EXSC 420 “Research Methods in Exercise Science” Fall 2022 Methods Draft Template

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Subjects

Eight resistance-trained college-aged females will be subjected to the study. Recruits will be familiar with resistance training and their caffeine intake status at the time of the study. Prior to testing, subjects should be regularly exercising (no less than 150 minutes per week) and should be familiar with bench presses (able to lift 70-75% of their body weight). Subjects will be excluded from the study if they are excessive caffeine users, smokers, or recently suffering from an injury or illness. All subjects will be screened according to the ACSM Guidelines for Exercise Testing and Prescription (Liguory, et al., 2018). In order to recruit subjects for the study, we plan to primarily recruit via word of mouth and, additionally, place flyers around campus. The study protocol will be approved by university policies governing undergraduate research conducted only for instructional purposes. The study protocol will be verbally explained to the subjects who will also provide written informed consent prior to the experiment.

Design and Protocol

We will conduct a randomized double-blind crossover study in order to determine the effects 5 mg/kg of caffeine has on strength performance. There will be three sessions for each participant, with the purpose of the first session to test the subjects’ 1-RM. In the second and third sessions, the participants will do as many reps as they can at 70% of their 1-RM. One of the second or third sessions will be with caffeine and the other without caffeine. If the subject consumes caffeine on the second session, they will get the placebo on the third session and vice versa. The warm up protocol will be standard for all participants and will include a 10 minute treadmill walk at 3.5 speed and no incline. After this, the participants will do 10 reps at 25% of

their max, 8 reps at 50% 1-RM, followed by max their max reps at 70% of their 1-RM. After each set, the subject will rest for at least two minutes. Spotters will be placed on each side of the bar and water will be provided as needed. Participants will be asked to consume a control beverage or moderate amount of caffeine beverage before the 1-RM is administered. The caffeinated beverage will come in the form of a gatorade bottle with black tape on the exterior, preventing the subject from knowing what they are consuming. Participants will be instructed to refrain from alcohol, caffeine, and vigorous activity 48 hours prior to the trials. The study protocol is presented in Table 1.

Table 1. Protocol for a 2 trial 1 RM with 2 randomized treatments (caffeine vs. control)

Subject recruitment, informed consent, baseline descriptive measurements Formation of matched pairs for treatment order assignment F/C where F=Caffeine; C=Control	ID/Gender	Mass(kg)	Baseline Measurement	Session 1 Standardized warm up plus 1RM	Reps to Exhaustion	2-3 days	Session 2 Standardized warm up plus 1RM	Reps to Exhaustion
	1/F	60 kg	80 lbs	C	16		F	18
	2/F	68.18 kg	55 lbs	F	12		C	8
	3/F	55 kg	65 kg	C	-		F	-
	4/F	66.81 kg	115 lbs	F	12		C	6
	5/F	57.2 kg	65lb	C	11		F	15

Reps to Exhaustion: Full elbow extension to 90° elbow flexion is defined as one repetition at 70% of body weight on a Standard Bench Press. Instrumentation that will be used in measuring bench press reps is the 20kg Rogue Fitness Barbell (Rogue, Columbus OH), Hammer Strength

Olympic Flat Bench (Life Fitness: Rosemont, IL), and Troy barbell weights (Troy Barbell and Fitness: Houston, TX).

All continuous dependent variables will be examined for normality and homogeneity of variance. Bench press performance will be analyzed by dependent t-test. All data will be analyzed using IBM SPSS Version 22 (Armonk, NY). The criterion for statistical significance will be $\alpha=0.05$. Unless otherwise indicated, summary group values will be mean±SE.

References

Liguory, G., et al. (2018). *Acsm's guidelines for exercise testing and prescription*.

Martin, Norum., et al. (2020). Caffeine Increases Strength and Power Performance in Resistance-Trained Females During Early Follicular Phase. Scandinavian Journal of Medicine and Science in Sports, 30(11), 2116-2129.