Do You Feel the Pump? Examination of Affective Responses to Different Modes of Resistance Training in College Females

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Introduction

Improved mental health is one benefit that has often been reported to be a result of exercise. However, the psychological benefits of resistance exercise have not been as thoroughly studied as aerobic exercise. In a meta-analysis, Petruzzello et al. (1991) actually found an increase in state anxiety following resistance exercise. However, recent studies have shown improved psychological health following acute bouts of resistance training (Bartholomew et al., 2001; Focht, 2002).

Ekkekakis and Petruzzello (2002) have recently described a dimensional approach, the circumplex model (Russell, 1978), which can be used to examine the affective responses to exercise. A dimensional approach assumes that affective responses are interrelated and may be a combination of dimensions and may be better to study the psychological benefits that result from exercise as opposed to categorical approaches (e.g., anxiety and depression) because they can account for a wider array of experiences. The two primary dimensions of the circumplex model are affective valence (pleasantness-unpleasantness) and activation. The circumplex can be divided into four quadrants: (a) pleasant-activated, reflecting excitement, enthusiasm, energy, (b) pleasant-unactivated, reflecting relaxation and calmness, (c) unpleasant-unactivated, reflecting boredom, fatigue, depression and (d) unpleasant-activated, reflecting anxiety, tension, and distress. Previous research has found increased pleasant-activated affect following aerobic exercise (Hall, Ekkekakis, & Petruzzello, 2002; Ekkekakis, Hall, Van Landuyt, & Petruzzello, 2000).

Main Text

The purpose of this research project was to examine the affective responses, via the circumplex model, female exercisers experience following acute bouts of resistance training.

Participants

Thirty-one college females (mean age = 20.2 ± 1.3 years; average BMI = 22.5) volunteered to participate in the study. No previous resistance training experience was required of these participants.

Measures

The circumplex model of affect was measured by two-single items scales, the Feeling Scale (FS; Hardy and Rejeski, 1989) and the Felt Arousal Scale (FAS; Svebak & Murgatroyd, 1985) and by the Activation Deactivation Adjective Check List (ADACL; Thayer, 1989). The ADACL is a multi-item measure of the bipolar dimensions of Energetic Arousal (EA) and Tense Arousal (TA). The EA dimension ranges from Energy to Tiredness, whereas the TA dimension ranges from Tension to Calmness.

Procedures

Participants were asked to complete four sessions of resistance training with 24-78 hours in between sessions to insure proper recovery from previous bouts of exercise. Session one was used to determine the participant’s ten repetition max (10-RM). The participant was tested on four resistance training machines (chest press, row, overhead press, and bicep curl).
During the testing, the participant was given a resting period of at least one minute between each set performed.

The testing protocol was similar for the next three sessions. At the beginning of each session, the participant completed the affect questionnaires (e.g., FS, FAS and ADACL). Participants were then randomized to one of three resistance training conditions: a) eccentric only, b) concentric only or c) traditional resistance training (concentric-eccentric). For each session, the participant completed three sets at different intensities for every machine. The load was set at 80% 10-RM, 100% 10-RM, and 120% 10-RM. Participants were asked to complete 10 repetitions for both the 80% 10-RM and 100% 10-RM conditions and 5 repetitions for the 120% 10-RM condition. The order in which the participant performed these intensities was also randomized. Each participant was given a minimum of one minute rest between each set. Following each session, the participant filled out the affect questionnaires. The participants were asked to take the affect questionnaires with them and complete them at one hour post exercise. The participants were told to refrain from performing resistance training between sessions.

Results

A 3 (condition: eccentric, concentric and concentric-eccentric) by 3 (time points: pre-exercise, post-0, and post-60 min) repeated measures MANOVA on ADACL (EA and TA) scores showed a significant main effect of time, F (4, 82) = 5.57, p = .001 and a condition by time interaction, F (8, 166) = 2.25, p = .026. Univariate analyses for time revealed that this was attributable to changes in both EA \[F (2, 42) = 9.80, p < .001\] and TA \[F (2, 42) = 6.83, p = .003\]. Univariate analyses for the condition by time interaction revealed that this was attributable to changes in only TA \[F (4, 84) = 4.42, p = .003\]. See Figure 1 for a pictorial depiction of the temporal dynamics of the affective responses to resistance training.

Figure 1. Energetic Arousal (EA) and Tense Arousal (TA) responses to three different modes of resistance training.

A 3 (condition: eccentric, concentric and concentric-eccentric) by 3 (time points: pre-exercise, post-0, and post-60 min) repeated measures MANOVA on FS an FAS scores showed only a significant main effect of time, F (4, 102) = 11.51, p < .001. Univariate analyses revealed that this was attributable to changes in both FS \[F (2, 52) = 16.18, p < .001\] and FAS \[F (2, 52) = 22.28, p < .001\]. See Figure 2 for a pictorial depiction of the temporal dynamics of the affective responses to resistance training.
Conclusions

These results support the notion that resistance training can provide affective benefits to the exerciser. Similar to aerobic exercise, resistance exercise appears to increase pleasant-activated affect immediately following exercise. At post 60 minutes, activation appears to decline, but improvements in pleasantness can still be seen. These improvements in affect following exercise may play an important role in designing exercise prescriptions. People who have more positive affective responses to exercise may adhere to exercise programs better.

References


