

# EXERCISE AND MENTAL HEALTH

Kim McNally<sup>1</sup>, Sheri Branson<sup>1</sup>, Victoria Wickenheisser<sup>2</sup>, Ahmad Amireh, Gabby Cooper, Mallory Hahn, Michael Shu



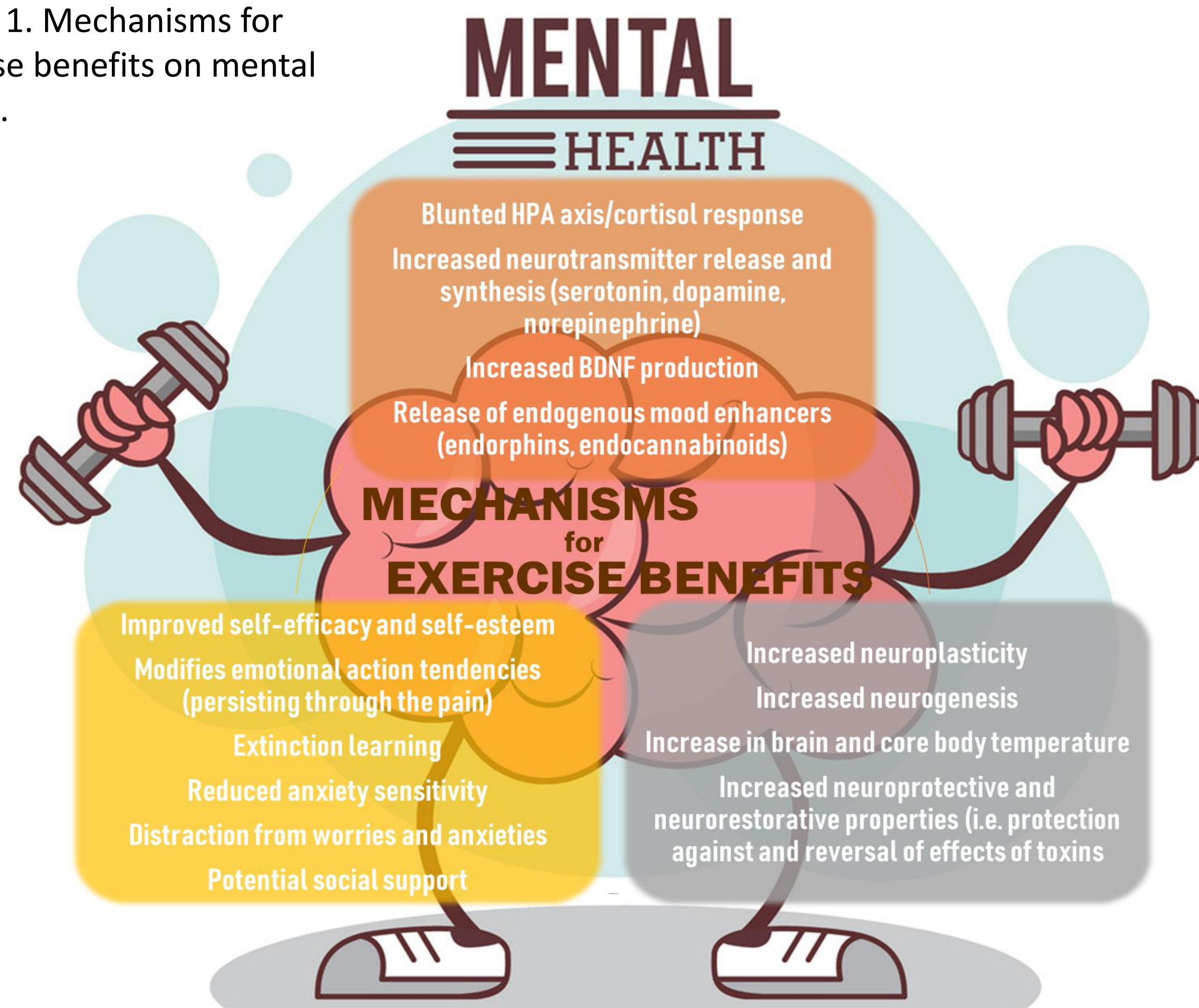
BASS CONNECTIONS

<sup>1</sup>Duke University Health, Wellness & PE, <sup>2</sup>Duke University School of Medicine

Bass Connections in Education & Human Development and Brain & Society

## Background

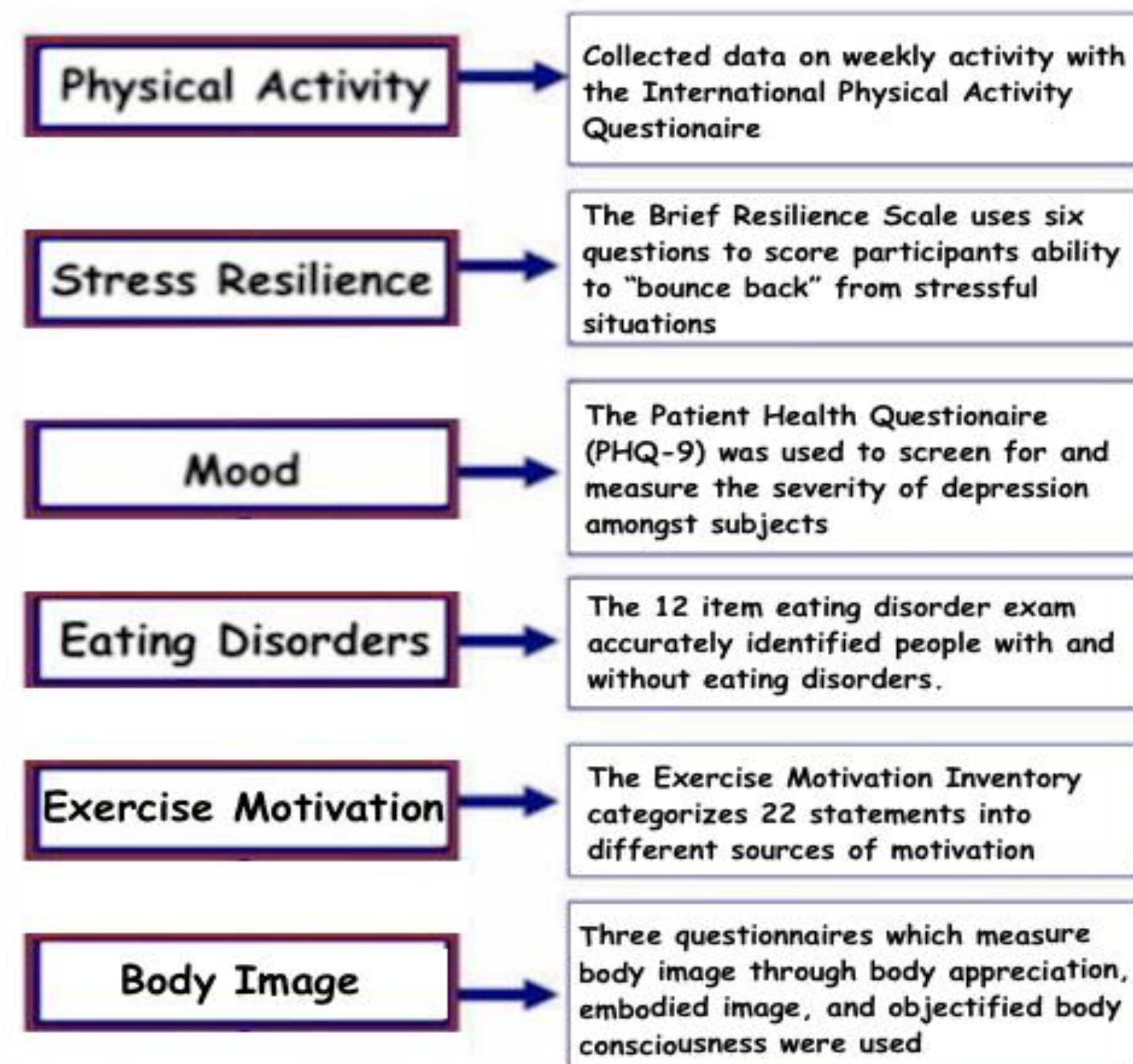
Figure 1. Mechanisms for exercise benefits on mental health.



- Exercise is associated with reduced risk for several mental health issues via neurobiological and psychosocial mechanisms (Figure 1).
- This study assessed the relationship between exercise and depression, anxiety, positive body image, and stress resilience; and examined moderators such as gender, exercise level, and motivation for exercise.

## Methods

Figure 2. Description of measures.



- Duke Physical Education students (n=415), ages 18-26, were surveyed during Fall 2018 on activity level and several measures of mental health (Figure 2).
- A two-way MANOVA was conducted to examine gender and activity level effects on resilience, anxiety, and depression; while a three-way MANOVAs was used to study the effects of gender, activity level, and weight and appearance motivation for exercise on three positive body image subscales

## Results

### Resilience, anxiety, and depression

- A 2 (gender) x 3 (activity level) MANOVA showed significant main effects for gender,  $F(3,406) = 5.485, p = .001, \text{Wilks}' \Lambda = .961, \text{partial } \eta^2 = .039$ , and activity level,  $F(6,812) = 3.123, p = .005, \text{Wilks}' \Lambda = .955, \text{partial } \eta^2 = .023$ , on the combined dependent variables of resilience, anxiety, and depression; but the interaction was not significant. Marginal means are shown in Tables 1-3.
- Follow-up univariates showed significant effects for gender on resilience,  $F(1,408) = 14.317, p < .001, \text{partial } \eta^2 = .034$ , and anxiety,  $F(1, 408) = 9.587, p = .002, \eta^2 = .023$ , but not depression.
- Follow-up univariates showed significant effects for activity level on resilience,  $F(2, 408) = 4.448, p = .012, \alpha = .05, \text{partial } \eta^2 = .021$ , and depression,  $F(2, 408) = 8.115, p < .001, \eta^2 = .038$ , but not anxiety.
- For activity level and resilience, pairwise comparisons showed statistically significant differences between moderate and high activity,  $p = .043$ , and low and high activity,  $p = .013$ , but not low and moderate activity. For activity level and depression, pairwise comparisons showed statistically significant differences between low and moderate activity,  $p = .047$ , moderate and high activity,  $p = .030$ , and low and high activity,  $p < .001$ .

### Positive body image

- A 2 (gender) x 3 (activity level) x 3 (weight/ appearance motivation) MANOVA showed significant main effects for activity Level,  $F(6,762) = 6.379, p < .001, \text{Wilks}' \Lambda = .907, \text{partial } \eta^2 = .048$  and weight/appearance motivation,  $F(6,762) = 5.568, p < .001, \text{Wilks}' \Lambda = .918, \text{partial } \eta^2 = .042$ , but not for gender ( $p = .065$ ), on the combined dependent variables of body appreciation (BAS), functional satisfaction (FSS), and body surveillance (BSS).
- Follow-up univariates showed significant effects for activity level on BAS,  $F(2,383) = 7.160, p = .001, \text{partial } \eta^2 = .036$ , and FSS,  $F(2,383) = 17.977, p < .001, \text{partial } \eta^2 = .086$ , but not BSS.
- For activity level and BAS, pairwise comparisons showed significant differences between low and moderate activity level,  $p = .033$ , and low and high activity level,  $p = .001$ , but not quite between moderate and high activity levels,  $p = .051$ . For activity level and FSS, pairwise comparisons showed significant differences between low and moderate activity level,  $p = .008$ , moderate and high activity level,  $p < .001$ , and low and high activity level,  $p < .001$ .
- Follow-up univariates showed significant effects for weight/appearance motivation on BAS,  $F(2,383), p < .001, \text{partial } \eta^2 = .040$ , and BSS,  $F(2,383), p < .001, \text{partial } \eta^2 = .069$ , but not FSS,  $p = .072$ .
- For weight/appearance motivation and BAS, pairwise comparisons showed statistically significant differences between low and moderate weight/appearance motivation,  $p = .001$ , and low and high weight/appearance motivation,  $p = .006$ , but not moderate and high. For weight/appearance motivation and BSS, pairwise comparisons showed significant differences between low and moderate,  $p < .001$ , and low and high,  $p < .001$ , but not moderate and high,  $p = .071$ .

## Conclusions

- Female PE students experienced higher anxiety and lower stress resilience compared to males. This finding could be related to interactions between sex hormone and stress hormone pathways (Rohit et al., 2011).
- High active students (>300 min./week) reported greater stress resilience. These students completed more vigorous intensity exercise; therefore, vigorous exercise may promote a physiological toughening in the stress response (HPA axis) system (Mitchell, 1996).
- Consistent with previous literature, there was a dose response relationship between activity level and depression so any increase in activity resulted in reduced depression (Carek et al., 2011)
- In contrast to previous literature, there were no gender differences on positive body image, perhaps due to a selection bias among students who take a PE class or different class preferences between males (i.e., sports) and females (i.e., fitness [Homan, 2014]).
- Students who reported the lowest weight/appearance motivation experienced more positive body image, suggesting that increased weight and appearance-based exercise can actually lower students positive feelings about their body (Homan & Tylka, 2014).

Table 1. Gender and activity level differences on resilience.

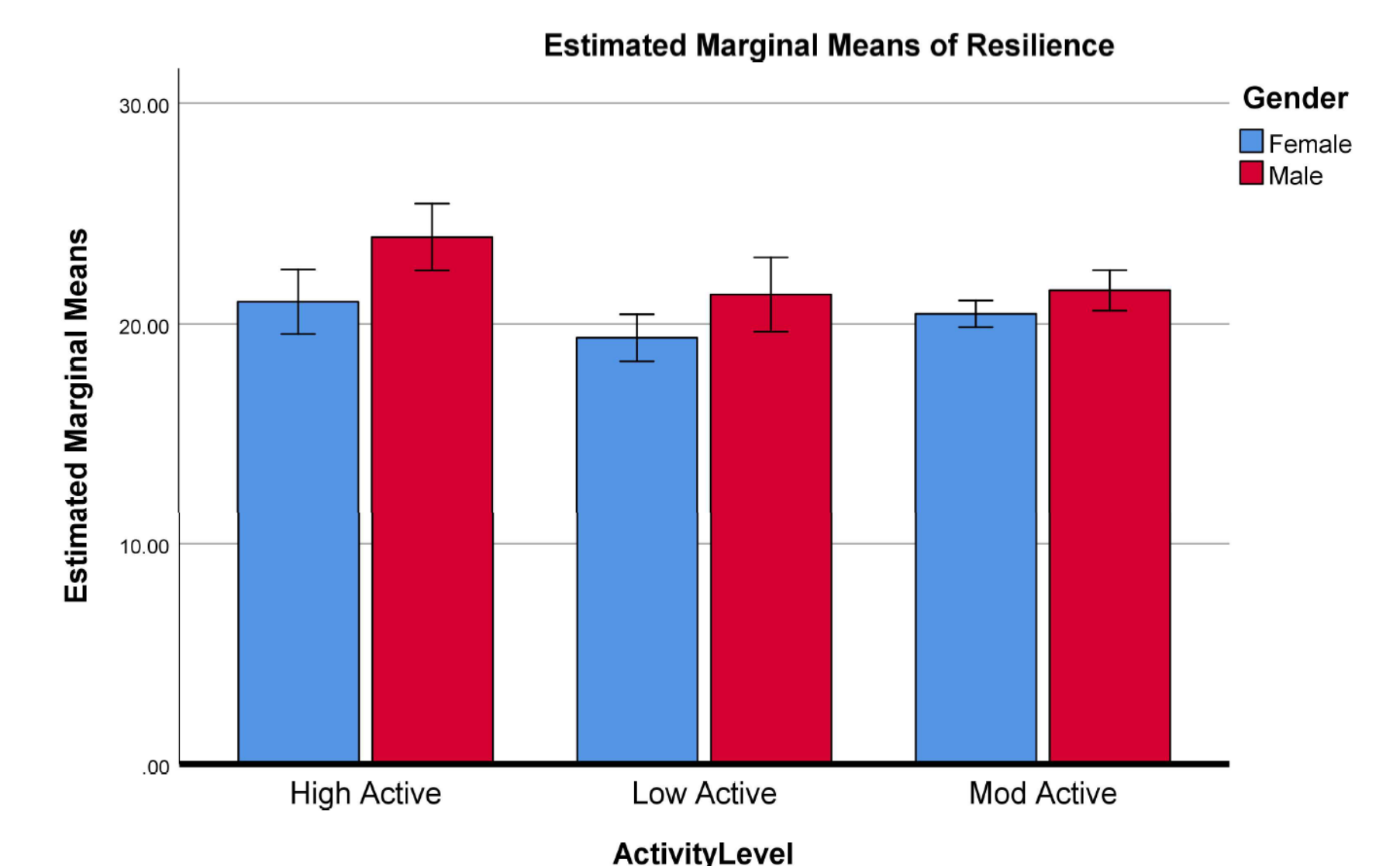


Table 2. Gender and activity level differences on anxiety.

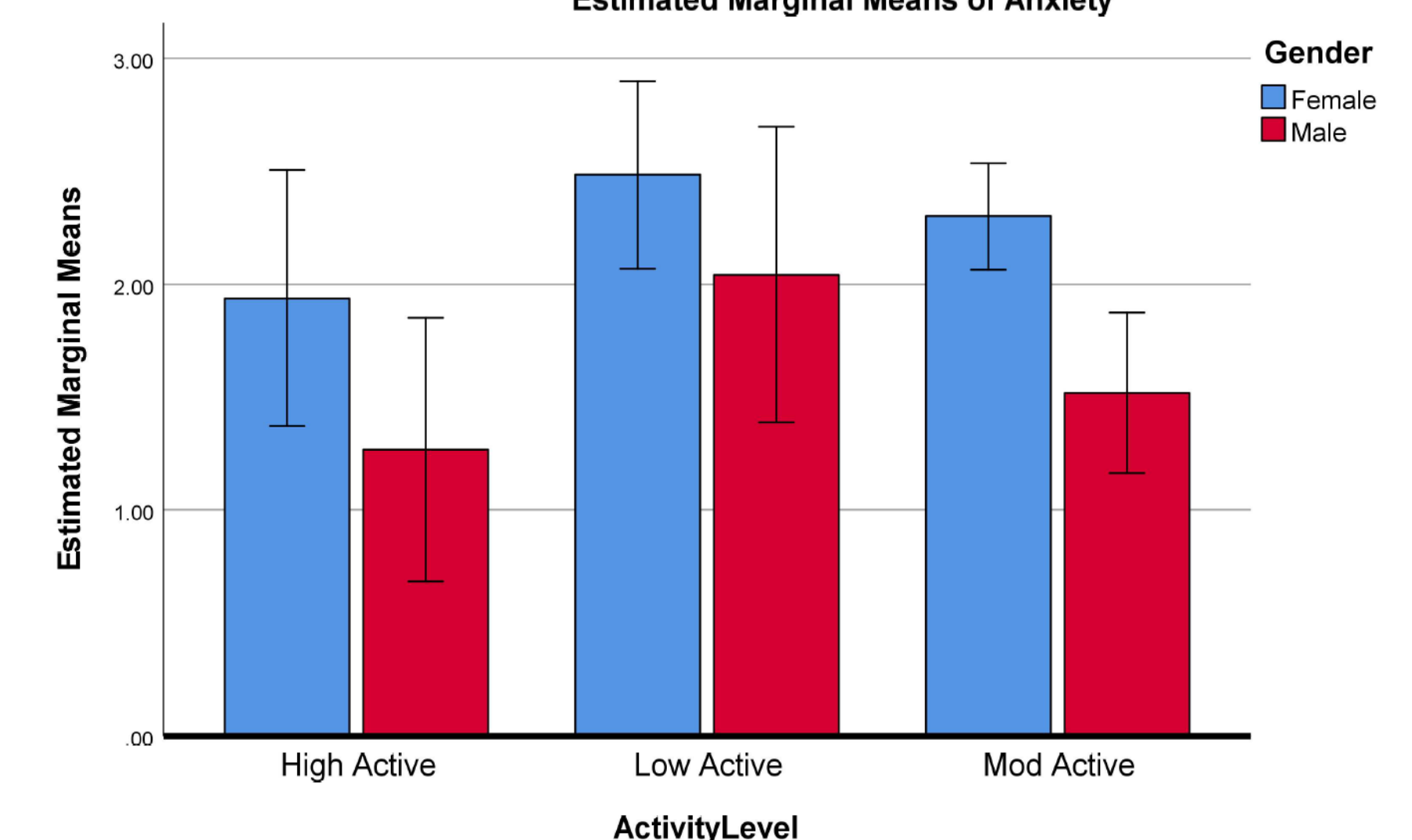


Table 3. Gender and activity level differences on depression.

