

The Effects of Listening to High Beat per Minute Music during a Cardio Workout on Body Satisfaction 1

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The Effects of Listening to High Beat per Minute Music during a Cardio Workout on
Body Satisfaction

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Abstract

This study examined the effects of listening to high beat per minute music during a cardio workout on an individual's body image satisfaction. A total of 17 participants (9 females and 8 males) performed two 10-min cardio sessions on a treadmill listening to either a high beat per minute music playlist or low beat per minute music playlist. Measures of body satisfaction, perceived exertion, heart rate, and mph were taken for each participant in each session. No significant effects or interactions were found for listening to high beat per minute music on body satisfaction compared to listening to low beat per minute music. There were also no significant gender differences that were found. Measures of perceived exertion, heart rate, and mph were also not significantly different from the low beat per minute playlist condition to the high beat per minute playlist condition.

Have you ever noticed that listening to music while working out tends to make the workout seem not as challenging or not as exerting? Have you ever noticed that upon completion of an intense cardio workout you feel much more positive about yourself?

This seems to be the case for most individuals according to personal experiences. Regular exercise is seen as a positive and necessary addition to an individual's daily activities. It is recommended to do a cardiorespiratory work out 3 to 5 days per week. "This work out should be 30 or more minutes of moderate-intensity physical activity on most, if not all, days" (Murray 2007). It is well established that regular exercise is known to have a host of health-related benefits such as improved cardiovascular fitness, aid in the maintenance of healthy joints, lower blood pressure, and reduce the risk of cardiovascular disease (US Department of Health and Human Services, 1996). Regular exercise also has its fair share of psychological benefits, including lower levels of body dissatisfaction, lower levels of depression and anxiety, and positive changes in mood (Hausenblas & Fallon, 2006; Stephens, 1988; Reed & Ones, 2006).

Despite the positive relation between exercise and both physical and psychological benefits, only 34.8% of U.S. adults aged 18 years and over engaged in regular leisure-time physical activity in 2010 (National Health Institute Survey, 2010). A considerable amount of research had been done on discovering variables that can increase the likelihood and intensity of exercising. One of the most well documented variables being the addition of listening to music while exercising. "Music can have positive effect on enjoyment of and motivation for performing physical exercise, especially for recreational exercisers who work out at submaximal intensity for health purposes" (Wijnalda, Pauws, Vignoli, & Stuckenschmidt, 2005). The positive effects of listening to

music while working out have been reported and applied in a variety of different settings. For example Thornby, Haas, & Axen, (1995), found that the amount of work done, the overall time spent working out, and heart rate were all significantly higher when listening to music than in the presence of no music. Szmedra & Bacharach (1998) also found that perceived exertion measures were also high in the no music conditions, thus portraying the fact that listening to music while working out can serve to distract the individual for the workout itself. This resulting in the individual working out harder and for a longer period of time.

The reported beneficial relationship between exercise and music has already resulted in the development of consumer products. For example Nike+® is a sensor embedded in Nike® shoes that transmits information from individual's shoes to their Apple iPod®, which is then transferred to their computer. During the training, the iPod® displays time, distance and calories burned. Nike+® also helps keep track of the music one is listening to and what the pace of the music is. With the recent advances in exercise technology, such as Nike+® the correlation between the pace of music and exercise has become a major topic of interest. A moderate amount of research has also been done on how high beat per minute music affects an individual's workout rate. "Fast-paced music is more arousing and may therefore produce higher level of performance" (Karageorghis et. al., 1999). Brownley, McMurray, & Hackney (1995) compared exercise performance in fast and slow music conditions and found that participants who were not regular exercisers or were untrained exercisers reported a more positive affect when listening to fast music during both low and high intensity exercise.

With the recent advances in research connecting exercise and music and the increase in the use of exercise technology, one can't help but wonder whether or not this increased attention on exercise and overall health affects the society at an individual level; namely, when it comes to body image satisfaction. To help answer this question, within the last decade there has been an increase in psychological research done on exercise and body satisfaction and dissatisfaction. Body dissatisfaction is defined as “a person’s negative thoughts and feelings about his or her body” (Grogan 4). “Many women in western societies are dissatisfied with their bodies particular their stomach, hips and thighs” “These ideas of thinness and dissatisfaction with their bodies have caused women to have obsessions and fascinations with working out and the use of exercise videos (Grogan 80)..

Additionally, a study conducted in 2006 found that, “exercising in a private, unmirrored laboratory environment resulted in more favorable feeling state responses among women” (Focht & Hausenblaus, 2006). McInman & Berger (1993) conducted a correlational study on the impact of exercise on body dissatisfaction in a naturalistic setting and found that just 60 minutes of aerobic exercise was associated with increases in body satisfaction. More recently, a study conducted in 2009 found that exercise has positive effects on body dissatisfaction and affect for high frequency exercisers (LePage & Crowther, 2009).

It was not until the 1980’s that the study of body image satisfaction started expanding to the male spectrum. When it comes to the male idea of the “perfect” body, “There is a general consensus that most men aspire to a muscular mesomorphic shape characterized by average build with well-developed muscles on chest, arms, and

shoulders, slim waist and hips rather than an ectomorphic (thin) or endomorphic (fat) build” (Grogan 81). Grogan also found that body dissatisfaction in women usually relates to feeling overweight, but in men it can relate to feeling underweight or over weight. Although there has been a relative amount of literature done on male body image satisfaction, there has not been a significant amount done on male body image satisfaction in relation to exercise. This is one aspect the present research highlights.

As noted above, exercise has a positive effect on body satisfaction and listening to music while exercising has been found to increase an individual’s intensity and performance, especially if that individual is listening to high beat per minute music. The present study attempted to ascertain if listening to high beat per minute music during a cardio workout could increase one’s body image satisfaction: If listening to high beat per minute music during a workout serves to increase the intensity and duration of the workout and exercise in general serves to increase an individual’s body satisfaction, perhaps listening to high beat per minute music during a cardio workout can serve to enhance the intensity of workout out, thus having a direct effect on individuals body image satisfaction. After an extensive literature review no documented research was found connecting the two variables above.

In light of the relative scarcity of this type of research, the present study also examined the effects of listening to high beat per minute music during a cardio workout on a variety of dependent variables, including heart rate, perceived exertion, and performance. The present study further explored this relationship in an experimental-laboratory setting. Participants were required to run on a treadmill for 10 minutes in two separate sessions listening to either high beat per minute music or low beat per minute

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music. Along with female participants, male participants were of particular interest due to the lack of research done on males, exercise, and body satisfaction. It was hypothesized that listening to high beat per minute music during a cardio workout would result in an increased heart rate, high levels of body image satisfaction, increased performance (higher mph), and a lower rating of perceived exertion.

Method

Participants

A total of 17 participants (9 females, 8 males) between the ages of 18 and 21 years participated in this study. Participants were obtained through a convenient sample of undergraduate students at Hanover College using a sign-up sheet. The majority of participants were Caucasian.

Materials

The study took place in the Kinesiology and Integrated Physiology (KIP) lab at Hanover College. All running trials were performed on a treadmill in the KIP lab. During the running trials each participant's time and pace were recorded for each minute using the treadmill display, but the display was covered so that only the researchers were able to access the data. Heart rate was monitored with a Polar (beat) heart monitors, which were used to make note of each participant's resting and maximum heart rate. Participants were with an informed consent [see Appendix 1 Exhibit A] and a pre-assessment survey prior to the beginning of the first condition. The pre-assessment survey included questions such as, "Do you play a Varsity Sport at Hanover College? If yes, which?" and "How often do you exercise per week? These pre-assessment questions served to help us to decide which mile per hour range to direct the participants to attempt to achieve [see Appendix 1 Exhibit B] (Kurutz 2008).

The high beat per minute and low beat per minute playlists were distributed to the participants via an iPod. It should be noted that the two playlists used were created in the Apple computer program "Djay." The participants were asked to bring their own

headphones, but if they forgot, an extra set of Apple headphones were distributed. Both playlists consisted of the same five genres played in the same order: pop, alternative rock, electronica, hip-hop, and reggae. The purpose of having five different genres in each playlist was to control for the variety of music tastes within our participants and also served to keep participants from becoming bored or unmotivated due to the choice of music being played. Each playlist included five songs that played for approximately two minutes each, resulting in a 10 minute long playlist condition. The thresholds for what was considered to be high beat per minute music and low beat per minute music was found in *The New York Times* article [They're Playing My Song. Time to Work Out by Kurutz \(2008\)](#) [see Appendix 1 Exhibit C]. In light of these thresholds the high beat per minute playlist music consisted of songs that have 147 or more beats per minute [see Appendix 1 Exhibit D]. The low beat per minute playlist music consisted of songs that have 120 or less beats per minute [see Appendix 1 Exhibit E].

Immediately following each condition every participant completed a Body Image Satisfaction Questionnaire (Grogan 2008) and a 15 point Perceived Exertion Scale (RPE) (Borg 1982). There were two gender specific BIS Questionnaires distributed. The Female Body Image Satisfaction Questionnaire was obtained from Grogan, 2008 [see Appendix 1 Exhibit F]. The Male Body Image Satisfaction Questionnaire was obtained from Grogan, 2008 [see Appendix 1 Exhibit G]. The 15 Point Borg Physical Exertion Scale [see Appendix 1 Exhibit H] summarized exertion levels between rest and maximum effort (6 to 20). Multiple studies have demonstrated the reliability and validity of this measure for assessing the perceived exertion after a work out (Edworthy & Waring,

2008). The debriefing form was given to participants after having completed both the high and low beat per minute conditions [see Appendix 1 Exhibit I].

Procedure

As stated above, this study took place in the Kinesiology and Integrated Physiology (KIP) lab at Hanover College. This study was a within subjects design and all participants were counter balanced between the two conditions to help with control. An informed consent was handed out to participants prior to the first condition as stated above. This informed consent included that the participants were free to withdraw from the study at any time, assured confidentiality, and that this study had been approved by the Hanover College Institutional Review Board (IRB). Following the informed consent, participants completed the pre-assessment and were informed that they will complete two ten-minute cardio treadmill sessions.

Before each trial the heart rate monitor was attached around the participants' chest and after a 5-min rest period the heart rate was recorded by the experimenter as a baseline measure. Participants were then handed an iPod with either a high beat per minute music playlist or a low beat per minute music playlist, depending on which condition they were participating in. Once on the treadmill, participants were informed that they were not allowed to look at the treadmill display to see the time or their mph, but they were allowed to run at any pace they feel comfortable with and they were allowed to change this pace during the trial to match their comfort level if need be. Participants were also informed that they were allowed to change the volume of the music playing, but they were not allowed to change the song. During the 10 minute treadmill session the experimenters recorded on an excel data sheet the participants heart rate and mph for

every minute. Additionally, participants did not receive any verbal encouragement to increase or decrease their performance.

After completion of each trial participants were required to fill out the 15 Point Borg Physical Exertion Scale and the gender specific Body Image Satisfaction Scale. Once done with the first trial participants were then asked to return one week later to complete the second trial. The second trial followed the same procedures as the first trial, the only difference being that participants were given a debriefing form at the end of the second trial. This debriefing form explained the purpose of the study and gave the participants the experimenters email address in case they had any questions or concerns.

Results

We expected to find that when listening to the high beat per minute (BPM) music playlist during a cardio workout versus a low beat per minute (BPM) playlist individuals would display an increased heart rate, higher levels of body image satisfaction, lower rating of perceived exertion, and run at a faster pace (mph). To test this hypothesis all results and analysis were divided by high beat per minute condition variables and low beat per minute condition variables. Differences in gender were also explored in data analysis.

Body Image Satisfaction

The Body Image Satisfaction survey consisted of 15 items. Questions 1-3 and 8 were rated on a 1-8 scale depending on which letter figure they wrote down for each blank (Figure A = 1, Figure H = 8). Questions 4-7 and 11-15 were rated on a 1-2 scale and questions 9 and 10 were rated on a 1-3 scale. Once all the ratings were found an overall

average was found for each participant in the high beat per minute condition and low beat per minute condition.

A 2x2 (BPM condition; gender) for body satisfaction; body image satisfaction questionnaire) ANOVA was first carried out. The analysis revealed no significant main effect for gender, body image satisfaction, or interaction between the bpm conditions. To get better power, analyses were then carried out collapsing across gender. A BPM condition by body image satisfaction questionnaire (BS)) ANOVA was then carried out. This analysis also revealed no significant main effect or interactions for differences the beat per minute music playlist condition and body image satisfaction. Results for the Low BPM x BS revealed ($F=0.094, p=0.764$) with a mean of 3.194 and a standard error mean of 0.0534. Results for the High BPM x BS revealed ($F=0.01, p=0.92$) with a mean of 3.2265 and a standard error mean of 0.577. (see Appendix 2 Graph A).

Physical Exertion

A 2x2x1 (BPM condition; gender; physical exertion) ANOVA was original carried out. The analysis revealed no significant main effect for gender and body image satisfaction. To get better power, analyses were then carried out collapsing across gender. A 2x2 (BPM condition; physical exertion (PE)) ANOVA was then carried out. This analysis also revealed no significant main effect for differences in the beat per minute music playlist conditions and physical exertion. Results for the Low BPM x RE revealed ($F=0.140, p=0.713$) with a mean of 13.412 and a standard error mean of 0.522. Results for the High BPM x PE revealed ($F=0.113, p=0.742$) with a mean of 13.647 and a standard error mean of 0.4017. (see Appendix 2 Graph B).

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Heart Rate & MPH

T-tests were run to find the mean and the standard error for individual heart rate and mph averages for both conditions, analysis were kept gender specific in order to see if there were differences between the genders. There was a slight increase in the average mph for both males and females between the two BPM conditions, but not enough to be significant. The average mph for the low beat per minute music condition in males (M=6.2) and the average mph for the high beat per minute music condition in males (M=6.4) [see Appendix 2 Graph C]. The average mph for the low beat per minute music condition in females (M=5.9) and the average mph for the high beat per minute music condition in females (M=5.8)[see Appendix 2 Graph D]. The average heart rate for the low beat per minute music condition is males (M= 162) and the average heart rate for the high beat per minute music condition is males (M= 160) [see Appendix 2 Graph E]. The average heart rate for the low beat per minute music condition in females (M= 162) and the average heart rate for the high beat per minute music condition is females (M= 171) females (M= 178) [see Appendix 2 Graph F].

Discussion

We did not find any statistical significance amongst our results. Therefore, our findings do not support our hypothesis. However, we did find that perceived exertion and body satisfaction both had higher means in the high BPM category, but not high enough to be statistically significant. Males ran 0.10 mph on average faster in the high BPM category compared to their miles per hour in the low BPM category.

There were some limitations that were encountered with this study. A major limitation being Hanover College students were the only participants. Therefore, these results can be generalized to a very small population. If a larger sample size was available perhaps we would have statistical significance. Another limitation that was encountered was the majority of our participants fell into the 'runners' category meaning they ran at five or more mph. We had fifteen of our seventeen participants fall into this category and two female participants fall into the 'power walker' category. The majority of our participants were also NCAA Division III Varsity athletes. Some participants came straight from their varsity sport practice to our study so things like fatigue, thirst, and low motivation could have played a part in their ability to participate. It should be noted that some athletes had practice on one day of the testing and then did not have practice on the other. Time constraint played a large roll in that we had to sign up for lab time that was convenient with both of the researchers schedules, and then find participants who could fit into the slim time slots.

This study could be taken in a few future directions. The first being a larger more diverse sample size, outside of the ninety-four percent Caucasian race and the 18-21 year old age range. It would be interesting to look at different ethnic groups as well as different age ranges such as middle thirties, or individual who are in their fifties. As stated before the majority of our participants were varsity athletes and ran at a five mph or more speed. This leads to the question of potential effects on individuals who prefer to walk instead of run. As researchers, it would have been interesting to record the individual's weight and see if there would be any correlation between body weight and body image satisfaction as well as perceived exertion. It was also brought to our attention

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that the possibility of injury could exist because music has been found to successfully distract an individual away from their perceived exertion during exercise. This could serve to push the exerciser past their individual limits, resulting in injury. This would be another interesting future direction for this area of research.

References

- Borg, G. (1970) Perceived Exertion as an indicator of somatic stress. *Scandinavian*
- Borg, G. (1982) Psychophysical bases of perceived exertion. *Medicine and Science in Sports and Exercise*, 14 (5), p. 377-81
- Borg, G. et al. (1983) A category-ratio perceived exertion scale: relationship to blood and muscle lactates and heart rate. *Med. Sci. Sports Exerc.*, 15 (6), p. 523-528
- Brownley, K. A., McMurray, R. G., & Hackney, A. C. (1995). Effects of music on physiological and affective responses to graded treadmill exercise in trained and untrained runners. *Journal of Psychophysiology*, 19 (3), 193-201.
- Çatikkaş, F. (2011). Physical correlates of college students' body image satisfaction levels. *Social Behavior and Personality*, 39(4), 497-502.
doi:10.2224/sbp.2011.39.4.497
- <http://www.sahealthinfo.org/lifestyle/bodygirls.pdf>
- Cohen, S. L., Paradis, C., & LeMura, L. M. (2007). The effects of contingent-monetary reinforcement and music on exercise in college students. *Journal of Sport Behavior*, 30(2), 146-160. Retrieved from EBSCOhost.
- Dachis, Adam. (2010, August 30). How to Create the Ultimate Exercise Playlist. *Lifehacker Exercise*. Retrieved from <http://lifehacker.com/5622382/creating-the-ultimate-exercise-playlist>
- Dyrlund, A. K., & Winger, S. R. (2008). The effects of music preference and exercise intensity on psychological variables. *Journal of Music Therapy*, 45(2), 114-134. Retrieved from EBSCOhost.
- Edworthy, J., & Waring, H. (2006). The effects of music tempo and loudness level on treadmill exercise. *Ergonomics*, 49(15), 1597-1610.
doi:10.1080/00140130600899104
- Garner, D. M., Garfinkel, P.E., Schwartz, D., & Thompson, M. 1980. Cultural Expectations of Thinness and Women. *Psychological Reports*, 47,483-491.
- George, Shannon. (2011, June 14). Popular Cardio Songs. *Livestrong*. Retrieved from <http://www.livestrong.com/article/358506-popular-cardio-songs/>.
- Grogan, Sarah. (2008). *Body Image. Understanding Body Dissatisfaction in Men, Women, and Children.* Psychology Press.

- [http://www.teachersyndicate.com/2011/uploads/2/Body%20Image%20-%20Understanding%20Body%20Dissatisfaction%20in%20Men,%20Women,%20and%20Children%20\(Second%20Edition\).pdf](http://www.teachersyndicate.com/2011/uploads/2/Body%20Image%20-%20Understanding%20Body%20Dissatisfaction%20in%20Men,%20Women,%20and%20Children%20(Second%20Edition).pdf).
- Karageorghis, C. I. (2008). The scientific application of music in sport and exercise. In A. M. Lane, A. M. Lane (Eds.), *Sport and exercise psychology: Topics in applied psychology* (109-137). London United Kingdom: Hodder Education Group. Retrieved from EBSCOhost.
- Kurutz, Stephen. (2008, January 10). They're Playing My Song. Time to Work Out. *The New York Times*. Retrieved from <http://www.nytimes.com/2008/01/10/fashion/10fitness.html>
- LePage, M. L., & Crowther, J. H. (2009). The effects of exercise on body satisfaction and affect. *Body Image*, 7 (2), 124-130.
- Mackenzie, B. (2003) *Borg Scale* [WWW] Available from: <http://www.brianmac.co.uk/borgscale.htm> [Accessed 11/12/2011]
- Madison, G., & Paulin, J. (2010). Ratings of speed in real music as a function of both original and manipulated beat tempo. *Journal Of The Acoustical Society Of America*, 128(5), 3032-3040. doi:10.1121/1.3493462
- McInman, A. D., & Berger, B. G. (1993). Self-concept and mood changes associated with aerobic dance. *Australian Journal of Psychology* (45), 134-140.
- Murray, Steven R. (2007). *Wellness for Life*. Revo, NV. Bent Tree Press. (111).
- National Health Institute Survey. (2010). *Leisure-time physical activity*. Retrieved from CDC:http://www.cdc.gov/nchs/data/nhis/earlyrelease/201103_07.pdf
- Redzic, April. (2010, March 23). Aerobic Music and Movement. *Livestrong*. Retrieved from <http://www.livestrong.com/article/84363-aerobic-music-movement/>
- Szmedra, L., & Bacharach, D. W. (1998). Effect of Music on Perceived Exertion, Plasma Lactate, Norepinephrine and Cardiovascular Hemodynamics during Treadmill Running. *International Journal of Sports Medicine*, 19 (1), 32-37.
- Thornby, M. A., Haas, F., & Axen, K. (1995). Effect of Distractive Ausitory Stimuli on Exercise Tolerance in Patients with COPD. *American College of Chest Physicians*, 1213-1217.
- Wijnalda, G., Pauws, S., Vignoli, F., & Stuckenschmidt, H. (2005). *Pervasive Computing in Sports*. Retrieved from A Personalized Music System for Motivation in Sport Performance: www.computer.org/pervasive

Appendix 1

Exhibit A. Informed consent

This research is being conducted by Shelby Henderzahs and Emily Williams, students in the Psychology Senior Seminar course at Hanover College. The experiment in which you are asked to participate is designed to examine the effects of music while exercising. You will be asked to fill out a pre-assessment evaluation. Then you will be asked to listen to music that is provided and run on a treadmill for ten minutes. Depending on your pre-assessment answers if you exercise 0-3 times a week you will be asked to run at a 1.0-3.5mph pace. If you exercise 3-5 times a week you will be asked to run at a 3.6-5.5mph pace. If you exercise 5 or more times a week you will be asked to run at a 5.6-7.5mph pace. You will however have the option to run at any pace that you feel comfortable. After you have completed the first condition, you will answer two questionnaires about your work out. After you finish answering the questions, you will be asked to return 3-7 days later to complete the second and final condition. Finally, after you have finished the second condition and answering all the questions, you will be debriefed.

The entire experiment will not take more than 30-45 minutes. There are no known risks involved in being in this study, beyond those of everyday life. The information you provide during the experiment is completely anonymous; at no time will your name be associated with the responses you give. If you have any questions about what you will be doing in the study or about the study itself, feel free to ask them now or at any other time during your participation.

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If you have any questions now or after the study, please contact:

- For questions about the research itself, you may contact the researchers: Shelby Henderzahs at henderzahsj12@hanover.edu and Emily Williams at williamse12@hanover.edu.
- For questions about your rights as a participant in this research, you may contact the faculty member supervising the research, Dr. Alexis Green, at green@hanover.edu, or the chair of Hanover College's Institutional Review Board, Dr. Bill Altermatt, at altermattw@hanover.edu.

Participation in this study is voluntary. Refusing to participate or ceasing to participate at any time will involve no penalty. Incomplete participation will not result in credit for participating, but you may complete an alternative assignment of equal time commitment in order to receive credit. Please inform the researchers if you would like to keep a copy of this informed consent form.

Exhibit B. Pre-Assessment

Pre-assessment

Age: _____

Year in School: _____

Ethnicity: _____

Do you play a Varsity sport at Hanover College? If yes which?

How often do you exercise per week? Exercise meaning twenty or more minutes of cardio work out per day. Please circle the appropriate range.

0-3 times per week

3-5 times per week

5-or more times per week

Exhibit C. They're Playing My Song. Time to Work Out. *The New York Times*

Exertion	MPH	BPM
Stroll Walker	3 MPH	115-118 Beat per Minute
Power Walker	4-5 MPH	137-139 Beats per Minute
Runner	5 + MPH	147-160 Beats per Minute

From the answers provided by the participants to the questions in the pre-assessment survey such as “please circle the appropriate range (0-3 times per week, 3-5 times per week, 5-or more times per week) of how often you exercise, exercise meaning twenty or more minutes of cardio work out per day” will help us to decide which mile per hour range the participants need to attempt to run at (Kurutz 2008). For example if a participant expresses that he or she works out in the 5 or more times per week category, he or she would be considered a runner and would need to run at a pace of 5 or more mph during the ten minute cardio work out.

Exhibit D. The High Beat per Minute Music Playlist (147 + BPM) (Kurutz 2008)

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Genre	Song	Artist	BPM
Pop	Live your life	T.I. & Rihanna	160
Alternative Rock	Mr. Brightside	The Killers	150
Electronica	Bulletproof	La Roux	175
Hip-Hop	Dirt off your	Jay-Z	164
Reggae	shoulder One love	Bob Marley	155

Exhibit D shows the genre, song, artist, and beat per minute of the five songs that will be played in the high beat per minute music playlist during the participant's ten minute cardio workout.

Exhibit E. The Low Beat per Minute Music Playlist (120 - BPM)

Genre	Song	Artist	BPM
Pop	Circus	Britney Spears	100
Alternative Rock	If your gone	Matchbox Twenty	110
Electronica	Paper Planes	MIA	86
Hip-Hop	Turn my swag on	Soulja Boy	75
Reggae	Don't worry be	Bob Marley	69

happy

Exhibit E shows the genre, song, artist, and beat per minute of the five songs that will be played in the low beat per minute music playlist during the participants ten minute cardio workout. Some of the songs used in Exhibit B and Exhibit C were found at

<http://www.livestrong.com/article/358506-popular-cardio-songs/>.

Exhibit F. Female Body Image Satisfaction Questionnaire

<http://www.sahealthinfo.org/lifestyle/bodygirls.pdf>



This image will be given to female participants after they complete each of the two conditions to survey their body image satisfaction. The questions that will be asked referring to this scale are provided below.

Survey Questions:

1. Choose the girl that you think is

Thin: _____

Normal weight: _____

Fat: _____

2. Choose the girl that you think will:

Look best: _____

Be clumsy: _____

Have more respect from others: _____

Have less respect from others: _____

Be the strongest: _____

Be the weakest: _____

Be the happiest: _____

Be most unhappy: _____

3. Choose the girl that:

You would want to look like: _____

Your mom/dad/grandma/grandpa/sister/brother will want you to look like: _____

Your friends will want you to look like: _____

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4. Have you ever thought that you are thin? (Check answer in blank)

Yes: _____

No: _____

5. Have your mom/dad/grandma/grandpa/sister/brother ever told you that you are thin? (Check answer in blank)

Yes: _____

No: _____

6. Have your friends ever told you that you are thin? (Check answer in blank)

Yes: _____

No: _____

7. Have you ever thought that you are fat? (Check answer in blank)

Yes: _____

No: _____

8. Which one of the pictures do you think you most look like? _____

9. How happy are you with your present weight? (Check answer in blank)

Happy: _____

Not sure/somewhat happy: _____

Unhappy: _____

10. Do you think you are: (Check answer in blank)

Underweight: _____

Normal weight: _____

Overweight: _____

11. Do you worry about being thin?(Check answer in blank)

Yes: _____

No: _____

12. Do you worry about being fat? (Check answer in blank)

Yes: _____

No: _____

13. Have you ever tried to lose weight? (Check answer in blank)

Yes: _____

No: _____

14. Are you now trying to lose weight? (Check answer in blank)

Yes: _____

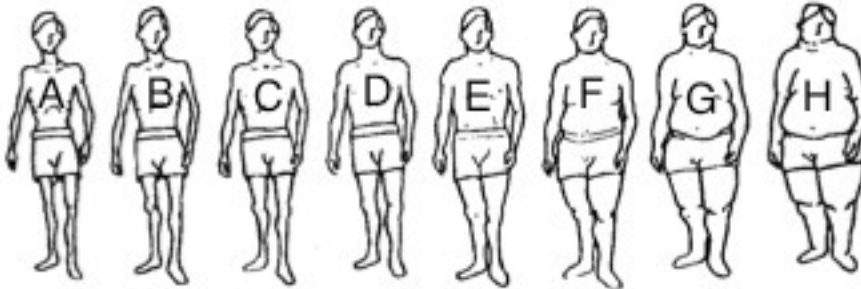
No: _____

15. Have you ever tried to gain weight? (Check answer in blank)

Yes: _____

No: _____

Exhibit G. Male Body Image Satisfaction Questionnaire (Grogan 2008).



This image will be given to male participants after they complete each of the two conditions to survey their body image satisfaction. The questions that will be asked referring to this scale are provided below.

Survey Questions:

1. Choose the guy that you think is

Thin: _____

Normal weight: _____

Fat: _____

2. Choose the guy that you think will:

Look best: _____

Be clumsy: _____

Have more respect from others: _____

Have less respect from others: _____

Be the strongest: _____

Be the weakest: _____

Be the happiest: _____

Be most unhappy: _____

3. Choose the guy that:

You would want to look like: _____

Your mom/dad/grandma/grandpa/sister/brother will want you to look like: _____

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- Your friends will want you to look like: _____
4. Have you ever thought that you are thin? (Check answer in blank)
Yes: _____
No: _____
5. Have your mom/dad/grandma/grandpa/sister/brother ever told you that you are thin? (Check answer in blank)
Yes: _____
No: _____
6. Have your friends ever told you that you are thin? (Check answer in blank)
Yes: _____
No: _____
7. Have you ever thought that you are fat? (Check answer in blank)
Yes: _____
No: _____
8. Which one of the pictures do you think you most look like? _____
9. How happy are you with your present weight? (Check answer in blank)
Happy: _____
Not sure/somewhat happy: _____
Unhappy: _____
10. Do you think you are: (Check answer in blank)
Underweight: _____
Normal weight: _____
Overweight: _____
11. Do you worry about being thin?(Check answer in blank)
Yes: _____
No: _____
12. Do you worry about being fat? (Check answer in blank)
Yes: _____
No: _____
13. Have you ever tried to lose weight? (Check answer in blank)
Yes: _____
No: _____
14. Are you now trying to lose weight? (Check answer in blank)

Yes: ____

No: ____

15. Have you ever tried to gain weight? (Check answer in blank)

Yes: ____

No: ____

Exhibit H. 15 Point Borg Physical Exertion Scale (Borg 1982)

Scale	Percent Effort	Exertion
6	20%	
7	30%	Very, Very light (rest)
8	40%	
9	50%	Very light (gentle walk)
10	55%	
11	60%	Fairly light
12	65%	
13	70%	Somewhat hard (steady pace)
14	75%	
15	80%	Hard
16	85%	
17	90%	Very Hard
18	95%	
19	100%	Very, Very Hard
20		Exhaustion

This scale will be given to both male and female participants after they complete each condition of the study. The participants will be asked to circle the ranking number in which the energy they feel they exerted during the ten-minute cardio exercise.

Exhibit I. Debriefing Form

The study in which you just participated was designed to measure the effect of high beat per minute music in a cardio workout on body satisfaction. You exercised for ten minutes while listening to both high and low beat per minute music in the two separate conditions. Each participant completed both conditions of this study. We will be testing to see if the high beat per minute music condition leads to increased heart rate, better body

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satisfaction, a higher performance, and a lower rating of perceived exertion than when participating in the low beat per minute music condition. Previous research using found that high upbeat music leads to higher levels of physical exertion. Exercise also leads to higher levels of body satisfaction.

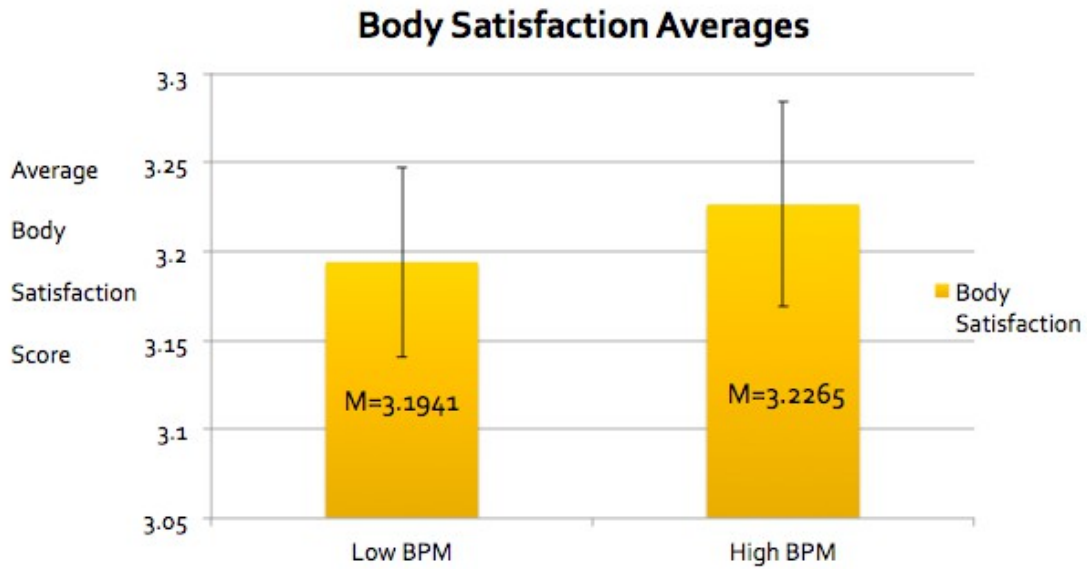
Please do not discuss this study with other potential participants until the semester is over. If people know what we're testing before the study begins, they may respond differently, jeopardizing our results. As soon as the results from this study are available, you can contact either of the researchers about them via e-mail. If you have any questions, please contact:

- For questions about the research itself, you may contact the researchers: Shelby Henderzahs at henderzahsj12@hanover.edu and Emily Williams at williamse12@hanover.edu.
- For questions about your rights as a participant in this research, you may contact the faculty member supervising the research, Dr. Alexis Green, at green@hanover.edu, or the chair of Hanover College's Institutional Review Board, Dr. Bill Altermatt, at altermattw@hanover.edu.

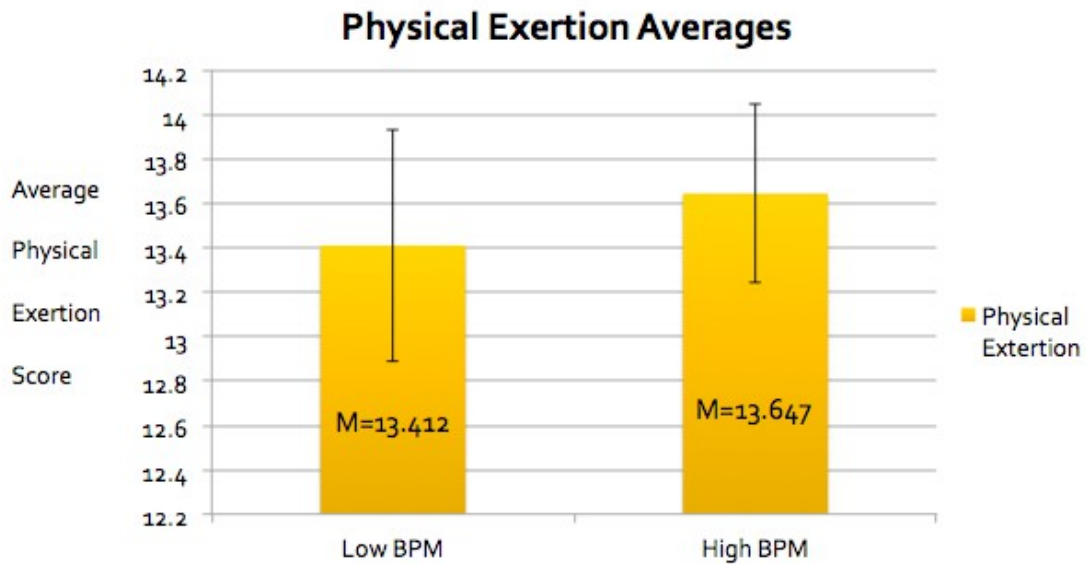
For more information on these topics, we suggest reading Sarah Grogan's 2008 Book, "Body Image. Understanding Body Dissatisfaction n Men, Women, and Children" and Karageorghis, C. I 2008 article, "The scientific application of music in sport and exercise," published in *Sport and Exercise Psychology*, pages 109-137.

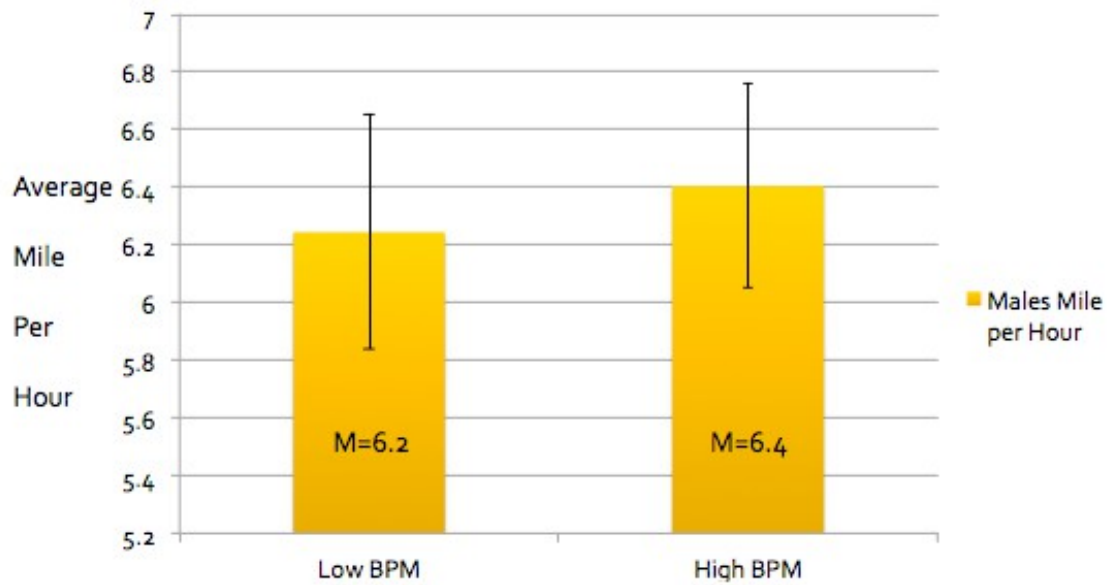
Appendix 2

Graph A. Body Satisfaction Averages



Graph B. Physical Exertion Averages



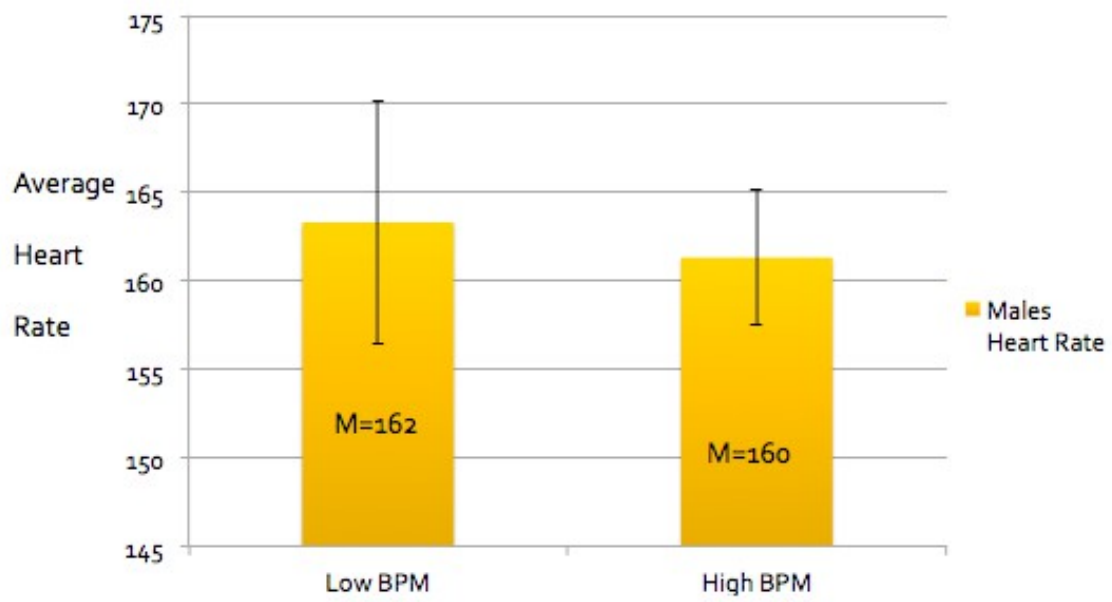
Graph C. Males Average Miles per Hour**Male Miles per Hour**

Graph D. Females Average Miles per Hour

Female Miles per Hour

Graph E. Males Average Heart Rate

Male Heart Rate



Graph F. Females Average Heart Rate

Female Heart Rate