

FIT TO PLAY?



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ABSTRACT

Kids love to play video games, sometimes too much. Parents often are asking their kids to put down the remote and get some exercise. The purpose of my project is to see whether an active video game, like Wii sports can increase heart rate enough to actually count as exercise. I used volunteers and measured both their resting heart rates as well as their heart rates while playing a regular/non-active video game, Super Mario World. I then had the test subjects play an active game, Wii sports cycling and then their heart rate was taken again. After analyzing my data, although there was a significant increase in heart rate while playing the Wii Cycling game, it was clear that heart rates had not increased enough for it to be counted as exercise. Although better than just a non-active game, these active videogames are not a good substitute for kids getting outside and doing something truly active.

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PURPOSE

The purpose of this project is to answer the following question:

Can playing active video games increase your heart rate enough to qualify as exercise?



VS.



RESEARCH

For this project, I researched about heart rates. What the difference between a resting heart rate and a target heart is. I learned that a resting heart taken when you have not been active for at least 10 minutes. Your resting heart rate is the number of times your heart beats per minute while at complete rest.

I then researched target heart rate. Target heart rate is defined as “the minimum number of heartbeats in a given amount of time in order to reach the level of exertion necessary for cardiovascular fitness, specific to a person's age, gender, or physical fitness.

I used the following charts to help me study the heart rates for my volunteers.

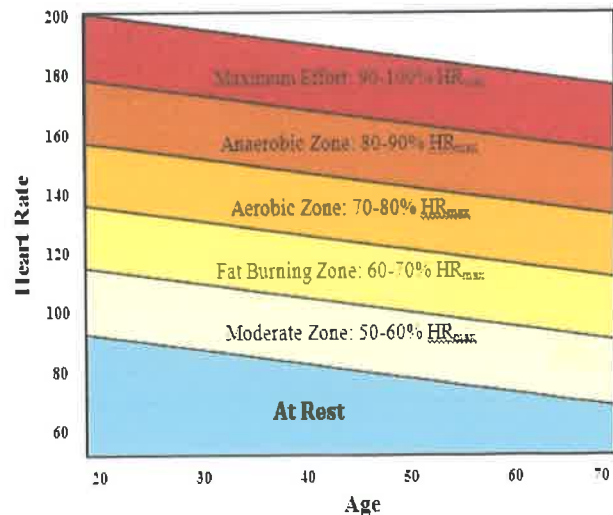
| Age | Max HR *Estimated | Easy Recovery Zone | | General Aerobic | | Steady Distance Race | | Anaerobic Zone | | Vo2 Max | |
|-----|----------------------|--------------------|----------|-----------------|----------|----------------------|----------|----------------|----------|---------|----------|
| | | Low End | High End | Low End | High End | Low End | High End | Low End | High End | Low End | High End |
| 14 | 196 | 108 | 128 | 129 | 147 | 149 | 161 | 163 | 173 | 175 | 186 |
| 15 | 196 | 108 | 127 | 129 | 147 | 149 | 160 | 162 | 172 | 174 | 186 |
| 16 | 195 | 107 | 127 | 129 | 146 | 148 | 160 | 162 | 171 | 173 | 185 |
| 17 | 194 | 107 | 126 | 128 | 146 | 148 | 159 | 161 | 171 | 173 | 184 |
| 18 | 193 | 106 | 126 | 128 | 145 | 147 | 159 | 161 | 170 | 172 | 184 |
| 19 | 193 | 106 | 125 | 127 | 145 | 147 | 158 | 160 | 170 | 172 | 183 |
| 20 | 192 | 106 | 125 | 127 | 144 | 146 | 158 | 159 | 169 | 171 | 182 |
| 21 | 191 | 105 | 124 | 126 | 144 | 145 | 157 | 159 | 168 | 170 | 182 |
| 22 | 191 | 105 | 124 | 126 | 143 | 145 | 156 | 158 | 168 | 170 | 181 |
| 23 | 190 | 105 | 124 | 125 | 143 | 144 | 156 | 158 | 167 | 169 | 181 |
| 24 | 189 | 104 | 123 | 125 | 142 | 144 | 155 | 157 | 167 | 169 | 180 |
| 25 | 189 | 104 | 123 | 125 | 142 | 143 | 155 | 157 | 166 | 168 | 179 |
| 26 | 188 | 103 | 122 | 124 | 141 | 143 | 154 | 156 | 165 | 167 | 179 |
| 27 | 187 | 103 | 122 | 124 | 140 | 142 | 154 | 155 | 165 | 167 | 178 |
| 28 | 187 | 103 | 121 | 123 | 140 | 142 | 153 | 155 | 164 | 166 | 177 |
| 29 | 186 | 102 | 121 | 123 | 139 | 141 | 152 | 154 | 164 | 165 | 177 |
| 30 | 185 | 102 | 120 | 122 | 139 | 141 | 152 | 154 | 163 | 165 | 176 |

| Age | 18-25 | 26-35 | 36-45 | 46-55 | 56-65 | 65+ |
|---------------|-------|-------|-------|-------|-------|-------|
| Athlete | 49-55 | 49-54 | 50-56 | 50-57 | 51-56 | 50-55 |
| Excellent | 56-61 | 55-61 | 57-62 | 58-63 | 57-61 | 56-61 |
| Good | 62-65 | 62-65 | 63-66 | 64-67 | 62-67 | 62-65 |
| Above Average | 66-69 | 66-70 | 67-70 | 68-71 | 68-71 | 66-69 |
| Average | 70-73 | 71-74 | 71-75 | 72-76 | 72-75 | 70-73 |
| Below Average | 74-81 | 75-81 | 76-82 | 77-83 | 76-81 | 74-79 |
| Poor | 82+ | 82+ | 83+ | 84+ | 82+ | 80+ |

| Age | 18-25 | 26-35 | 36-45 | 46-55 | 56-65 | 65+ |
|---------------|-------|-------|-------|-------|-------|-------|
| Athlete | 54-60 | 54-59 | 54-59 | 54-60 | 54-59 | 54-59 |
| Excellent | 61-65 | 60-64 | 60-64 | 61-65 | 60-64 | 60-64 |
| Good | 66-69 | 65-68 | 65-69 | 66-69 | 65-68 | 65-68 |
| Above Average | 70-73 | 69-72 | 70-73 | 70-73 | 69-73 | 69-72 |
| Average | 74-78 | 73-76 | 74-78 | 74-77 | 74-77 | 73-76 |
| Below Average | 79-84 | 77-82 | 79-84 | 78-83 | 78-83 | 77-84 |
| Poor | 85+ | 83+ | 85+ | 84+ | 84+ | 84+ |

The figures are averages, so use them as general guidelines.

The last subject I researched is what types of video games are considered active and non-active games. There different kinds of video games and I like to play them all. In my research, I found that there are some types of video games that are advertised to be a form of exercise. This research helped me pick the two games I chose to test. For my non-active game, I chose Mario 3D World. This is basic video game which is not considered active. For my active game, I chose Wii Sports Cycling. This is one of several Wii games which is advertised to be a game that is physically active.



HYPOTHESIS

If I compare heart rates while playing non-active video games and active video games, then the active video games will increase heart rate enough to qualify as exercise.

EXPERIMENT

PROCEDURE

1. Volunteer sits and rests for 5 minutes
2. Resting heart rate is taken
3. Play Mario for seven minutes
4. Take heart rate again
5. Volunteer takes a rest for 5 to 7 minutes
6. Volunteer plays Wii Sports cycling for 7 minutes
7. Take heart rate
8. Compare both video games heart rates
9. Record data



LIST OF MATERIALS

- Volunteers
- Wii U
- Wii remote
- Mario 3D World game
- Wii Sports Resort game
- Fitbit
- Paper and pen
- Timer
- TV



VARIABLES

Independent Variable (what is changed in the experiment): The video game each volunteer played

Dependent Variable (what is measure in the experiment): The heart rate for each volunteer after they played the game

Controls: Each volunteer played each video game for 7 minutes, they each rested for 5 minutes before their resting heart rate was taken, every volunteer's heart rate was taken with a Fitbit.

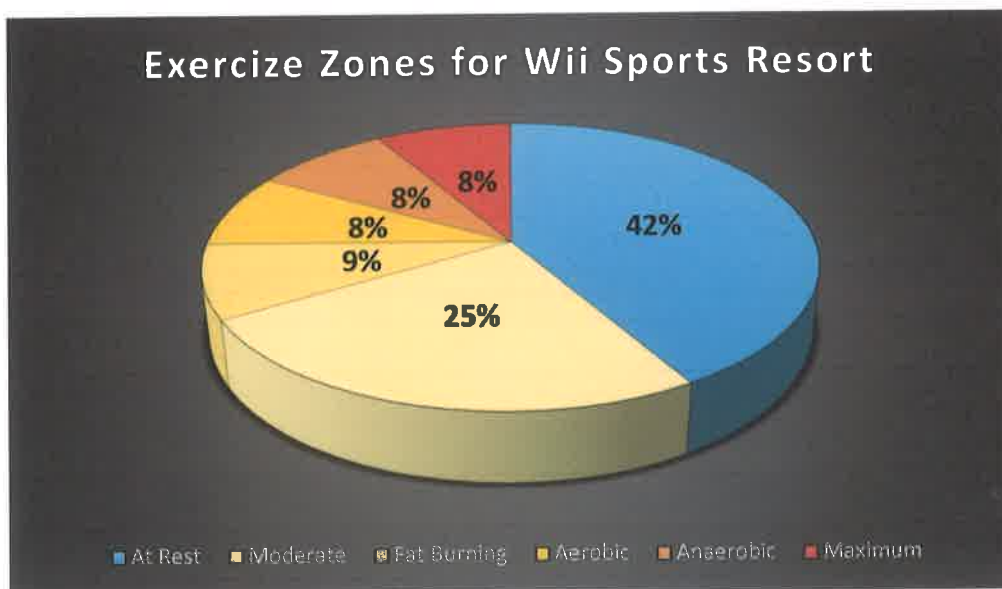
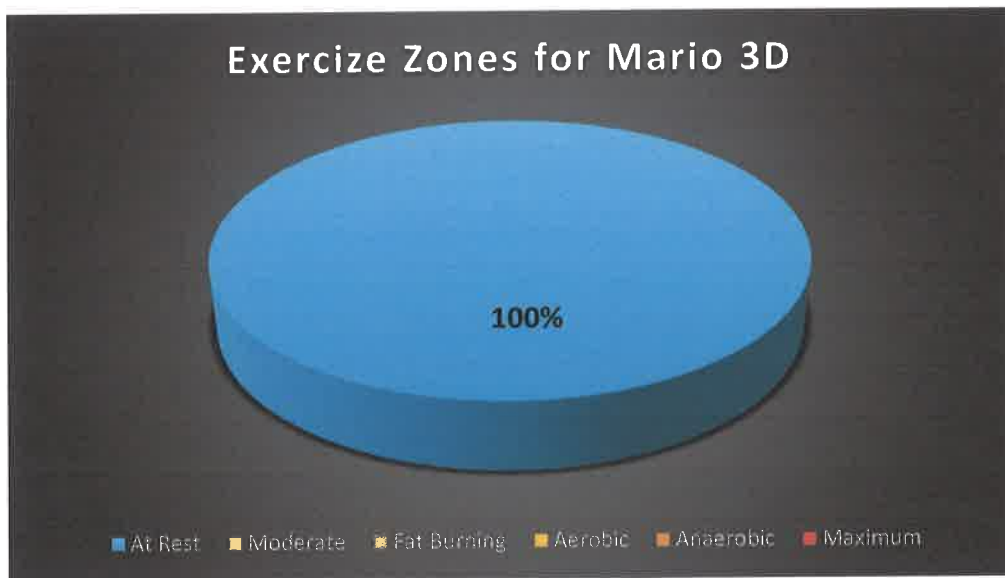
DATA

| Volunteer | Resting | Mario | Diff | % | Exercise Zone | Wii Sports Cycling | Diff | % | Exercise Zone |
|-----------|---------|-------|------|-----|---------------|--------------------|------|-----|---------------|
| 1 | 79 | 81 | 2 | 3% | 0 | 122 | 43 | 54% | 1 |
| 2 | 89 | 76 | -13 | 15% | 0 | 105 | 16 | 18% | 0 |
| 3 | 84 | 86 | 2 | 2% | 0 | 93 | 9 | 11% | 0 |
| 4 | 92 | 112 | 20 | 22% | 0 | 146 | 54 | 59% | 1 |
| 5 | 76 | 79 | 3 | 4% | 0 | 106 | 30 | 39% | 0 |
| 6 | 91 | 96 | 5 | 5% | 0 | 120 | 29 | 32% | 0 |
| 7 | 87 | 78 | -9 | 10% | 0 | 133 | 46 | 53% | 1 |
| 8 | 76 | 81 | 5 | 7% | 0 | 135 | 59 | 78% | 3 |
| 9 | 83 | 87 | 4 | 5% | 0 | 133 | 50 | 60% | 2 |
| 10 | 87 | 79 | -8 | -9% | 0 | 117 | 30 | 34% | 0 |
| 11 | 91 | 85 | -6 | -7% | 0 | 169 | 78 | 86% | 4 |
| 12 | 76 | 94 | 18 | 24% | 0 | 148 | 72 | 95% | 5 |



ANALYSIS

Based on the results of my experiment the Mario 3D game did not increase heart rate enough to qualify as exercise. I did notice that on the Wii Sports Resort cycling game some of the volunteers increased their heart rate enough to qualify as exercise. I also noticed that the ones who did qualify were usually younger and didn't exercise regularly.



CONCLUSION

Out of the 12 people I tested only one third of them raised their heart rate enough to be considered as exercise. These results proved my hypothesis incorrect. I was surprised by these results because Wii Sports Resorts games are active and even advertised to be more than just video games. They are meant to be a way to get kids active. Although, in comparison to a regular video game like Mario, the Wii Sports games did increase heart rate in the players significantly. The increase was not enough to be considered true exercise.

If I were to do this project again I would use a different Wii game to compare to. This time I used cycling. The cycling game is active and would appeal to both boys and girls. However, the cycling game only requires the player to use their arms and not necessarily their whole body. Perhaps a game like Just Dance would provide different results because it requires the player to use their whole body. I did not choose Just Dance this time because I wanted to pick a game that both boys and girls would like equally.

The results of this project are important for parents because oftentimes parents are worried about their kids being active. Playing active video games should not be considered a good form of exercise for kids. Although better than just a non-active game, these active videogames are not a good substitute for kids getting outside and doing something truly active.

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