

POSTER PRESENTATION

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# Effects of ingesting a pre-workout supplement with and without synephrine on cognitive function, perceptions of readiness to perform, and exercise performance

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## Background

A number of nutritional strategies have been developed to optimize nutrient delivery prior to exercise. As a result, a number of pre-workout supplements have been developed to increase energy availability, promote vasodilation, and/or positively affect exercise capacity. The purpose of this study was to examine the acute effects of ingesting a pre-workout dietary supplement with and without synephrine on cognitive function, perceptions of readiness to perform, and exercise performance.

## Methods

In a double-blind, crossover, randomized and placebo-controlled manner; 25 apparently healthy and recreationally active men and women ( $21.76 \pm 3.00$  yr,  $15.24 \pm 5.26\%$  fat,  $25.09 \pm 3.03$  kg/m<sup>2</sup>) volunteered to participate in this study and performed a Stroup-Color cognitive function test (CFT) and rated perceptions of readiness to perform on a visual analogue scale (RTP-VAS). Participants then ingested in a randomized and counterbalanced manner a dextrose flavored placebo (P); a pre-workout supplement (PWS) containing 3.0 g beta alanine, 2 g creatine nitrate, 2 g arginine AKG, 300 mg of N-acetyl tyrosine, 270 mg caffeine, 15 mg of Mucuna pruriens; or, the PWS with 20 mg of synephrine (PWS+S). Approximately 30 minutes following ingestion of the supplements, participants performed a second CFT, completed a RTP-VAS, and then performed 3 sets of 10 repetitions at 70% of 1 repetition maximum (1RM) on the bench press and leg press

with 2 minutes recovery between sets and 5 minutes recovery from exercise modes. Participants completed as many repetitions as possible during the final set. Following a 5-minute recovery, subjects also performed a 30-sec Wingate Anaerobic Capacity test on a cycle ergometer for determination of peak power (PP), mean power (MP), and total work (TW). Lastly, subjects performed a third CFT and RTP-VAS test. Participants repeated the experiment after a one week washout period with alternate supplements provided in a randomized and counterbalanced manner. Data were analyzed by repeated measure MANOVA or ANOVA and are presented as means  $\pm$  SEM from baseline. Consent to publish the results was obtained from all participants.

## Results

Repeated measures MANOVA analysis revealed significant interactions among supplementation groups in ratings of "I am optimistic about my future performance" ( $P: 3.70 \pm 0.95$ ; PWS:  $4.05 \pm 0.73$ ; PWS+S:  $4.21 \pm 0.63$ ;  $p < 0.01$ ), "I feel vigorous and energetic" ( $P = 3.35 \pm 0.91$ ; PWS:  $3.77 \pm 0.79$ ; PWS+S:  $3.89 \pm 0.74$ ;  $p = 0.01$ ), and "I have little muscle soreness" ( $P = 3.42 \pm 1.00$ ; PWS:  $3.81 \pm 1.36$ ; PWS+S:  $3.27 \pm 1.29$ ,  $p = 0.04$ ) 30 minutes after ingestion. MANOVA revealed an overall Wilks' Lambda time ( $p < 0.001$ ) and time  $\times$  group interaction ( $p = 0.003$ ) effect on the CFT results. Delta analysis revealed that mean changes in word ( $P = 0.64 \pm 1.1$ ; PWS:  $3.57 \pm 1.1$ ; PWS+S:  $7.40 \pm 1.1$ ;  $p = 0.001$ ), color ( $P = 1.41 \pm 0.7$ ; PWS:  $4.01 \pm 0.7$ ; PWS+S:  $5.08 \pm 0.7$ ;  $p = 0.002$ ), and word-color ( $P = 1.8 \pm 1.0$ ; PWS:  $3.28 \pm 1.0$ ; PWS+S:  $5.41 \pm 1.0$ ;  $p = 0.03$ ) were greater in the PWS and PWS+S groups than P with

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PWS+S word responses greater than PWS. There were no significant differences among groups in Wingate PP (P: 1,579±510; PWS: 1,502±561; PWS+S: 1,491±516 W; p=0.46), MP (P: 602±132; PWS: 596±145; PWS+S: 583±188 W; p=0.60), or TW (P: 17,663±4,605; PWS: 17,850±4,341; PWS+S: 18,203±4,658 J; p=0.49). MANOVA revealed significant Wilks' Lambda time and time x group (p<0.001) effects in bench press and leg press lifting volume in the final set of exercise. MANOVA univariate analysis revealed no significant Greenhouse-Geisser differences among groups in third set bench press lifting volume (P: 4,749±1,606; PWS: 4,889±1,614; PWS+S: 4,870 ±2,000 lbs; p<0.51). Leg press lifting volume differed among groups (P: 27,607±9,608; PWS: 28,905±9,859; PWS+S: 19,342±4,855 lbs; p<0.51) but PWS supplementation did not provide greater benefit than P.

### Conclusion

Ingesting a PWS and PWS with 20 mg of synephrine 30-minutes prior to exercise enhanced perceptions of readiness to perform and cognitive function with no significant effects on anaerobic capacity or isotonic lifting volume.

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