Hi, my name is Hannah Angelella and I will be presenting my research today entitled the Efficacy of a Motivational Video on Heart Rate, RPE, and Total Work Performed During Stationary Cycling.

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The purpose of this study was to compare the effects of watching a motivational video versus a calming video while cycling. The motivational video used was Tour de France 2018 Best Moments and the non-motivational video used was Bob Ross Mystic Mountains Season 20 Episode 1.

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I'm going to start off by providing you with some background information on physical activity and motivation.

First, implementing PA into an individual's lifestyle remains one of the primary recommendations in prevention against CVDs, obesity, and premature death.

The recommended amount of PA to maintain a healthy lifestyle for adults ages 18-65 is 150 minutes of moderate intensity exercise per week, also commonly defined as 30 minutes per day 5 days per week. OR 60 minutes of vigorous intensity exercise per week, commonly defined as 20 minutes per day 3 days a week.

Despite PA public health recommendations regarding the health risks resulting from inactivity, participation rates have declined in the last fifty years due to a variety of reasons.

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A rise in this sedentary lifestyle is most often attributed to 5 reasons:

Lack of motivation or boredom during PA, not enough time to participate, the financial cost of exercise, the desire to avoid feeling soreness or pain, and being unsure of what to do once ready to start physical activity. In regard to that lack of motivation point, another study found that peer influence can enhance or deter an individual's PA levels depending on that peer's own actions and behaviors. So basically, if someone is jogging on the treadmill next to you, you might be motivated to jog at a faster pace to keep up with them.

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In an effort to increase participation in PA, several studies have manipulated several common barriers to physical activity.

For example, numerous studies investigated the effects of visual and auditory stimuli on exercise performance, usually running, and enjoyment, and they all demonstrated similar findings that exercising with both or at least one stimulus compared to no stimuli at all was preferred.

While most of the studies I looked into tested running as their exercise of choice, a few studies did test the effects of audiovisual stimuli with cycling. However, the cycling was most often set at a 70% VO2max or a high-intensity pace and subjects watched visual stimuli ranging from videos of themselves cycling, tv sitcoms with commercials, self-selected movies, or music videos. These studies, while producing interesting results, did not make their findings applicable to a general population that is typically sedentary.

One of the most common dependent variables in the majority of these studies was RPE. Several of them found that ratings of perceived exertion significantly decreased as a result of auditory and visual stimuli when compared to control measurements.

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Given these findings and the increased prevalence of video-based technology and internet access available in gyms and homes, it may be advantageous to reevaluate the impact on exercise performance and perceived exertion of video motivation during physical activity. While previous studies allowed subjects to view television, themselves cycling, or music videos, none tested the effect of a subject viewing a model, or essentially an elite athlete, performing the same exercise. This idea stems from a psychophysiological effect in which observing a model performing the same exercise as the individual motivates the individual to compete with the model and perform better.

Another key takeaway I found from researching various studies is that most of the results found could not be translated into easily accessible recommendations for all populations

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Therefore, based on the purpose of this study to compare the effects of watching a motivational video versus a non-motivational video while cycling, it was hypothesized that the

motivational test would have increased exercise heart rates, total mileage, and lower perceived ratings of exertion compared to the same exercise test during the non-motivational video.

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Four males and six females volunteered to participate in this study.

Age restrictions placed on the study required subjects to be within 18-50 years of age and all ten subjects were recruited from the University of Lynchburg student, faculty, ad staff population and completed the study.

Varsity collegiate athletes were excluded from this study and all subjects who volunteered were required to be recreationally active at least three times per week for at least 30 minutes per day and possess full auditory and visual capabilities.

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A randomized within-subjects design was used to administer the study conditions. The independent variable was the type of video being watched during the exercise trial and the dependent variables were heart rate, RPE, and total mileage.

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Subjects were required to attend two sessions. The first session began with the subject arriving at the exercise physiology lab and completing an informed consent and a PAR-Q. Then, subjects were familiarized with the BORG RPE scale. They were informed that the ranges of exertion are quantified from 6-20, from little intensity to maximal intensity. A score of six represent the feeling one would have while resting, while a score of 20 indicated the maximal amount of exertion possible. Subjects were informed that during warm-ups and cool-downs, they should aim to cycle at an intensity defined as 10 on the BORG RPE scale and during the twenty-minute test, aim to cycle at a moderate intensity defined as an RPE of 12-14. Subjects were also informed that when reporting their RPE during each data collection point, they should report accurately and not feel obligated to only report a number defined as moderate on the scale.

The following measurements were then assessed in the lab: age and sex, which were reported via verbal inquiry. Ht was measured using a wall-mounted stadiometer and reported in meters. Wt was measured using a digital scale and reported in kilograms. Body fat was measured using a handheld BIA device and reported as a percentage.

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Subjects performed one of two exercise trials depending on random assortment. The non-motivational test began in the Drysdale Gym with subjects warming up for two minutes at an RPE of 10 prior to performing the exercise test at a moderate intensity for 20 minutes. The subject wore a heart-rate monitor around their chest and noise-canceling headphones during the test. The headphones were paired to a tablet on which the Bob Ross video played. The tablet rested on the bike's dashboard to also cover the dashboard's speed and resistance levels displayed. However, subjects were able to control their own intensity through a knob situated below the dashboard while they cycled. RPE and heart rate were recorded during minute 1 of the 2-minute warm-up, at minutes 5, 10, 15, and 20 of the exercise test, and at minute 1 of cool-down. Total mileage was recorded based on the bike's dashboard report at the completion of the 2-minute cool-down and was not shared with the subject in order to prevent any influence over the next exercise session.

The motivational video exercise test was performed using the exact same procedure as described on the prior slide but playing Tour de France 2018 Best Moments as opposed to Bob Ross painting.

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As previously mentioned, the instrumentation consisted of a Tanita Digital Scale, an Omron handheld bioelectrical impedance device, a SECA wall-mounted stadiometer, the BORG rating of perceived exertion scale ranging from 6-20, Cowin E8 Bluetooth noise-cancelling headphones, and Apple iPad, a Polar FT1 heart rate monitor, chest strap, and watch, Youtube Premium, and a SportsArt Indoor Cycle C530.

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And to reiterate, the videos viewed were tour de France 2018-Best Moments, and Bob Ross Season 20 Episode 1 Mystic Mountain. Both of which were streamed through Youtube Premium to prevent commercials.

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SPSS IBM Technologies version 26 was used for all statistical analyses. A paired samples t-test, a 2x6 factorial ANOVA, and demographics were all reported in the following tables.

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Demographics presented were height, weight, body fat, and age in a mean with a standard deviation as seen here in Table 1. As you can see, the age range was quite small across the sample size.

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A paired samples t-test was conducted for the mean differences between the two treatments for mileage, heart rate mean, and RPE mean. As you can see, the motivational condition had a non-significant difference in means with a small effect on both heart rate and RPE with both p values being greater than 0.05. I was happy to see however, that the heart rates did average about 11 bpm higher than the non-motivational video average despite it not being significant. In addition, there was a significant difference in means with a medium effect on mileage for the motivational condition with the p value being 0.004. So, based on this table, we can see that the first hypothesis was mostly supported. Motivational condition heart rate averages and total mileage average from all ten subjects were higher than the non-motivational HR and mileage averages. The significant difference in mileage could be attributed to subjects feeling more motivated during the motivational test, and consequently pedaling further during the same time period as the other trial. I did convert the mileage into miles per hour to see how the speed differed between the two trials and found that subjects pedaled an average of 20.025 mph during the motivational test compared to 17.375 mph during the non-motivational test. A few subjects even had as much as a 5 mph increase from non-motivational to motivational test speeds.

The second hypothesis that the RPE would decrease during the motivational test was not supported as the RPEs were almost exactly the same in both tests. So, this actually shows that subjects were able to bike a further distance without perceiving an increase in effort during the motivational condition.

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A 2x6 Factorial ANOVA was conducted for heart rate and RPE from both conditions compared across time. What we can see from this table is that there was a significant main effect for time with heart rate and there was a significant main effect for time with RPE. However, there was

no significant difference between video type. So essentially, this shows that the exercise trial did what was expected and continued to increase heart rate and RPE significantly from one time point to the next.

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So, previous studies testing conditions with only visual stimuli consisting of television shows with commercials, movies, etc, found that mileage significantly increased in cycling or running tests from control test with no visual aid to test with visual aid. My study was able to take that research a step further and determine whether mileage significantly increased from a visual stimuli to a motivational cycling visual. And it did as we saw in Table 2 on a prior slide.

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Many extraneous factors were controlled for in this study including covering the dashboard of the stationary bike to prevent influence of quantitative data on subjects' effort. In addition, subjects wore noise-cancelling headphones to prevent distraction from other people in the Drysdale Student Gym. Lastly, Youtube Premium was purchased in order to provide subjects with a twenty-minute video with no commercials, which could have potentially distracted subjects from the test.

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However, some limitations to this study which could not be controlled for included subjects' sleeping habits, caffeine intake, and medications. While a better exercise performance is attributed to the motivational video subjects watched in this test, there is a chance that a subject had more energy, better sleep, and/or more caffeine on the day that they participated in the motivational test. A second limitation of this study was that no subject can be forced to watch a video. Therefore, some subjects might have not paid attention to videos in their entirety, which might have influenced results.

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Future studies wishing to replicate the findings of this study should aim to test a larger population size upwards of 40 to 50 subjects as well as test a larger sample of ages in order to obtain more generalizable results. Secondly, future studies should examine whether the motivational video's activity impacts performance. For example, would a subject who was

cycling perform better not only watching a video of another cyclist, but also while watching a runner win a marathon? Finally, it would be interesting to investigate whether the effects of motivational videos while cycling have the same effect on special populations such as individuals with diabetes or obesity.

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So, to sum up, the purpose of this study was to compare the effects of a motivational cycling video to a non-motivational video on subjects' intensity, performance, and perceived effort. The present study found that the motivational trial performed longer, so more mileage cycled, for the same amount of time with near similar heart rates and perceived exertions. Therefore, it can be concluded from these results that a motivational video, while not significantly impacting intensity and perceived effort, enhances performance.

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And finally, these results can be put into practice particularly in increasing the exercise volume for a general population. Many individuals who lack the motivation to exercise could benefit from implementing a motivational cycling video into their cycling session to improve performance. Although further research is needed, the findings of this study contribute important knowledge to the exercise physiology community.