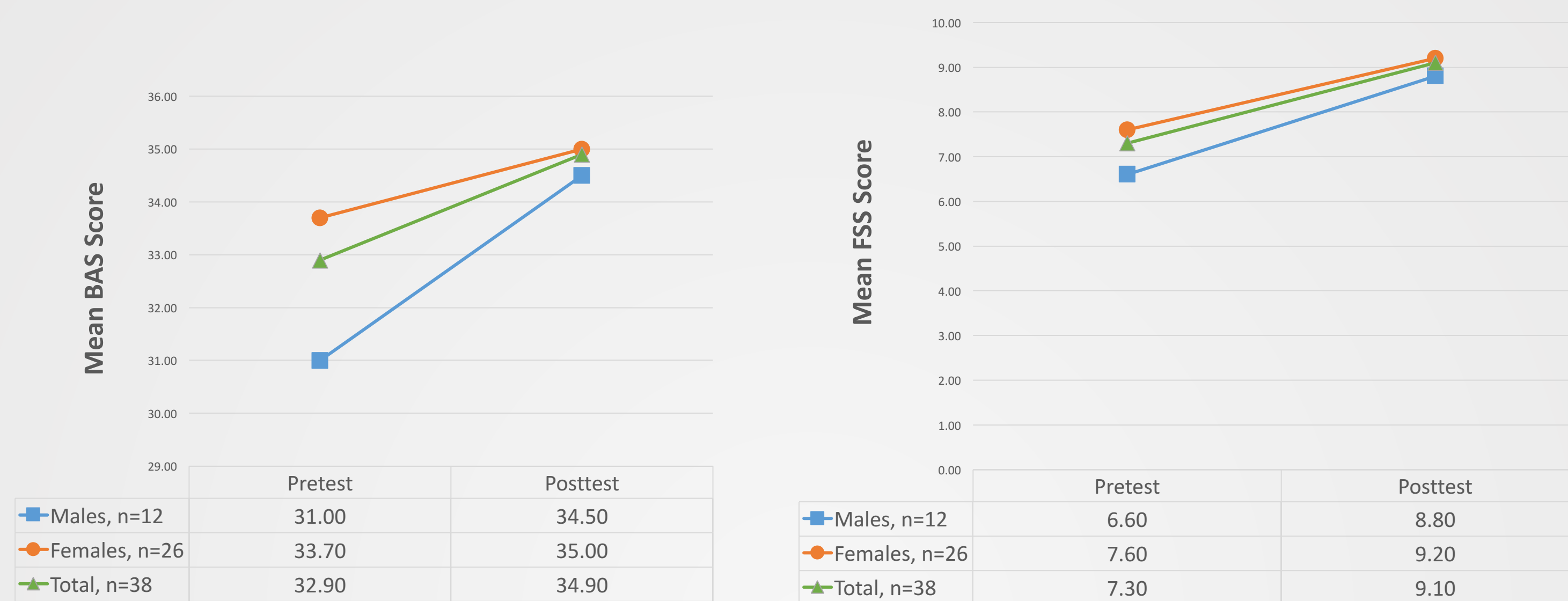


Figure 1. BAS and FSS scores significantly increased from pretest to posttest.

#### Purpose #2

The second analysis examined possible correlations between pretest motivation scores and PBI (BAS, FSS, and BAS) changes pre to posttest. There were no significant correlations between BAS change scores and Exercise Motivations. For FSS (Figure 2.), there was a significant negative correlation between Appearance Motivation for Exercise and change in FSS scores,  $r(36) = -.421, p = .004$ . There was also a near significant negative correlation between Weight Management Motivation for Exercise and change in FSS scores,  $r(36) = -.257, p = .06$ . For BSS (Figure 3.), there was a significant negative correlation between Health Motivation for Exercise and change in BSS scores,  $r(36) = -.319, p = .025$ . There was also a significant negative correlation between Strength and Endurance Motivation for Exercise and change in BSS scores,  $r(36) = -.341, p = .018$ .

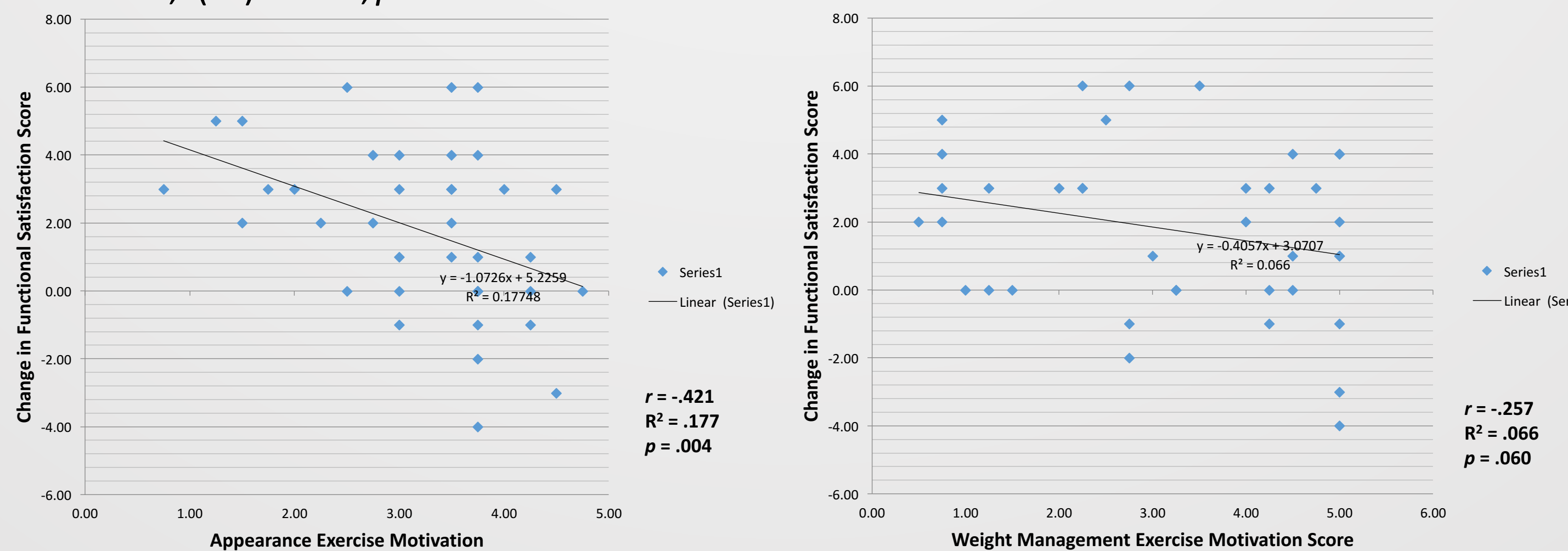


Figure 2. Appearance and Weight Management Motivation for Exercise are negatively correlated with FSS change scores.

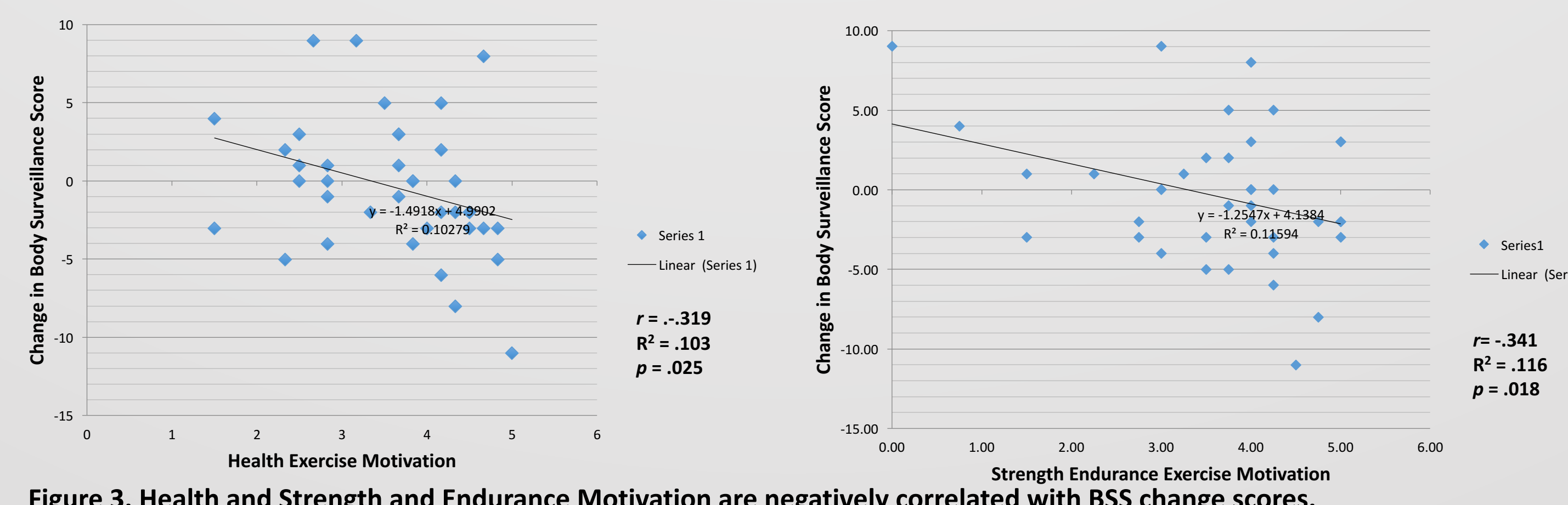


Figure 3. Health and Strength and Endurance Motivation are negatively correlated with BSS change scores.

### Discussion

#### Purpose #1

- The primary hypothesis was supported as participants reported a significant pre to posttest improvement in the PBI constructs of body appreciation (based on BAS) and satisfaction with physical capabilities (based on FSS).
- Males had lower pretest body image than females on the BAS and FSS, which is different from previous body image studies measuring body image disturbance or body dissatisfaction<sup>1</sup>. This finding may reflect a selection bias where inactive males with less body appreciation and strength satisfaction were more interested in a strength training intervention. Or this finding could reflect the unique constructs of PBI which are more internalized and functional (i.e. capabilities)<sup>5</sup> compared to body image disturbance and body dissatisfaction which are appearance-driven and externalized.
- Despite the lower pretest scores for males, there was not a significant main effect for gender. This analysis; however, may have been under-powered due to the small male sample (n = 12).
- Improved PBI is also associated with reduced body surveillance (BSS); however, this effect was not evident in the current study. Demographic factors such as age and SES, and sociocultural factors such as a competitive environment and a residential campus (increasing opportunities for surveillance and comparison), that are specific to Duke University may have contributed to higher body surveillance that is resistant to change.

#### Purpose #2

- The second hypothesis was supported as exercise motivations were significantly correlated with PBI changes.
- Individuals with higher pretest appearance motivation and weight management motivation for exercise experienced less improvement in satisfaction with one's capabilities (based on FSS). Although all participants increased their strength during the intervention, perhaps appearance and weight management motivated individuals were less likely to notice or value their strength gains. This finding suggests that helping individuals value other exercise motivations and have realistic exercise expectations for appearance and weight may improve PBI<sup>5</sup>.
- Participants with higher health motivation and strength and endurance motivation for exercise had less change in body surveillance (based on BSS). A closer inspection of the data revealed that health motivated and strength and endurance motivated individuals had lower body surveillance at pretest and thus less room for decreasing body surveillance, which would be the change indicative of improved PBI.

#### Strengths, Limitations, and Future Directions

- This study addresses gaps in the body image literature by examining the emerging concept of PBI and evaluating the effects of strength training (as compared to aerobic training) on body image. This study is limited by having a small sample size (especially for males) and no control or comparison group.
- Future studies should examine gender differences in PBI, compare changes in PBI for different types of exercise (e.g., cardio vs strength training), and examine whether PBI confers protection from body image-related disorders.

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