



Difference in Intrasession Rate of Perceived Exertion during Resistance Training Designed to Achieve Different Physiological Adaptations

JACKSON C. MAYNARD, ANDY A. WOLFE, RUTH E. CADDELL, EMMA J. THORNTON, GILLIAN C. BRADEN, MICHEAL LUERA, & CHEYENNE B. LAVENDER

Kinetic Performance Laboratory; Department of Health and Human Performance; Tarleton State University, Stephenville, TX

Abstract

The OMNI RPE scale (1 - 10 scale), specifically session RPE (sRPE), is recognized as a validated tool for assessing internal stress for upper- and lower-body resistance training exercises. While RPE is prevalent within the resistance training research, to the best of our knowledge, no study has investigated training goals specific (i.e., strength, power, hypertrophy, endurance) intrasession RPE measures. **PURPOSE:** Therefore, the aim of the current investigation was to examine differences in intrasession RPE across 4 distinct resistance training sessions for upper- and lower-body exercise. **METHODS:** Participants (age 20 ± 1.32 yrs; ht 168.91 ± 5.72 cm; wt 80.60 ± 10.12 kg; male = 10; female = 8) with 6 months of resistance training experience performed 5 resistance training sessions. Session 1 consisted of one-repetition-maximum (1RM) testing for the barbell bench press (BP) and barbell back squat (SQ) and served as a familiarization session for the OMNI RPE scale. In randomized session order, sessions 2 - 5 were structured to achieve 4 different training adaptations: strength - 6 sets of 2 repetitions at 90% 1RM (3-minute rest between sets), power - 6 sets of 3 repetitions at 80% 1RM (3-minute rest between sets), hypertrophy - 4 sets of 8 repetitions at 70% 1RM (90s rest between sets), and endurance - 3 sets of 15 at 55% 1RM (30s rest between sets). Rate of Perceived Exertion was assessed immediately after the completion of each set (intrasession RPE) and 30 minutes after session completion (sRPE). A 2 (exercise) x 4 (training mode) Mixed Factorial ANOVA ($p < .05$) was employed to explore the difference in average intrasession RPE slope for SQ and BP across 4 training types. **RESULTS:** A significant main effect was observed between average RPE slope per training modes for both SQ ($p < .001$) and BP ($p < .001$). Bonferroni post-hoc tests identified significant RPE slope difference between endurance and hypertrophy ($1.36 \pm .46; .5 \pm .62; p < .001$), endurance and strength ($1.36 \pm .46; .31 \pm .34; p < .001$), endurance and power ($1.36 \pm .46; .28 \pm .22; p = < .001$) for SQ. Additionally, a significant difference in RPE slope for BP was identified between endurance and hypertrophy ($1.75 \pm .58; .76 \pm .68; p = .007$), endurance and strength ($1.75 \pm .58; .25 \pm .23; p < .001$), endurance and power ($1.75 \pm .58; .16 \pm .24; p < .001$), as well as hypertrophy and strength ($.76 \pm .68; .25 \pm .23; p = .027$) and hypertrophy and power ($.76 \pm .68; .16 \pm .24; p = .022$). **CONCLUSION:** In support of previous reports, these data suggesting training mode and musculature effect RPE. Specifically, higher RPE slope was achieved during endurance and hypertrophy training when activating the lower extremities. Acute tissue damage and accumulation of metabolic byproduct via high-volume protocol of endurance and hypertrophy training, may activate a greater pain receptor response and attributed to the increases in RPE. Alternative to standard repetition prescription, these established training goal specific RPE averages may serve as an intrasession modulator by utilizing RPE as an exercise set termination target.

Introduction

The OMNI RPE scale (1 - 10 scale), specifically session RPE (sRPE), is recognized as a validated tool for assessing internal stress for upper- and lower-body resistance training exercises. While RPE is prevalent within the resistance training research, to the best of our knowledge, no study has investigated training goals specific (i.e., strength, power, hypertrophy, endurance) intrasession RPE measures.

Methods

Purpose: The aim of the current investigation was to examine differences in intrasession RPE across 4 distinct resistance training sessions for upper- and lower-body exercise.

Participants:

- N = 18 (10 male, 8 female)
- 6 months of prior resistance training

Session 1:

- Familiarization of RPE
- Anthropometrics
- Skinfold
- 1- Repetition Maximum Test SQ
- 1- Repetition Maximum Test BP

Session 2-4 (Randomly Selected)

- Standard warm up
- Barbell Back squat & Barbell Bench Press
 1. Endurance (3x15 @ 55% 1RM, 30s rest)
 2. Hypertrophy (4x8 @ 70% 1RM, 90s rest)
 3. Strength (6x2 @ 90% 1RM, 3-mins rest)
 4. Power (6x3 @ 80% 1RM, 3-mins rest)
- RPE was collected immediately after set completion.
- 48 h Rest between Session

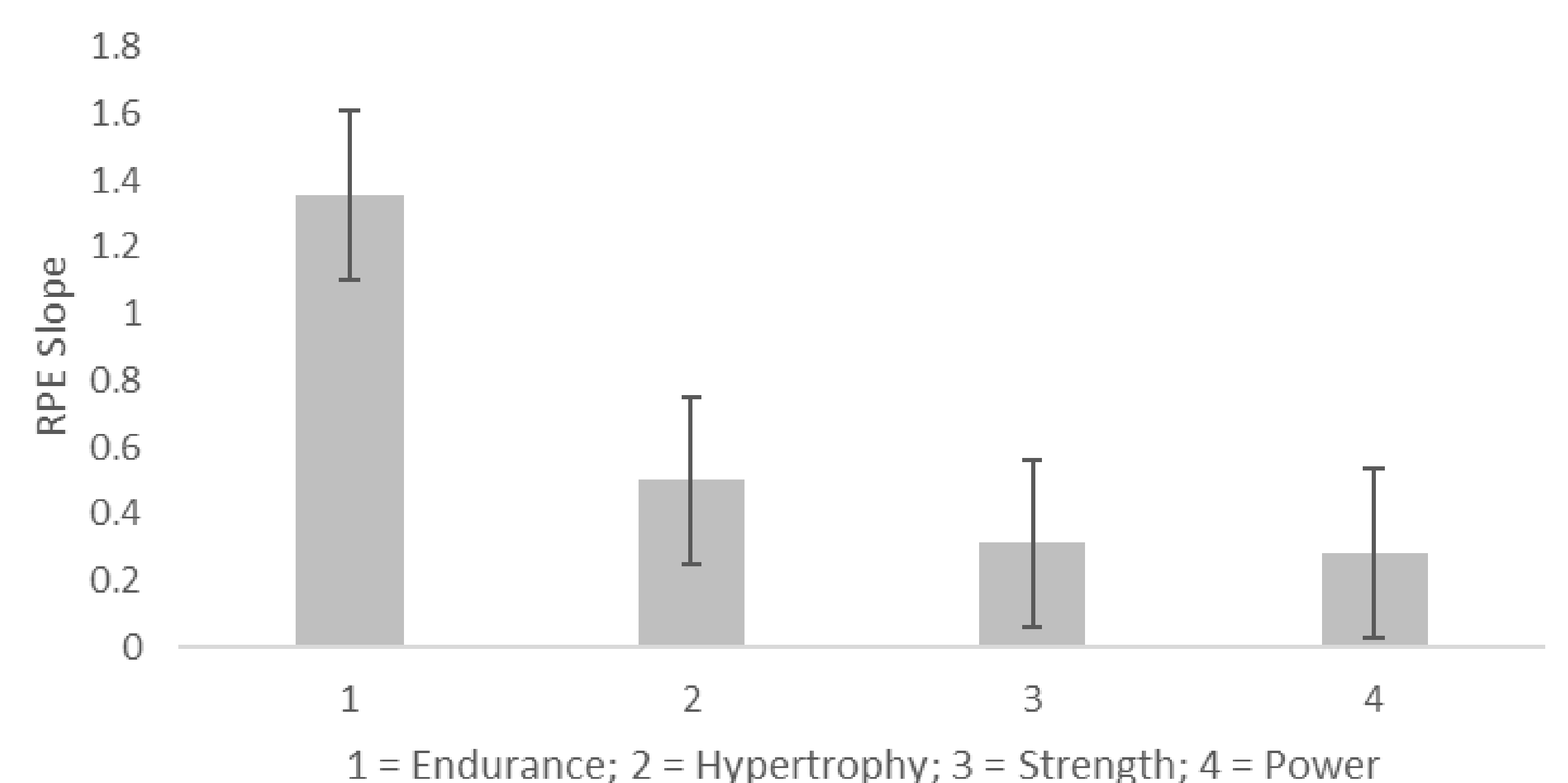
Results

A significant main effect was observed between average RPE slope per training modes for both SQ ($p < .001$) and BP ($p < .001$).

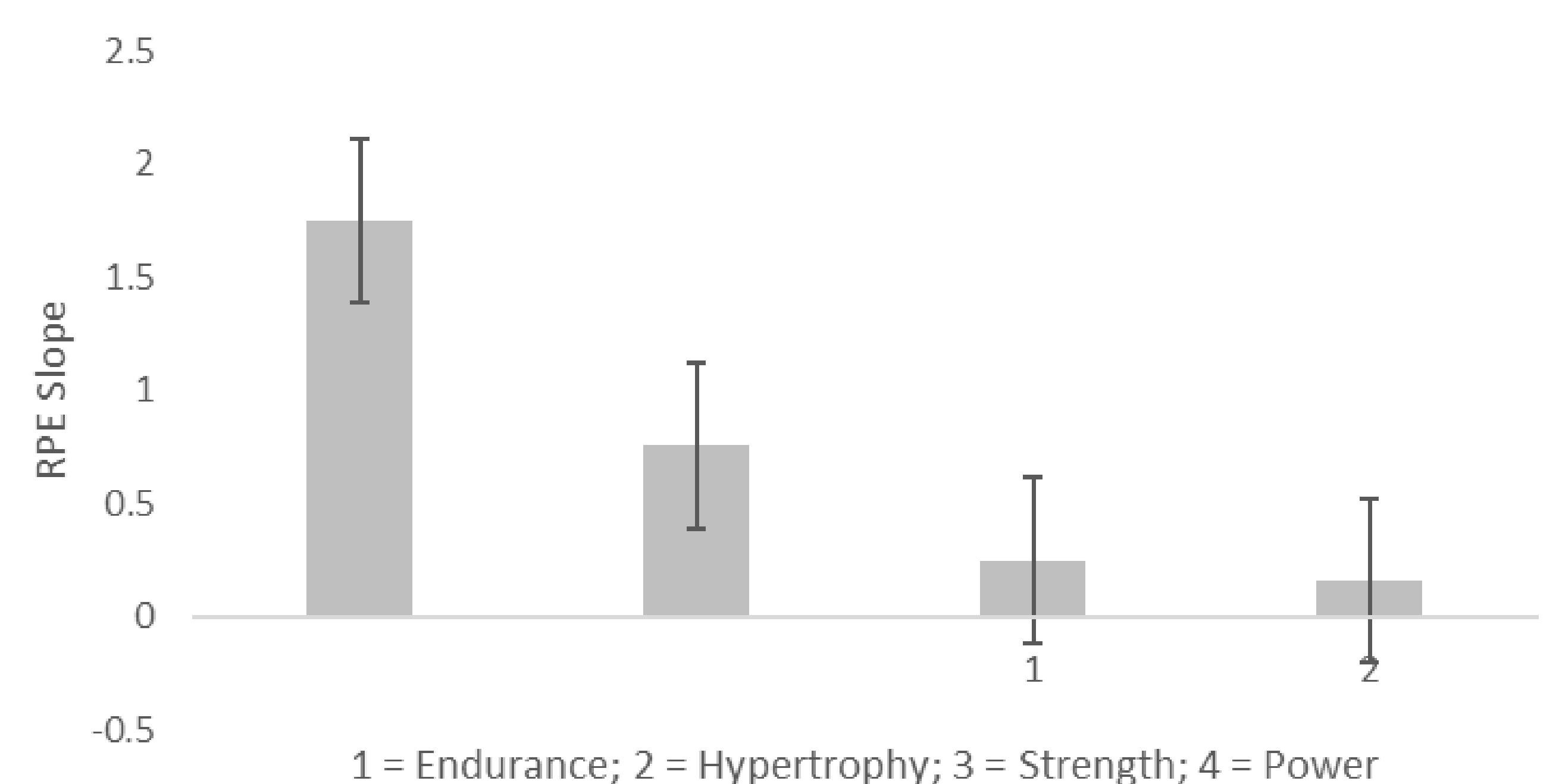
Bonferroni post-hoc tests identified significant RPE slope difference between endurance and hypertrophy ($1.36 \pm .46; .5 \pm .62; p < .001$), endurance and strength ($1.36 \pm .46; .31 \pm .34; p < .001$), endurance and power ($1.36 \pm .46; .28 \pm .22; p = < .001$) for SQ.

A significant difference in RPE slope for BP was identified between endurance and hypertrophy ($1.75 \pm .58; .76 \pm .68; p = .007$), endurance and strength ($1.75 \pm .58; .25 \pm .23; p < .001$), endurance and power ($1.75 \pm .58; .16 \pm .24; p < .001$), as well as hypertrophy and strength ($.76 \pm .68; .25 \pm .23; p = .027$) and hypertrophy and power ($.76 \pm .68; .16 \pm .24; p = .022$).

RPE SQ Slope per Training Type



RPE BP Slope per Training Type



Discussion

In support of previous reports, these data suggesting training mode and musculature effect RPE.

Specifically, higher RPE slope was achieved during endurance and hypertrophy training when activating the lower extremities. Opposingly, power training was perceived as the least exerting mode of training. Acute tissue damage and accumulation of metabolic byproduct via high-volume protocol of endurance and hypertrophy training, may activate a greater pain receptor response and attributed to the increases in RPE.

Alternative to standard repetition prescription, these established training goal specific RPE averages may serve as an intrasession modulator by utilizing RPE as an exercise set termination target.

References

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