

JUMP SCARE HEART RATE STUDY!

Log book

Testable question ideas:

- Does a jump scare spike a person's heart rate?
- Does heart rate increase more during a jump scare if they don't know it's coming?
- How much does a heart rate change during a scary clip/movie?
- Does it change how high a person's heart rate is if they know/don't know a jump scare is coming?
- How much does heart rate change when someone knows a jump scare is coming opposed to not knowing?

We will measure the heart rate of two different groups when they see a relaxing clip that changes to a jump scare. One group will know its coming and the other will not.

Material list:

- Heart rate monitor
- Phone/device for watching video and recording heart rate
- Informed consent form
- Survey (part one)
- Survey (part two)
- Instructions
- Hand sanitizer
- Sanitizing wipes
- Cord for phone
- pencil/pen

Heart rate monitor:

<https://www.polar.com/ca-en/products/accessories/oh1-optical-heart-rate-sensor>

Log book: (february 2)

We have been steadily working out the kinks with our materials and procedure of this project. This had us waiting for the heart rate monitor and beginning to finalize the procedure.

We have been writing out our questions for the subject to fill out as well as making instructions for the subject to follow in order to do the procedure themselves. We have decided to separate our subjects into two groups: butterfly and Zebra one will know that our jumpscare is coming in the video and the others will not. In our questions the subject will fill out which group they are in so that we can subtly see if they know it is coming without drawing attention to the fact that there is a jumpscare in the video. We have also been selecting our test subjects through email and text. We have decided to use extended family members that live in Calgary, that way we can drive a package to them so that they can complete the testing (our heart monitor will record their heart rate the entire time). We have decided that the package will include a phone to record their heart rate, the heart monitor, a pencil, forms and questions to fill out, sanitizing products (hand sanitizer and disinfectant wipes so that they can clean the package before giving it to us). We are yet to begin testing and analyzing but are just finalizing the details such as the exact procedure, questions and what video we are using.

Set up polar app on feb 1

Participants asked to do project and respond from feb 1-8

Zebra won't know there is a scare and Butterfly will know

Hypothesis:

We think the heart rate will increase at the scary part. We suppose their heart rate will not increase drastically but it will increase from their average in the calm part to the scare. Based on our personal knowledge and experience, we think heart rate will increase prior to the scare if they know it's coming due to suspense and the unknown.

Our project is LOW RISK!!!

Variables:

Independent: The video going from calm to a jump scare, the subjects age, the subjects experience with scary things,

Dependant: the subjects heart rate,

Controlled: Video, forms, heart rate monitor,

Clips and pictures in video from:

- WallpaperFlair - sunset, winter, landscape, sunray, forest, snow, trees, snowy, HD wallpaper
- Jungle Vlog (youtube) - Jungle creek 'Kleine Falawatra' • Test Footage | Jungle Vlog - December 23 2018 <https://www.youtube.com/watch?v=IIClzzoYyNU>
- Uscenes relaxing videos - Fireplace Video Country Cottage - July 28 2013 https://www.youtube.com/watch?v=nocNEnxc_wc

- EX films - Free stock footage (Free clip) - sea waves - March 21, 2016
<https://www.youtube.com/watch?v=IA8tuc4ckQk>
- Rune Lilleeng - Short fireworks show (FWSim) - May 21 2014
<https://www.youtube.com/watch?v=by8Gt96pq58>
- GoodFreePhotos - snowy landscape with tree and house
- Bensound - piano moment
<https://www.bensound.com/royalty-free-music/track/piano-moment>
- 8 below - 2006 - released February 17, 2006 - Walt Disney Pictures - film directed by Frank Marshall and written by David DiGilio.
- Marco88324 - German car commercial - March 31 2006
https://www.youtube.com/watch?v=oYTrbDLSy_w

Procedure: We will select ten subjects to participate in our testing. After agreeing to a specific time, we will bring a kit to their house. Within this kit there will be forms, sanitizing products, a pencil, a phone and an armband heart rate monitor. To begin, the subject will read the instructions provided in the kit, next they will put the heart rate monitor on their arm and set the phone to record their heart rate, according to the instructions. Our subjects will fill out the consent form and the part one to our questionnaire. Our volunteer will have been instructed to watch a clip provided and they will move on to do so. As the subject watches they will experience calming sounds and clips until the scare. Once the video is concluded they will complete the second part of the questionnaire, sanitize their hands and the items they have touched and will proceed to returning the kit. Once the kit is returned it will be sanitized again. After collecting some data from that experiment we will reset the kit and pass it on to the next test volunteer. Once all the data has been collected we will analyze and compare the facts, looking for similarities in heart patterns and considering background information and more. This will send us toward the conclusion of our project.

Kit:



Yellow highlight: For sure date
 No highlight: Request

February/march calendar: (dates open for participants)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			Feb 17	Feb 18 	Feb 19 	Feb 20 Lane 
Feb 21	Feb 22	Feb 23 	Feb 24 	Feb 25 	Feb 26	Feb 27 
Feb 28	Feb 29	March 1	March 2 	March 3	March 4	March 5
March 6	March 7					

2c consent form that participants will fill out:

Project description

We will measure the heart rate of two different groups (zebra and butterfly). Both will watch a clip as a monitor records their heart rate. We will then analyze, compare, and extract the data we collect to come up with our conclusion.

Benefits from participating: Supporting us, giving us a chance to participate in this science fair

Risks from participating: possibly stress from lack of knowledge of the project, possible discomfort while watching the video

According to three youtube videos:

The independent variable is: This is the variable that we are changing to get the dependent variable. Ex: You are testing if the amount of light a plant gets affects the height of its growth, the independent variable is the amount of light because that is what you are changing to get the data you require.

The dependent variable is: It is what you are measuring= it depends on the independent variable. Ex: in that experiment your dependent variable would be the height of the plants.

The controlled variable is: This is the variable that you make sure stay the same so that the outcome is not tainted by other things Ex: you make sure that the soil used, the amount of nutrients, the pot size, watered amount ect is the same otherwise the outcome could be affected by outside circumstances. Aka: what we are purposely keeping constant.

Learned this from: <https://www.youtube.com/watch?v=I0jTMDtX4WY> ,
<https://www.youtube.com/watch?v=iaewZmc4TYQ> and
<https://www.youtube.com/watch?v=uPBz9PDIsMA>

Independent Variables: if the participants have been informed of the scares or not.

Dependent Variables: the participants heart rate.

Controlled Variables: the video/clips we are using/the music in the video, the questionnaire/forms filled out, the procedure, the heart monitor used, the phone used (the one attached to the monitor).

Research:

Anxiety:

Anxiety is a response to stress. It's a dread and worry of some perceived threat, real or imagined. It's not just in the mind though. It can trigger the ANS or the autonomic nervous system. This is also known as the 'fight or flight' reaction. The ANS helps regulate the heart, lungs, digestive system, various muscles throughout the body. This is why the 'fight or flight' reaction happens. Your worries activate reactions such as heart palpitations, rapid breathing, muscle tension, sweating, feeling tired, stomach problems, or trembling. After the threat has passed the flight or fight reaction fades and is replaced with the parasympathetic nervous

system. This helps you calm down and 'rest and digest'. It also contributes to making you feel that calming relief that the monster under your bed didn't eat you.

According to [Medical News Today](#) along with anxiety, heart palpitations* are common. "Heart palpitations can be a symptom of anxiety and not a major cause for concern" They wrote. Anxiety is not very rare as 19.1% of adults in the US have it. This makes it the most common mental health problem.

Anxiety and Horror movies:

"[When watching horror films], your heart pumps and the adrenaline flows, and your attention narrows in, even as you know you are at home or in the theatre and there is no real danger." States Sally Winston, licensed psychologist and executive director of the Anxiety and Stress Disorders Institute of Maryland. According to Winston, horror or scary movies are perfectly okay to watch for those with anxiety, if they can process what's real and what's not. As in this experiment we are using adult participants, we assume most of them are going to be able to process what's real and what's not.

When watching a scary movie the body could release hormones like norepinephrine, cortisol, and adrenaline from the autonomic nervous system. All movies try to elicit emotions from the watchers, whether its fear, stress, sadness, happiness, or tension. Horror movies tend to focus on drawing out stress, fear, and tension. They add in bits of sad or happy moments to relax you, just to get you riled up again.

Dr. Pamela Rutledge, director of the Media Psychology Research Center says "Generally, people who watch horror films tend to enjoy them for a variety of reasons, so for most viewers, it is a positive impact." She also explains "If someone is being treated for an anxiety disorder or OCD, horror movies can provide useful opportunities to face one's fears and develop the confidence that you can, in fact, endure unpleasant distress, and that it's not dangerous to you" In a [2018 study](#), it showed that those who just love a good horror movie may like them because it gives them a sense of control and mastery over fears, from your home or a theatre with friends.

A more [recent study](#) shows horror movie lovers, those who watch scary movies often, are coping better with the emotional drain that comes with the COVID-19 pandemic. Science Direct states "Conducted during the COVID-19 pandemic, this study tested whether past and current engagement with thematically relevant media fictions, including horror and pandemic films, was associated with greater preparedness for and psychological resilience toward the pandemic." When they finished they took their results and concluded. "These results are consistent with the hypothesis that exposure to frightening fictions allow audiences to practice effective coping strategies that can be beneficial in real-world situations"

In another [study in 2020](#), found that horror movies are a good fear-inducing stimulus. The study concluded that parts of your brain process the horror movie like a real threat, and then prepares the body to react in the same way if that situation happens.

Anxiety disorders can be caused by multiple different conditions such as:

- heart disease
- thyroid disease

- respiratory disorders
- withdrawal from drugs or alcohol

*heart palpitations are when the heart pounds, is fast beated, or flutters. Things that can trigger them include stress, exercise, medication or, rarely, or a medical condition.

Fear is a natural human emotion. The fight or flight response to fear is a way to protect the human body. Within scary things such as haunted houses, roller coasters and videos/movies when something scary happens fear kicks in and different parts of the human brain are activated. The fight or flight response is a way to describe the adrenaline rush that comes with fear. This natural thing can give you a rush of adrenaline that can protect you in a stressful or dangerous situation. So why would we use jumps, scares and scary moments to thrill. When someone feels fear, different parts of the brain are activated and certain hormones (the body's chemicals) are released into your body. The human body sometimes feels pleasure after or during a scary moment (like in a movie or something) and dopamine can be released. Dopamine is a hormone that gives pleasure and sometimes this is released during scary movies/clips/roller coasters/other stuff this can explain why some people like scary things!

The flight or fight response is a survival mechanism. As a human being our body has a way to protect us in a stressful or dangerous situation. If we were in danger our brain would almost instantaneously activate hormones and brain functions to protect us. This survival mechanism will give us adrenaline and our body will decide whether to fight the danger or flight it (escape the danger).

The fight or flight response helps us prepare for danger. Many different things occur to the human body when this survival mechanism is activated. Adrenaline and noradrenaline are activated and are sent throughout the body. Some things that happen or may happen during this time to prepare the human for survival are:

Redistribution of blood (the body may send the blood to more important vital organs this can sometimes prevent over bleeding if someone was cut on the fingers or something, since the body does this discolouration of the face can be normal before,during and after a flight or fight situation. Sometime people will lose the feeling in their fingers and toes because there is less blood in those areas.)

Change in breathing patterns (sometimes the body will prepare for a fight or an escape by changing the breathing patterns)

An increase in the human heart rate (the heart rate may speed up or become more powerful in a stressful situation, this pumps blood throughout the body at a faster pace and is common during fight or flight)

SUPER STRENGTH!!!

Have you ever felt that rush of adrenaline and felt like you could run forever? Sometimes when some people get the fight or flight experience their adrenaline will give them somewhat super strength!!!

This experience sometimes occurs to people and it is sometimes referred to as hysterical strength.

Reports of people lifting stuff several times their weight seems unreal but some people say to have seen it!!! This is not definitely accurate but stories of people lifting cars to save others they care about has dotted the new

s and internet. So why do we sometimes get a burst of inhuman strength? According to: [a Pen state site](#)

Superhuman strength can occur when adrenaline and noradrenaline are released (noradrenaline is a chemical released during the fight or flight response that can change your blood pressure and or heart rate). Super human strength has not been completely approved by scientists because there is not really a way to properly test it (aside from putting people in mortal danger). According to theory and reports it normally occurs when there is a life or death situation and chemicals are activated, just like the fight or flight reaction it happens in stress related situations and can save lives. Here are reports on super human strength:

<https://abcnews.go.com/US/superhero-woman-lifts-car-off-dad/story?id=16907591>

<https://www.dailymail.co.uk/news/article-1190759/Mighty-mothers-superhuman-strength-lift-1-400kg-car-run-schoolboy.html>

Scare times:

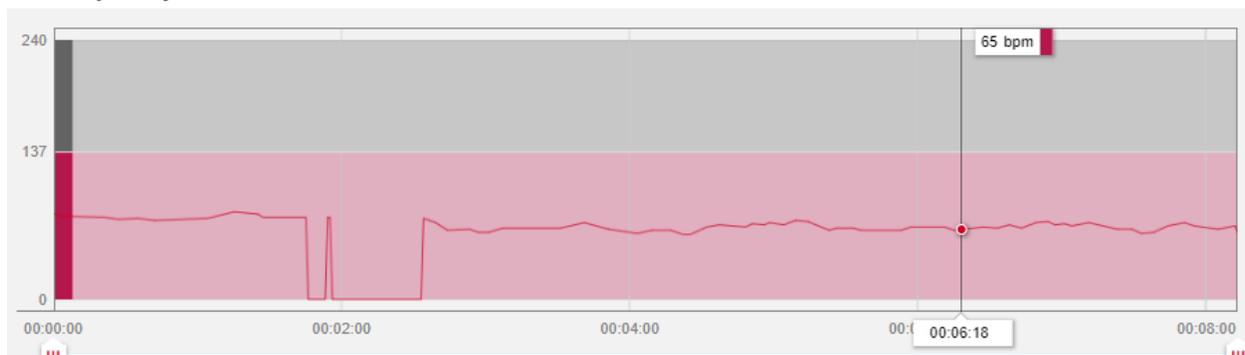
First Scare at about 3.21 minutes (there will be some time before video starts so I will skip a it and look at the heart rate)

Second scare at about 4.49 minutes (older scare so they might recognize it)

The dog scene starts (with dog walking) at ~2.59 minutes and ends at around ~3.26 minutes.

The car scene starts at ~4.40 minutes and ends at ~4.53 (these are rough estimations of me looking at the video, just to put everything in somewhat time)

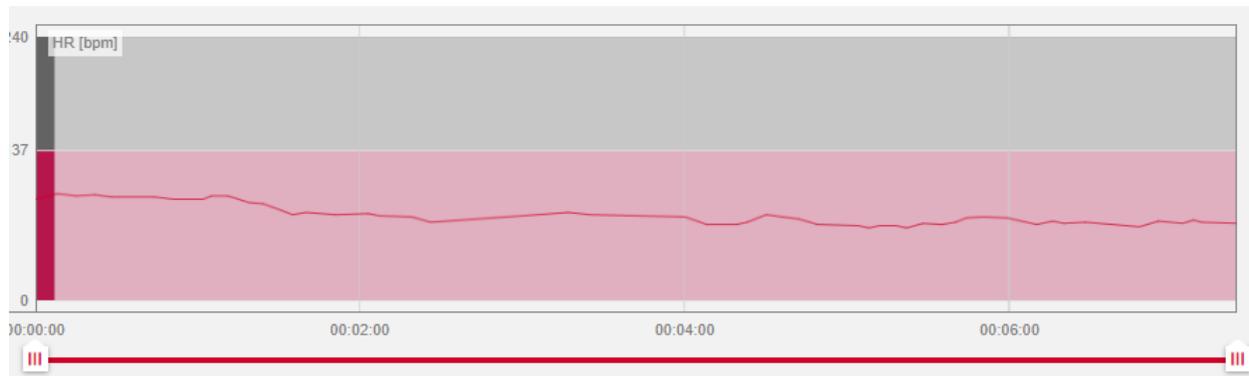
Butterfly subject 1



Beginning: 77 bpm Mid-Beginning: unknown (malfunction with the monitor) Middle: 63 bpm
Mid-End: 67 bpm End: 62 bpm

Butterfly Subject 1 had a heart rate average of ~71 bpm during the first scare and a heart rate surrounding ~69-73 bpm during the second scare (maximum of 73 bpm and a minimum of 69 bpm during the time surrounding and or during the scare)

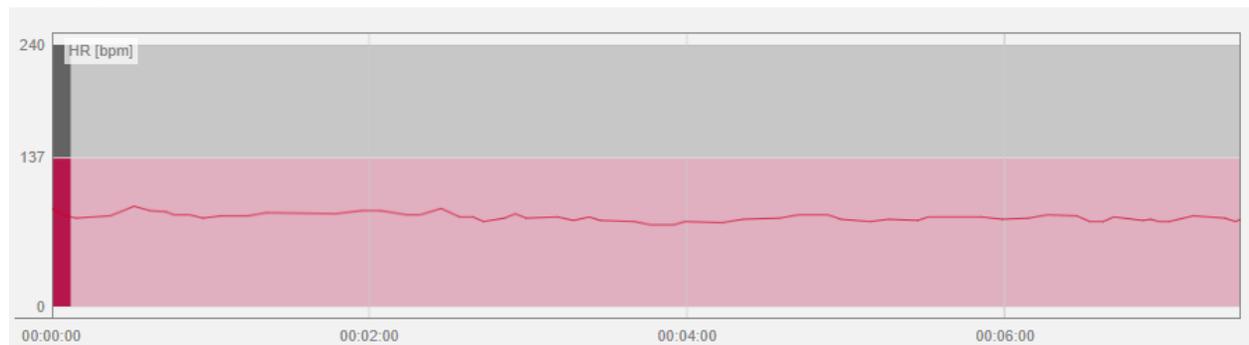
Butterfly subject 2



Beginning: 96 bpm Mid-Beginning: 78 bpm Middle: 76 bpm Mid-End: 74 bpm End: 70 bpm

Butterfly Subject 2 had an average heart rate of ~78 bpm during the first scare and an average of 69 bpm during the second scare.

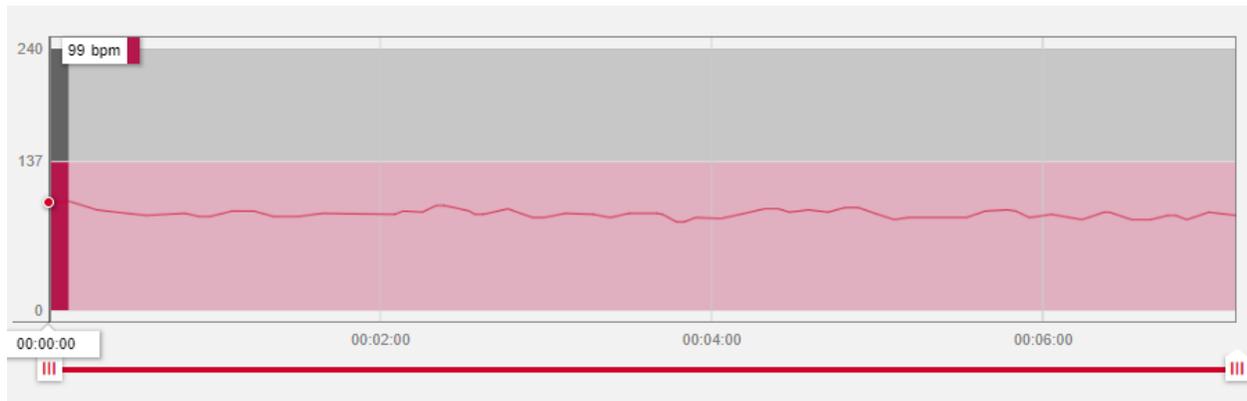
Butterfly subject 3



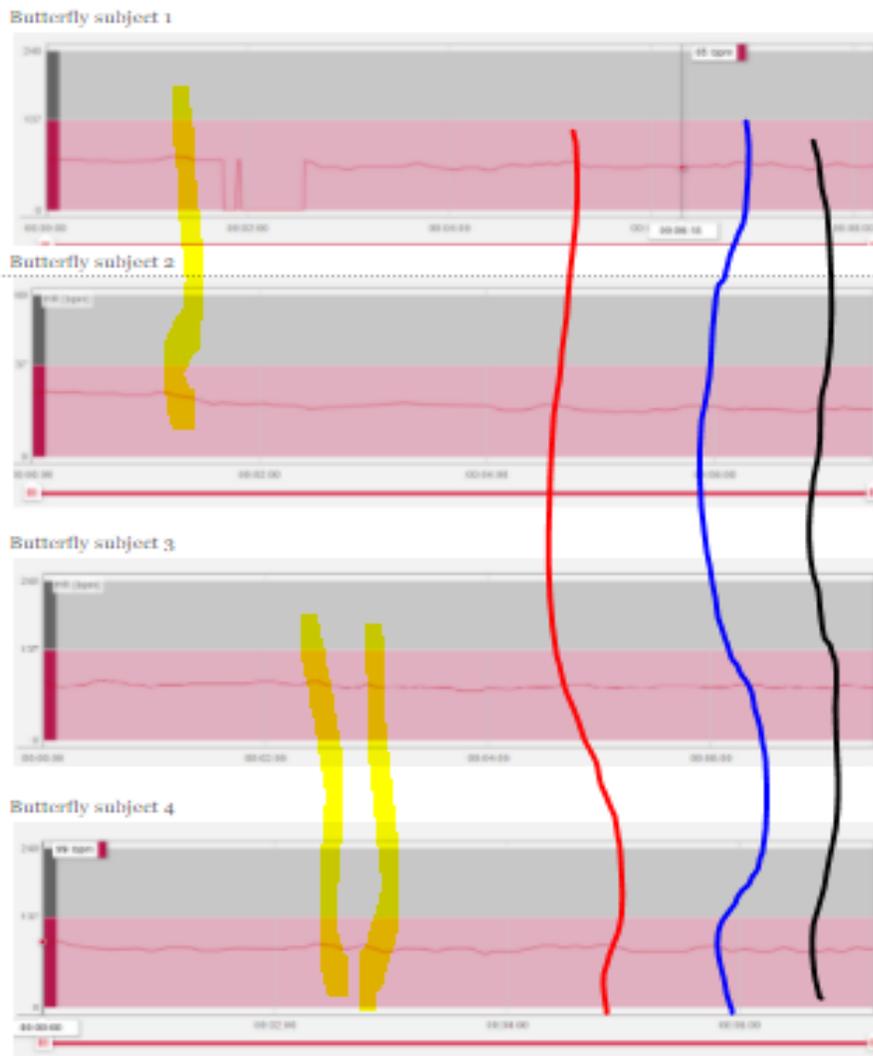
Beginning: 90 bpm Mid-Beginning: 88 bpm Middle: 77 bpm Mid-End: 81 bpm End: 80 bpm

Butterfly Subject 3 had an average heart rate of ~81 bpm during the first scare and a heart rate of ~83 bpm during the second scare.

Butterfly subject 4



Beginning: 99 bpm Mid-Beginning: 89 bpm Middle: 84 bpm Mid-End: 87 bpm End: 87 bpm
Butterfly subject 4 had an average heart rate of ~85 bpm during the first scare and a heart rate of ~94 bpm during the second scare.



The black line highlights a similar dip or decrease in heart rate at a similar point... so basically at around the same point the participants heart rate decreased.

The blue line highlights a similar spike or increase in heart rate at a similar point... the participants heart rate rose slightly at a similar point.

The yellow highlights are similarities in spikes of the heart rate between certain tests...

According to the polar flow app:

Subject 1: Had an average heart rate of 68 bpm (keep in mind it could possibly be erred because of the movement of the band making his average also include the 0 bpm that was caused by improper wearing of the monitor band). Had a maximum heart rate of 81 bpm and a minimum heart rate of 0 bpm (malfunction) so I looked and found it to be about 60 bpm (for the minimum).

Subject 2: Had an average heart rate of 77 bpm. Had a maximum heart rate of 97 bpm and a minimum heart rate of 66.

Subject 3: Had an average heart rate of 81 bpm. Had a maximum heart rate of 92 bpm and a minimum heart rate of 75.

Subject 4: Had an average heart rate of 88 bpm. Had a maximum heart rate of 100 bpm and a minimum heart rate of 81.

The average heart rate of group Butterfly is 78.5 beats per minute.

Averages:

Beginning: 90.5

Mid-Beginning: 85

Scare # 1: 78.75

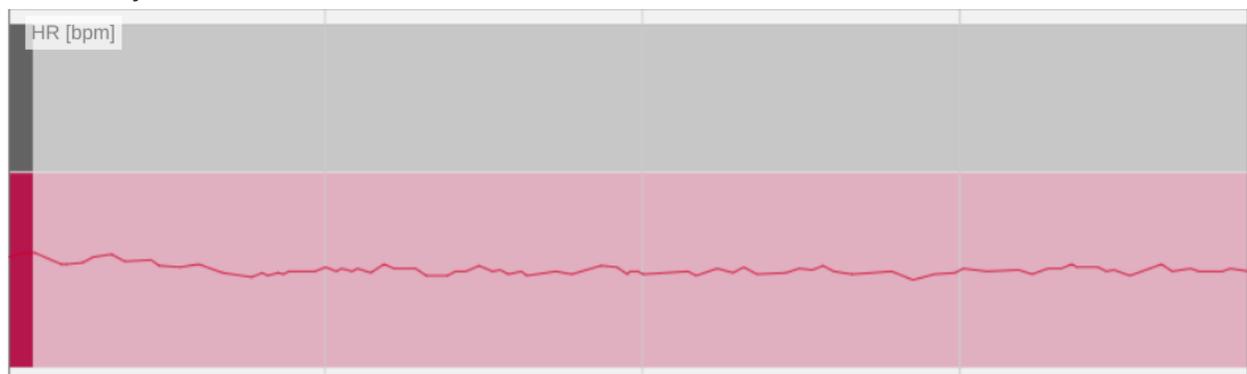
Middle: 75

Scare #2: 79.25

Mid-End: 77.25

End: 74.75

Zebra subject 1



Average throughout: 68 bpm

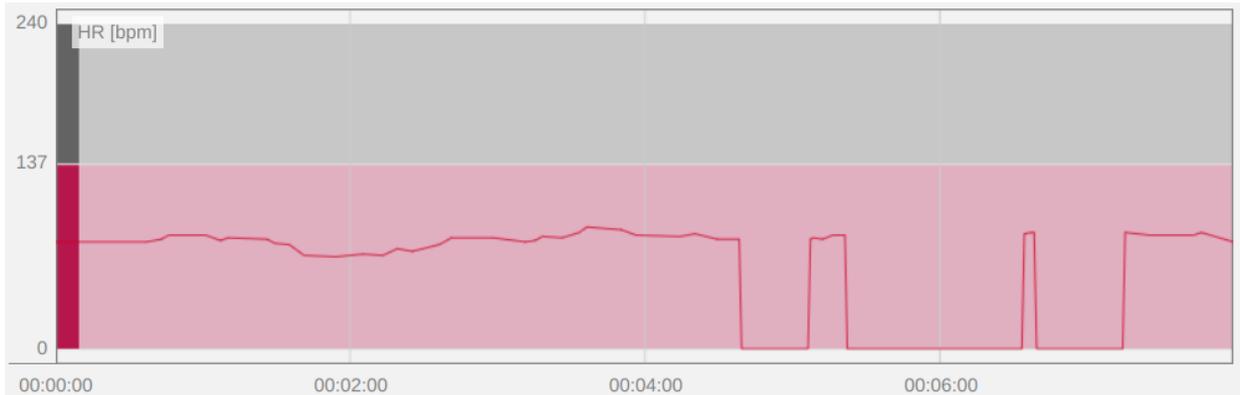
Max: 80 bpm

Min: 61 bpm

First Scare Average: 65.77 bpm

Second Scare Average: 68.42 bpm

Zebra subject 2:



Average throughout: 80 bpm

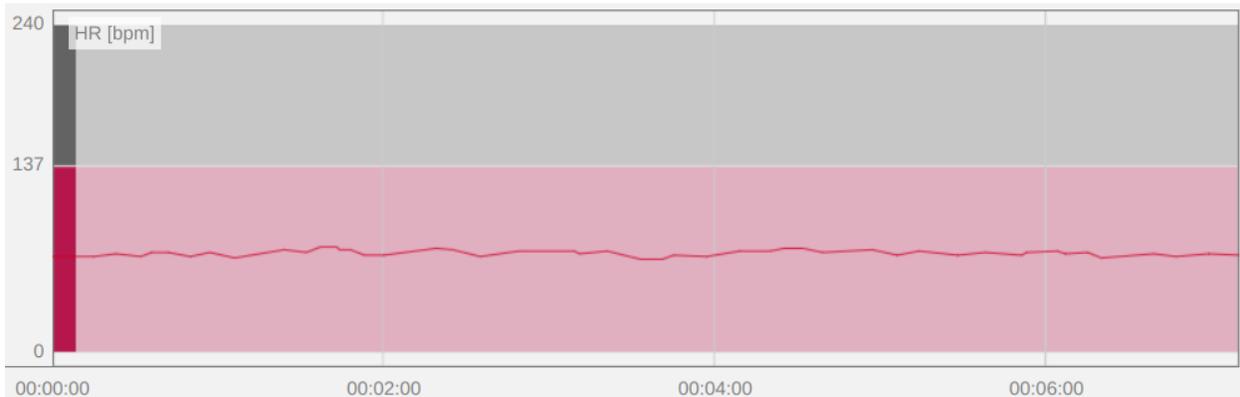
Max: 90 bpm

Min: 68 bpm

First Score Average: 82.88 bpm

Second Score Average: Unknown due to error of monitor (it didn't pick up participants heart rate)

Zebra subject 3:



Average throughout: 72 bpm

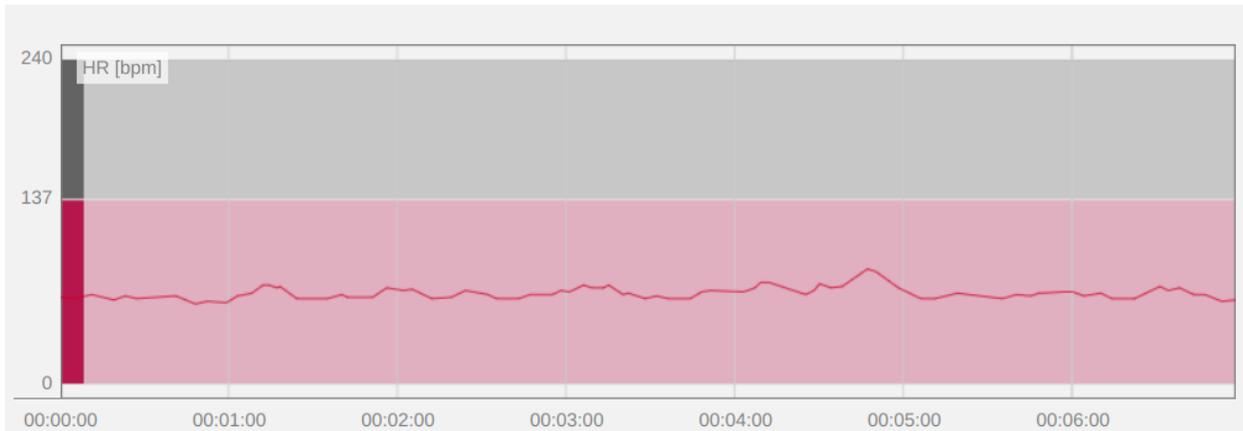
Max: 77 bpm

Min: 68 bpm

First Score Average: 73 bpm

Second Score Average: 74 bpm

Zebra subject 4



Average throughout: 66 bpm

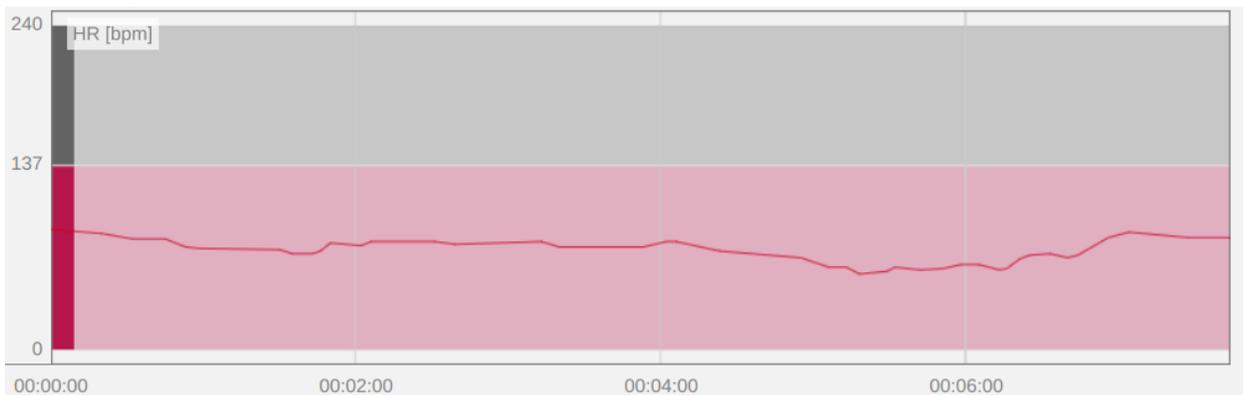
Max: 85 bpm

Min: 59 bpm

First Score Average: 67.50 bpm

Second Score Average: 83.33 bpm

Zebra subject 5



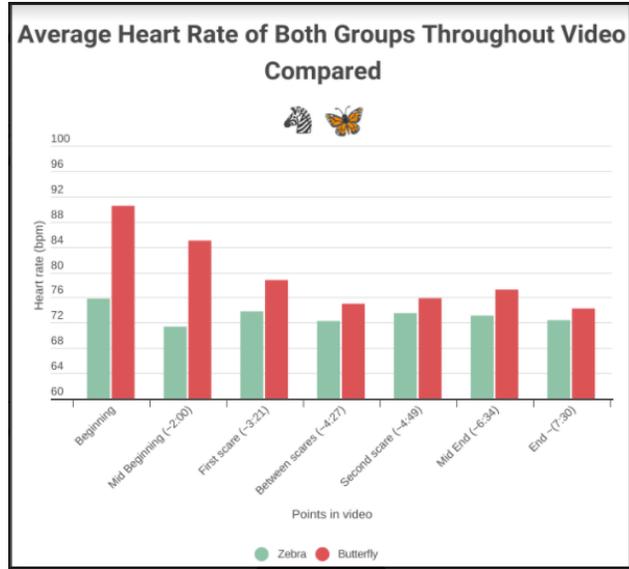
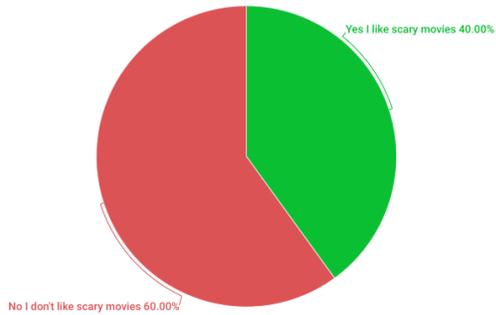
Average throughout: 74 bpm

Max: 89 bpm

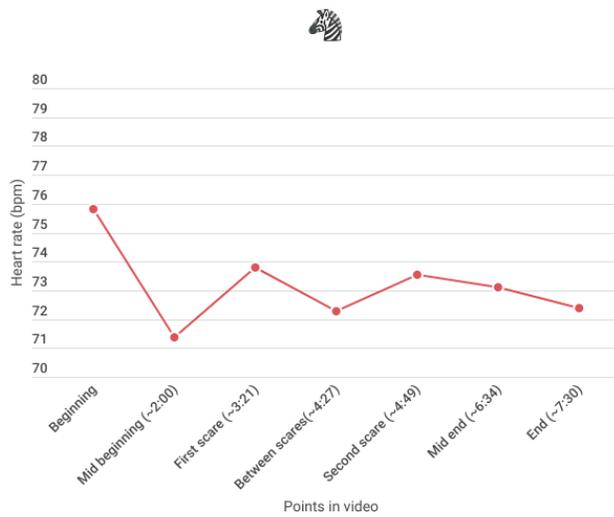
Min: 56 bpm

First Score Average: 79.80 bpm

Second Score Average: 68.33 bpm

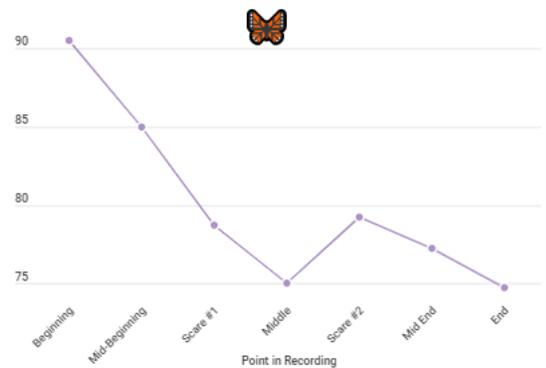


Average Heart Rate of Group Zebra Throughout Video



Beginning: 75.8 bpm
 Mid beginning: 71.38 bpm
 First score: 73.79 bpm
 Between scores: 72.27 bpm
 Second score: 73.52 bpm
 Mid end: 73.12 bpm
 End: 72.4 bpm

Average Heart Rates



Averages:
 Beginning: 90.5 bpm
 Mid-Beginning: 85 bpm
 Score #1: 78.75 bpm
 Middle: 75 bpm
 Score #2: 79.25 bpm
 Mid-End: 77.25 bpm
 End: 74.75 bpm



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- Got bear picture from pbs.org (got it on a google search image)
- Stressed person image found on google search from heart.org
- Physical actions of fight or flight image found on google search and is from verywellmind.com
- Heart with heart rate going through it found on google search images from dreamstime.com
-

Application to the real world:

If we were able to expand and dive deeper into this study we could possibly access more knowledge of anxiety and panic attacks and maybe find new ways to calm the heart rate. It could almost endlessly lead to studies on how the heart rate changes, how fast it can and it could lead to a way for us to gain a better understanding of how to slow the heart rate more efficiently during panic attacks or trauma. It could help people with heart conditions know what scares could do to their heart, and know how to keep their heart rate low. We could expand on how fast the heart rate changes and discover more proof on how powerful the mind is and how it can affect fear and your heart rate. There are so many possibilities for our project to expand on.

This science project currently serves us personally as knowledge. It shows us how powerful our brains can be and how being scared can affect your heart rate. If we were able to expand and dive deeper into this study we believe that we could access more knowledge on our autonomic nervous system, anxiety and overall more about the human heart rate. We could try to figure out if or why watching scary movies can be harmful for people with heart conditions. Expanding our research could have us learn what fear does to people with these conditions and learn what things can help lower a person's heart rate in an emergency situation. This research could enable us to figure how fast the heart rate can change and could eventually lead us to a way to calming a raging heart rate during panic attacks or trauma. There are so many possibilities for us to expand and apply our research to and this project could just be the beginning.

Conclusion:

From our results we have concluded that our hypothesis was correct. During the average group heart rates, we noticed the group Butterfly, the group that knew the scares were coming, had a higher heart rate than group Zebra who didn't know the scares were coming. We thought from personal experience watching scary movies, if we know a scare is coming but have not watched the movie, we get nervous, and our heart starts pacing. The music, the set of the scene or in our test case us telling participants there is a scare, are all clues that something big is going to happen. One thing we did not suspect would occur, was that the Butterfly group constantly had a higher heart rate. We did not tell them there would be two different scares, so it could be expected their heart rate would drop excessively after the first scare because they didn't think another scare would happen. It did not drop though. It stayed slightly higher than Zebra after the first scare. Butterflies high heart rates were what we hypothesized. In our hypothesis we stated "We suppose their heart rate will not increase drastically but it will increase from their average in the calm part to the scare.". This was true for both groups. Their heart rate spiked during the scares but not drastically. Overall our experiment was a success, it proved our notion about heart rate during scares.

Research acknowledgements:

- <https://www.medicalnewstoday.com/articles/anxiety-with-heart-palpitations#:~:text=Anxiety%20causes%20mental%20and%20physical,which%20increases%20their%20heart%20rate>.
- <https://www.healthline.com/health/anxiety/can-anxiety-cause-heart-palpitations#the-anxiety-response>
- <https://www.hopkinsmedicine.org/health/conditions-and-diseases/anxiety-and-heart-disease>
- [Anxiety and Stress Disorders Institute of Maryland](#)
- <https://www.healthline.com/health/how-do-horror-movies-affect-your-mental-health#physiological-effects>
- <https://www.sciencedirect.com/science/article/abs/pii/S0191886920305882>
- <https://www.nationalgeographic.com/science/article/how-horror-movies-can-help-overcome-trauma-and-relieve-stress>
- <https://psycnet.apa.org/record/2018-58515-001?errorCode=invalidToken>
- <https://www.sciencedirect.com/science/article/pii/S1053811920300094?via=ihub>
- <https://mprcenter.org/>
- <https://www.nm.org/healthbeat/healthy-tips/emotional-health/5-things-you-never-knew-about-fear#:~:text=As%20soon%20as%20you%20recognize,pressure%20and%20heart%20rate%20increase>.
- <https://www.health.harvard.edu/staying-healthy/understanding-the-stress-response>
- <https://www.cci.health.wa.gov.au/-/media/CCI/Mental-Health-Professionals/Anxiety/Anxiety---Information-Sheets/Anxiety-Information-Sheet---01---What-is-Anxiety.pdf>