

Study Protocol

Behavioral Mechanism of Energy Compensation with Exercise
NCT04651218

October 13, 2022

Visit 1 (week 1). The Study Coordinator will meet with each participant for a 30-minute orientation session. At this time, participants will have the study explained, questions answered, complete the necessary screening questionnaires (health history, PAR-Q+), complete an Accu-Check blood glucose test, and, if deemed eligible and interested, sign the informed consent. Upon enrollment, participants will also complete a food frequency questionnaire (DHQ-3), be assessed for body composition (BodPod), and have waist circumference measured. Participants will also be provided an ActiGraph accelerometer to objectively assess physical activity for the next seven days and scheduled for Visit 2 at least eight days later. Participants will be instructed not to purposely change dietary behaviors while enrolled in the study (i.e. start to diet).

Visits 2 and 3 (week 2 and 3). On the day of Visit 2, participants will record the specific foods, quantities, and time of day they consumed them prior to their testing visit. Participants will be instructed to eat the same foods at the same time of day prior to Visit 3 as they did prior to Visit 2. Visit 2 and 3 will be scheduled at the same time of day on the same day of the week where participants will be able to practice "usual" dietary behaviors, i.e. not on a holiday or a special occasion. Upon arriving to the LHBP exactly four hours post-prandial in the afternoon, participants will complete assessments for food reinforcement, attentional bias and inhibitory control for food cues before and twice after an acute bout of either exercise or sedentary activity, with one visit featuring exercise and the other visit featuring a sedentary activity. The order of the visits will be counterbalanced. Visual analog scales (VAS) will be performed for hunger and exercise enjoyment prior to each set of assessments. For female participants, these visits will occur while in the follicular phase, which will be assessed by a menstrual cycle questionnaire. Participants will wear the accelerometer to record physical activity during the washout period between assessment visits and be instructed to remain sedentary.

Acute Bout of Exercise. Participants will complete assessments of food reinforcement, attentional bias and inhibitory control before and after an acute bout of exercise during Visit 2 or visit 3 (depending on counterbalanced order). Participants will be provided a Polar A-300 heart rate monitor with smart-cal™ technology that factors the individual's sex, age, weight, activity level, and heart rate to produce an estimate of total energy in kilocalories (kcal) expended during the exercise session, with kcal expended displayed in real-time. Participants will engage in exercise on an elliptical ergometer (Octane Fitness ZR8) for the amount of time it takes them to expend 500 kcal

under supervision of a researcher in the laboratory. Participants will exercise at a self-selected intensity of at least 65% heart rate reserve (HRR), an intensity commonly prescribed for sedentary individuals beginning an exercise program. Based on previous studies conducted in our lab, 500 kcal of energy expenditure is attainable for even the most sedentary individual with exercise sessions lasting between 30 and 70 minutes depending on body mass and intensity of exercise. Prescribing the exercise bout on energy expenditure rather than duration or intensity will standardize the amount of total work being done across all participants. While both the intensity and duration of the exercise could be controlled, due to differences in body mass of the participants, either the exercise time or total work would still vary. An energy expenditure of 500 kcal is specifically used to ensure the exercise bout is of sufficient volume (intensity * time) to produce weight loss if included in a long-term program and to elicit a dopaminergic response. Participants will be permitted to drink 0.5 l of water during and after the exercise bout. Participants will take a brief 15-minute rest after completing the exercise session before repeating assessments for food reinforcement, attentional bias and inhibitory control for food cues (post exercise assessment 1). Participants will repeat these assessments 60 minutes after cessation of the exercise and sedentary activity bout (post exercise assessment 2).

Acute Bout of Sedentary Activity. Participants will complete assessments of food reinforcement, attentional bias and inhibitory control before and after an acute bout of sedentary activity (TV). Participants will watch TV for 60 minutes, choosing from a variety of television sitcoms (DVD) void of commercial advertisements that may feature food. Participants will have access to 0.5 l of drinking water during and after the test bout of TV viewing.