Heart Rate Lab Report Grading – updated Feb 28, 2026

- In general, ½ pt off for every spelling error and major grammatical error.
- ½ pt off for not labelling the sections as Abstract, Introduction, Methods, Results, Discussion (or Conclusion is fine), and Literature Cited.
- See example lab report after this guideline for an idea of what this report should look like.

Title = 2pt

- ½ pt for actual title of paper (that it's there)
- ½ pt for your name, date of lab, and Department of Biology, Francis Marion University, Florence SC.

Introduction = 10 pts

- 5 pts – You must provide some background about the things that can influence human heart rate. You can look through your course textbook, the information provided in the lab manual or go to some reputable web sites.
- 2 pts for including purpose of experiment. (Experiment was done to determine if exercise affected heart rate, and also to see if there was a difference in resting heart rate between men and women.)
- 2 pts for including hypothesis of experiment. (What do you expect to happen when comparing resting versus exercise heart rate for all students, and what do you expect to see when comparing resting heart rate between men and women?)
- 1 pts for including a properly cited reference within the introduction for your background information on things that influence heart rate. As a bare minimum, you must cite from the lab manual. ***See example lab report for how to cite your reference in the introduction.***

Methods = 10 pts

- 3 pts for including the total number of people in each group of the experiment. (There were 21 people total, divided into 7 men and 14 women.)
- 5 pts total for including the experimental design. (Subjects sat down and rested for five minutes, then measured their heart rate either by feeling for their radial or carotid pulse or by using a heart rate digital monitor. Hear rate was recorded as beats per minute. Subjects then exercised for 2 minutes (leg bends) and then re-measured their heart rate. You can cite the lab manual here for the methods used.
- 1 pts for stating that data was entered into and summarized using Excel
- 1 pt for stating that the data was analyzed using t-tests.

Results = 16 pts

- 2 pts for reporting the average heart rate for all students at rest and after exercise (2 values)
- 2 pts for reporting the average resting heart rate for men and for women (2 values)
- 2 pts for reporting the T-test P-value comparing resting versus exercise heart rate for all students combined.
-2 pts for reporting the T-test P-value comparing resting heart rate between men and women.
- 1 pts for stating that exercise heart rate was higher than resting for all students, and that there was no difference in resting heart rate between men and women.
- 1 pts for including data sheet (this can be embedded within Results or simply stapled at the end of report)

Discussion = 10 pts

- 4 pts for explaining why you think that exercise heart rate was higher than resting heart rate. (What is the biology behind why the heart rate went up?)
- 4 pts for explaining why you think that resting heart rate was not different between men and women. (Remember what we talked about in lab after finding out these results.)
- 2 pts for giving a possible source of experimental error. (Remember what we talked about in lab)

Literature Cited = 2 pts

Please list all sources you used for the background information in your introduction. Below are some examples of how to cite references in this section. ***PLEASE DO NOT USE AI as your background information. It is not citable!***

See example lab report below.

The Effect of Exercise Duration on Heart Rate

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Introduction

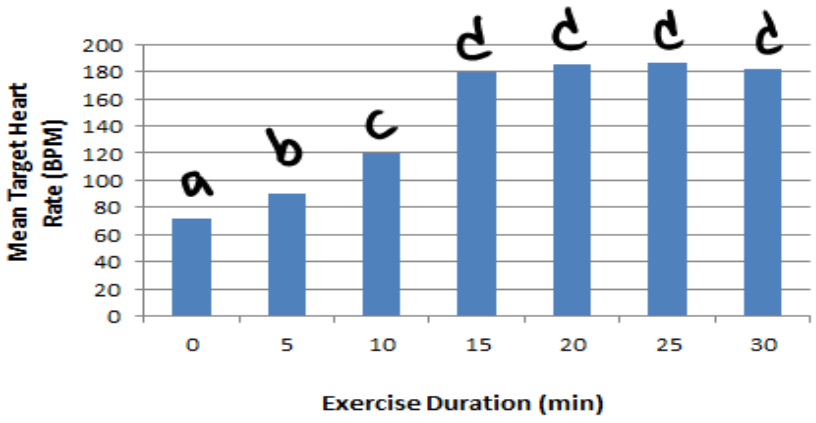
Heart rate changes in response to many factors, including exercise, stress, fear, cardiovascular health, pharmacological agents, and changes in blood pressure, among many other reasons (All About Heart Rate). For example, if a person's activity levels increase, their muscles and brain will increase their demands for oxygen (O2) and glucose in the bloodstream in order to fuel the activity. As activity levels increase, the skeletal muscles and brain start using up available blood O2 faster, resulting in a momentary drop in blood O2 levels. In response to lower O2 levels in cerebral spinal fluid and blood, chemoreceptors for O2 in the medulla oblongata, and in the aortic arch and carotid sinuses, sense the change, and the medulla responds with a sympathetic stimulation to increase heart rate.[1] The increased heart rate increases cardiac output so that more blood reaches the lungs, where it picks up O2. More O2 is then available for skeletal muscles and the brain to sustain the exercise (All About Heart Rate). This elevated heart rate continues as long as the O2 demand, by muscles and the brain, remain high (Goodenough and McGuire, 2016). One of the most common ways to measure the body's demand for O2 during exercise is by determining the target heart rate.[3] In this study, I will examine the target heart rate of 40 student athletes, ranging in age from 20 – 22 years old, in response to varying exercise durations. I propose that as exercise duration increases, target heart rate will increase proportionally.

Methods

Forty student athletes, from Francis Marion University, Florence, S.C., ranging in age from 20 – 22 years old, participated in the experiment. This sample size consisted of 20 male and 20 female participants with no known health problems. Heart rate was measured through manual palpation of the radial artery pulse. For each subject, heart rate was calculated by measuring pulses for 15 seconds and then multiplying that by 4 to get beats per minute (bpm). Subjects exercised on a stationary bicycle for 5, 10, 15, 20, 25, and 30 minutes measuring their heart rate at each time interval. Data was entered into an Excel spreadsheet, summarized, and analyzed using an ANOVA test (Barbeau et al., 2016). *[When there are more than 2 authors for a source, use the last name of first author followed by "et al." which means and others.]*

Results

Mean target heart rate was 72, 90, 120, 180, 185, 186, and 182 bpm for exercise durations of 0, 5, 10, 15, 20, 25, and 30 min respectively. The One-Way ANOVA P-value was <0.00001, indicating that heart rate was different among the time intervals. Pair-wise contrasts showed that mean heart rate increased significantly from 0, 5, 10, to 15 minutes, but then remained consistent between 15-30 minutes.



Discussion

My results indicate that, in athletic students between the ages of 20 – 22 years old, there was an increase in average heart rate during the first 15 minutes of exercise, followed by a plateau of heart rate for the remainder of the exercise duration. This shows that the target heart rate increased during the early stages of light exercise and then remains high, without significant further increase, for the remaining time. Physiologically, the body has met its overall demands for O2 within the first 15 min of light exercise. This indicates that, at this particular level of exercise intensity, mean target heart rate plateaus at approximately 180 bpm. Future studies could elaborate on these findings to show whether target heart rate increases above 180 bpm in response to greater exercise intensity over time.

As with any experiment, there were possible sources of error, which could include inaccurate measuring of heart rate, or variation in the intensity of how individual subjects exercised. For example, some subjects could have bicycled more slowly over the entire duration while others might have engaged in more strenuous bicycling.

Literature Cited

Barbeau, T., Bauer, V., Camper, J., Eaton, E., King, P., Knowles, T., Malakauskas, D., Pike, L., Pryor, G., Scarborough, D., Shannon, T., Turner, L., and Wrighten, S. (2016). Human Biology Laboratory Manual (Bio 104L), 9th Edition, Pg 9-17.

Goodenough, J. and McGuire, B. (2016) Biology of Humans: Concepts, Applications, and Issues, 6th Edition. Pearson Co. Pgs 8-10

All About Heart Rate. https://www.heart.org/en/health-topics/high-blood-pressure/the-facts-about-high-blood-pressure/all-about-heart-rate-pulse.