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Calories burned during HIIT exercise vs moderate exercise

Abstract

Purpose: The aim of this study was to determine if High Intensity Interval Training (HIIT) results in a higher energy expenditure and is more enjoyable when compared to moderate exercise. **Methods:** On two different days, ten college age men and women exercised on a treadmill at either 50% of their maximum heart rate for 20 consecutive minutes or 90% of their maximum heart rate for one minute, alternated by one minute of recovery walking, which was repeated 10 times for a total of 20 minutes of exercise. Heart rate and calories burned were assessed with a heart rate monitors. Assessment were continued during a 30-minute recovery period as participants sat quietly in a chair. PACES, a survey based on enjoyment of the exercise was also completed. **Results:** Moderate exercise burned an average of 139±40 calories while exercising and 64±15 calories during recovery. HIIT burned an average of 204±40 calories while exercising and 117±47 calories during recovery. The PACES score for moderate exercise was 94.1±14.2 while HIIT was 91.8±12.5, which was not statistically different and indicates no difference in enjoyment between the conditions. **Conclusion:** HIIT is the more effective way to burn more calories during exercise and after exercise given the same time period as moderate exercise.

Purpose

High Intensity Interval Training has become a very popular type of exercise because it can be done in a shorter time period with still burning as many calories at doing moderate exercise for a longer time period. The purpose of this study was to see if doing high intensity interval training (HIIT) would result in a higher energy expenditure both during and after exercising and if it is more enjoyable when compared to exercising at a moderate intensity.

Methods

10 college age participants (5 women and 5 men) ages 18-26 years old participated in this study at State Gym. The participants did a survey called the International Physical Activity Questionnaire based on their last seven days of physical activity. The participants ranged from inactive to health-enhancing physical activity (HEPA) active. They each had to perform two tests on the treadmill while their heart rate and calories were tracked using a heart rate monitor. Both tests had a five minute warm up and then 20 minutes of the designated test followed by a 5 minute cool down. The designated tests were exercising at 50% of their maximum heart rate (HR_{max}) or exercising at 90% of their HR_{max} . When exercising at 50% of their HR_{max} they exercised continuously at one speed for twenty minutes. When exercising at 90% of their HR_{max} they increased their speed for one minute and then went back down to the warm up pace for one minute. This was done for a total of ten times during the twenty minutes of exercise. After minutes 5, 15, and 25 during each test, the participant was asked their Rating of Perceived Exertion (RPE) based on the Borg Scale. After the exercise test, the participants' heart rate and calories were monitored for 30 minutes. After that, each participant did a survey based on enjoyment called Physical Activity Enjoyment Scale (PACES).

Participant t	Gender	Age	Height	Weight	Activity Level (IPAQ Score)	Predicted 50% HR	Predicted 90% HR
1	male	18	6' 1"	176	Inactive	139	184
2	female	23	5' 6"	132	HEPA	136	181
3	female	20	5' 2"	115	Minimally	131	181
4	male	18	5' 9"	140	HEPA	134	183
5	female	21	5' 2"	124	HEPA	132	186
6	male	26	6'	155	Minimally	121	169
7	female	22	5' 6"	160	Inactive	137	182
8	female	18	5' 5"	130	HEPA	137	183
9	male	22	5' 9"	180	Minimally	137	181
10	male	20	6'	171	HEPA	128	181

Results

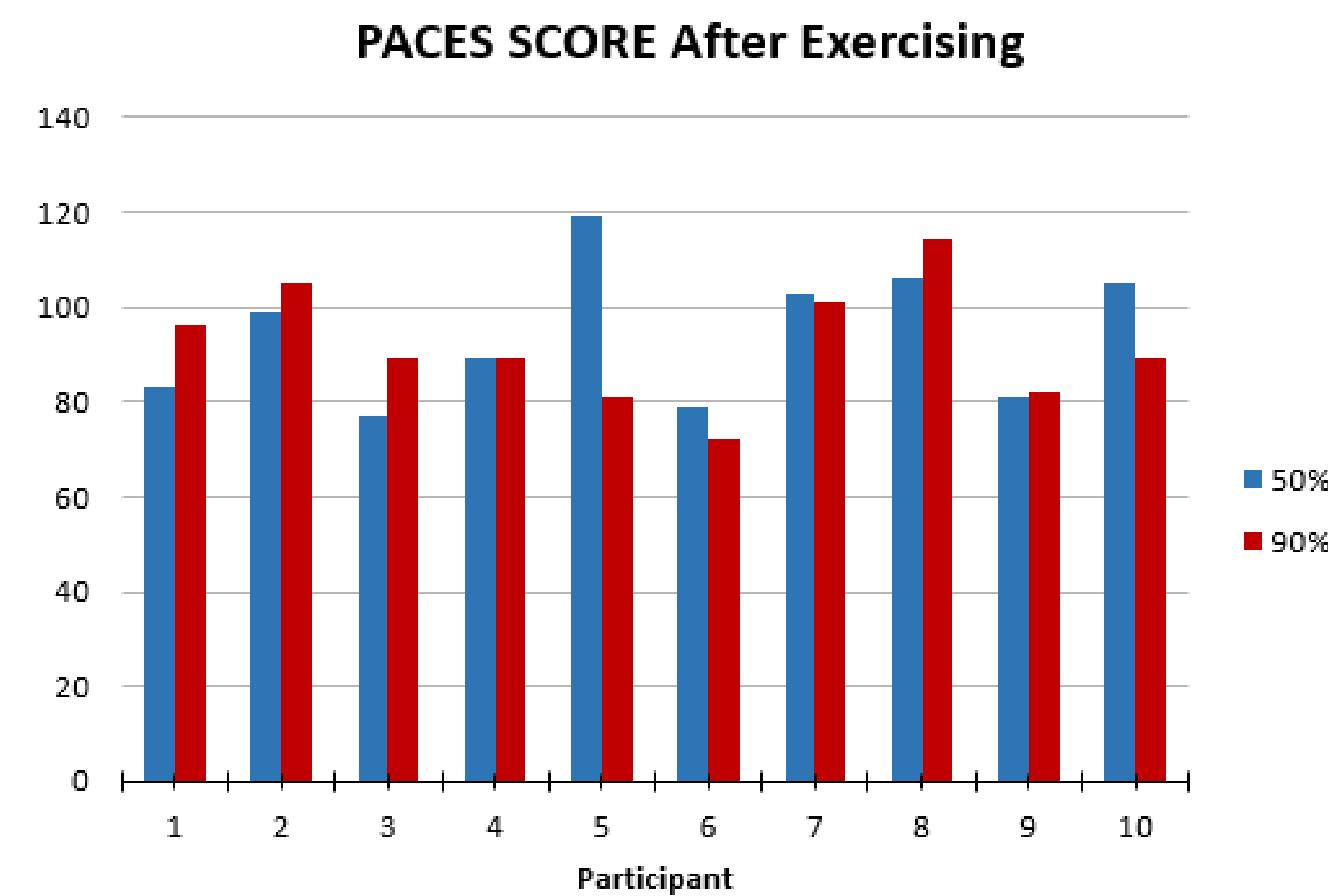


Figure 1. PACES scores after exercising for each participant at 50% and 90% of their heart rate max

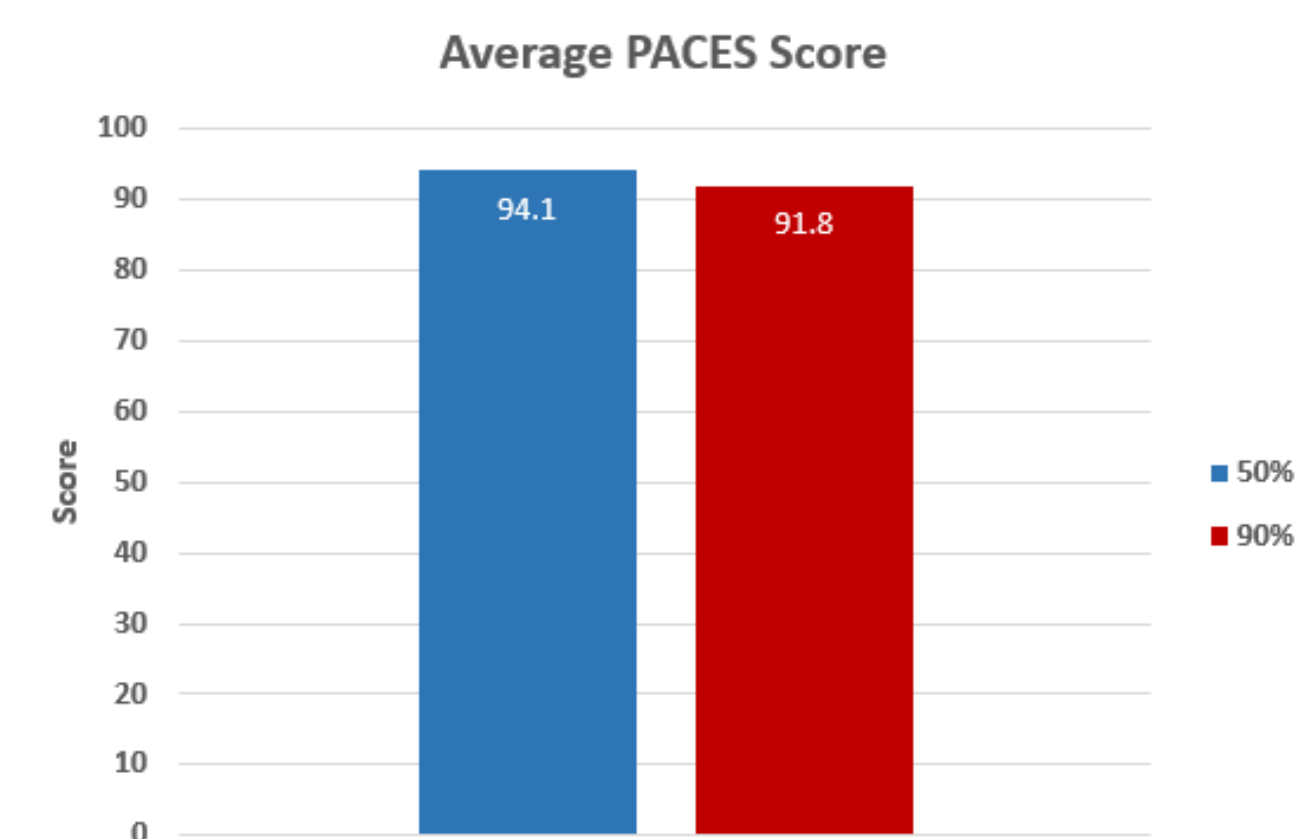


Figure 2. Average PACES scores after exercising at 50% and 90% of their heart rate max

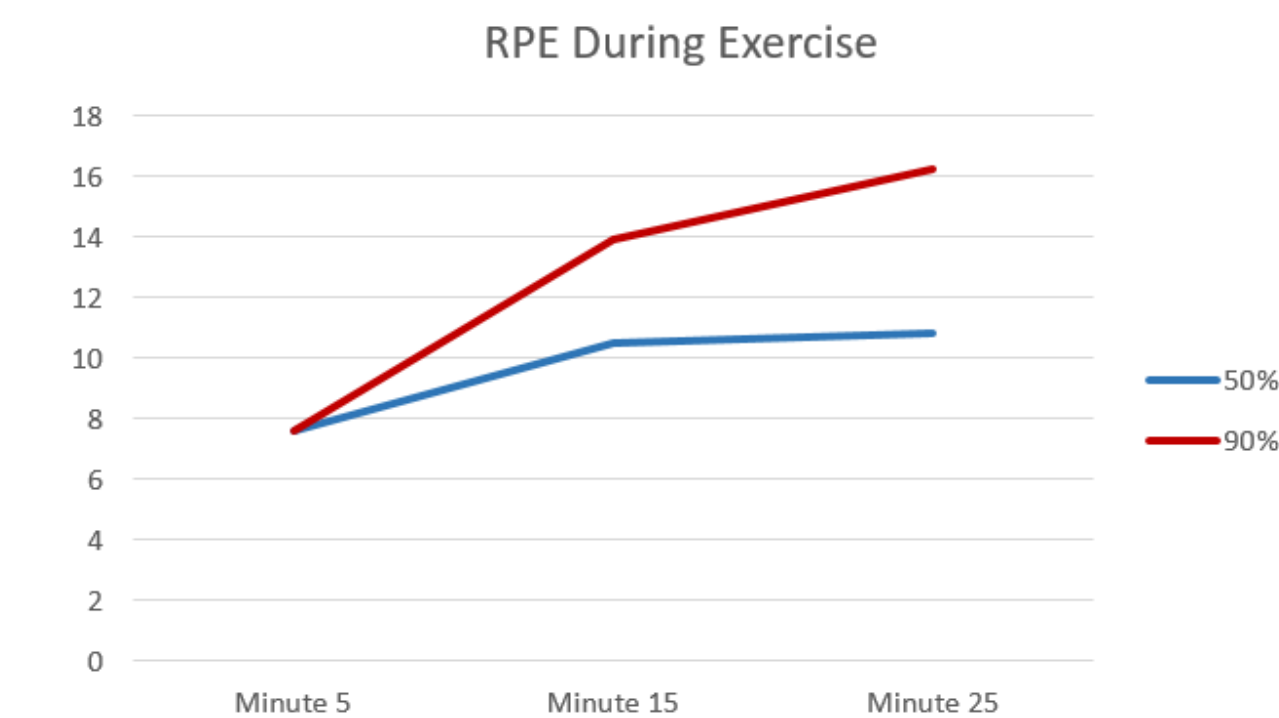


Figure 3. The rating of perceived exertion (RPE) at minutes 5, 15, and 25 during exercise.

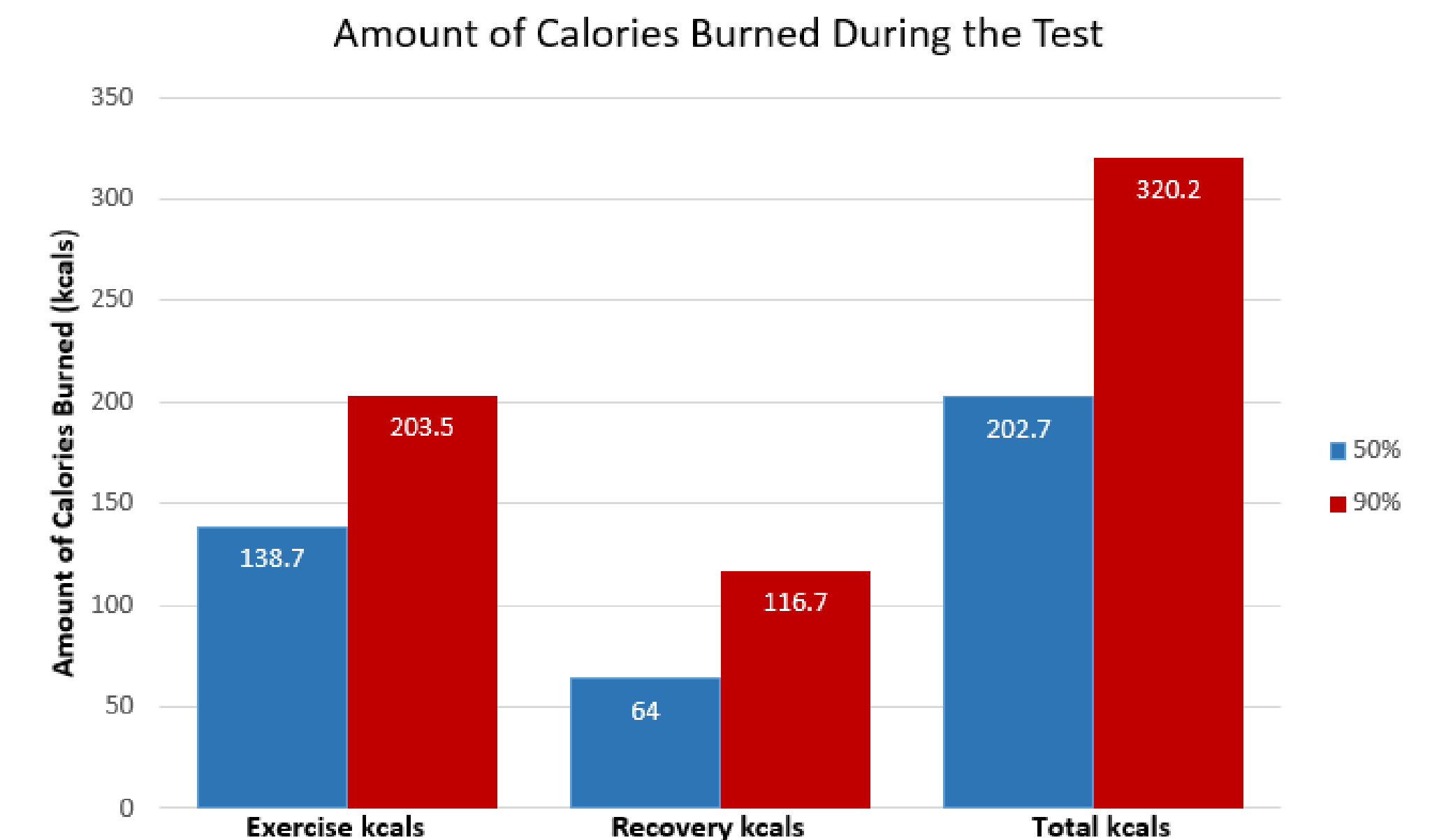


Figure 4. The amount of calories burned during exercise, 30 minutes for the recovery period, and the exercise plus the recovery period calories (total calories)

As you can see from figure 1 and 2, the PACES score for moderate exercise was 94.1±14.2 while HIIT was 91.8±12.5. These scores were not statistically different and indicates no difference in enjoyment between the conditions. Figure 3 shows that HIIT was perceived to be the harder test overall. In figure 4 you can see that moderate exercise burned an average of 139±40 calories while exercising and HIIT burned an average of 204±40 calories. During recovery, moderate exercise burned an average of 64±15 calories during recovery while HIIT burned an average of 117±47 calories during recovery. Overall, HIIT burned more calories when compared to moderate exercise.

Conclusion

- HIIT is more effective for burning calories during exercise.
- HIIT is more effective for burning calories for the thirty minutes post-exercise
- HIIT overall burns more calories compared to moderate exercise when exercising for the same amount of time.
- For this study, there was no statistical difference for enjoyment when comparing moderate exercise and HIIT