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# Visual Stimulus Effect on Jump Scares

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# Introduction

- Jump scares are commonly used in horror experiences for a predictable, forced physical response
  - Is it possible to accompany a startling sound with any visual to achieve the same response?
  - Is this response reliably measured using biometrics?
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# Background/Literature Review

- 2012 study by Haddad et al.
    - Research on stimulus generalization versus sensitization
    - Generalization = acquiring a conditioned fear response to a threatening cue
    - Sensitization = conditioned fear of a non-threatening cue
  - 2001 study by Chester Roy Wildey
    - Supporting data that skin independence can show a physiological response. And indicate a future response before another stimulus is shown
  - 2010 study by Jason Armfield
    - Four symptom groups: emotional, physiological, cognitive, and behavioral
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# Research Questions

- If a negative startling experience is diluted with a visual stimulus that is emotionally rewarding, can the negative emotional response of a startling sensation be mitigated?
  - How can we condition fear to manipulate user's emotional state in anxious experiences?
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# Research Methodology

## *Tools and equipment:*

- Neulog Sensors
    - Heart Rate and Pulse Logger Sensor
    - Galvanic Skin Response (GSR) Logger Sensor
  - NeuLog software, run on Mac operating systems
  - Microsoft Excel
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# Research Methodology

|                      |   |
|----------------------|---|
| Control Group        | Group of participants who viewed the negative stimulus (scary) before the positive stimulus (cute). |
| Experimental Group   | Group of participants who viewed the positive stimulus before the negative stimulus.                |
| Independent Variable | The negative or positive stimulus presented to the participant.                                     |
| Dependent Variable   | Participants' change in heart rate and galvanic skin response.                                      |

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# Research Methodology

## *Data types:*

- Quantitative data
    - Collected through NeuLog's free downloadable software
  - Qualitative data
    - Recorded by experimenters on participants' comments and physical behaviors
    - Participant self-reported data in the form of a post-experiment questionnaire
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# Research Methodology

## *Stimuli:*

- Negative or “scary” stimulus
  - Scary monster zombie still image
- Positive or “cute” stimulus
  - Short clip of corgi puppies running in grass
- Both stimuli were presented under the same conditions
  - Eerie music with spiral illusion for 24 seconds prior to stimulus
  - Stimulus was accompanied by a high pitched scream to elicit a scare





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# Hypothesis

**Experimental group Z** (primed with a negative visual stimulus) will anticipate another scary visual in the second section, thus their stress levels will be heightened.

**Experimental group D** (primed with a positive visual stimulus) will be more relaxed, because their previous experience with the jump scare was more positively rewarding.

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# Research Methodology

## *Participants:*

- 16 participants
  - Aged 19 to 22 years old
    - 56% aged 20 years
  - 9 males
  - 7 females
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# Research Methodology

## *Procedure:*

- Participants informed that research was based on the study of the physiological effect of an optical illusion sensation
  - Two computers, NeuLog sensors
    - GSR and Pulse set to an experiment time of 5 minutes, sampling rate of 20
  - Consent form signed
  - Video played
  - Post-experiment questionnaire
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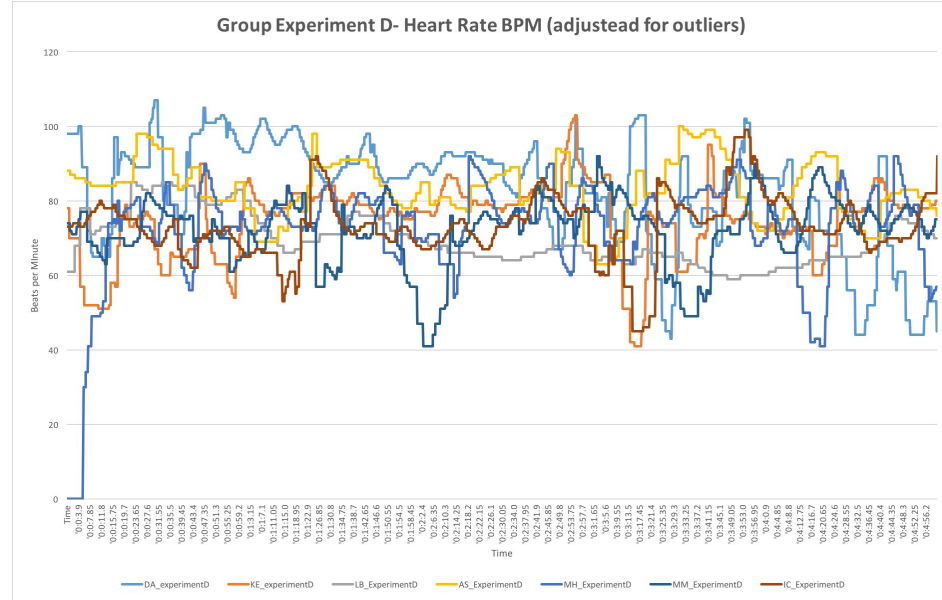
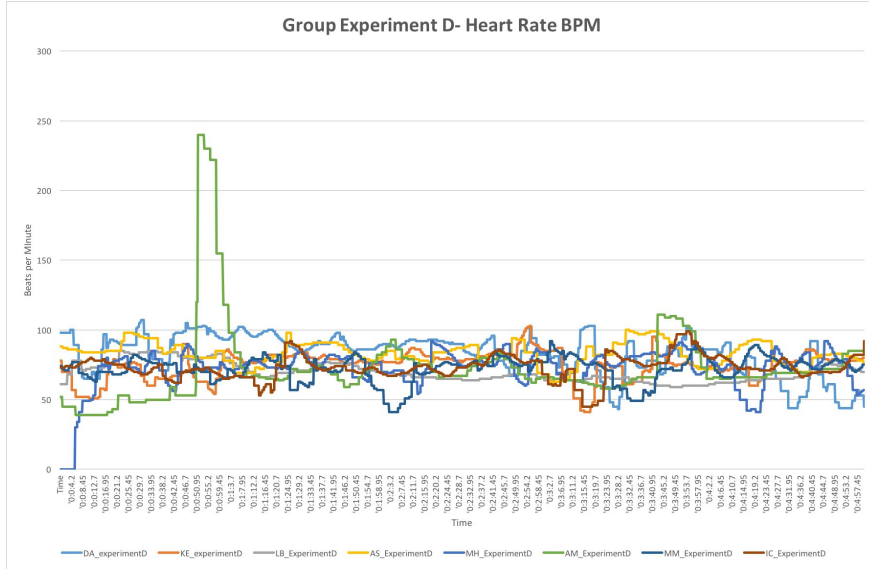
# Findings

Participants in Group Z experienced a more negative emotional response to both stimuli than those in Group D

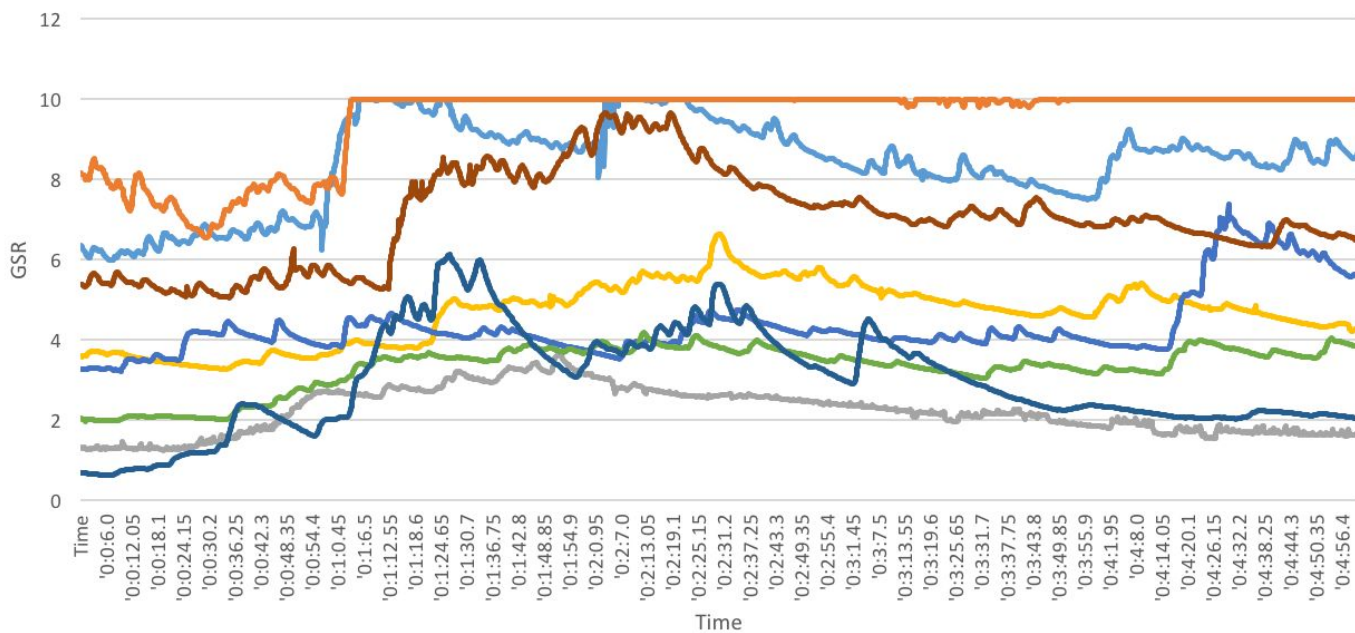
If users are exposed first to a positive stimulus, they are more likely to be less affected by the jump scare sensation

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# Data

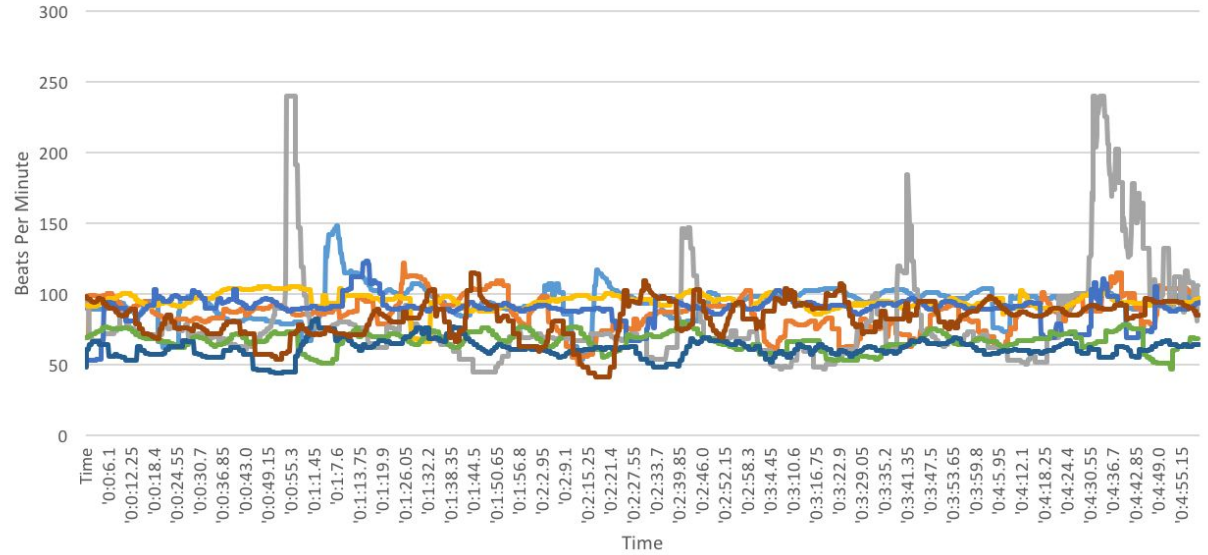


## Group Experiment Z - GSR



AC\_ExperimentZ AM\_ExperimentZ CW\_ExperimentZ KB\_experimentZ  
NZ\_ExperimentZ RM\_ExperimentZ SL\_ExperimentZ SS\_experimentZ

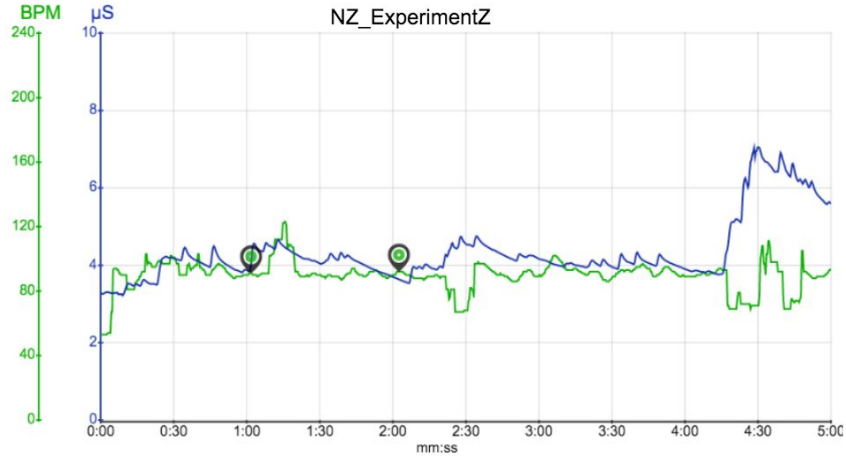
## Group Experiment Z- Heart Rate BPM



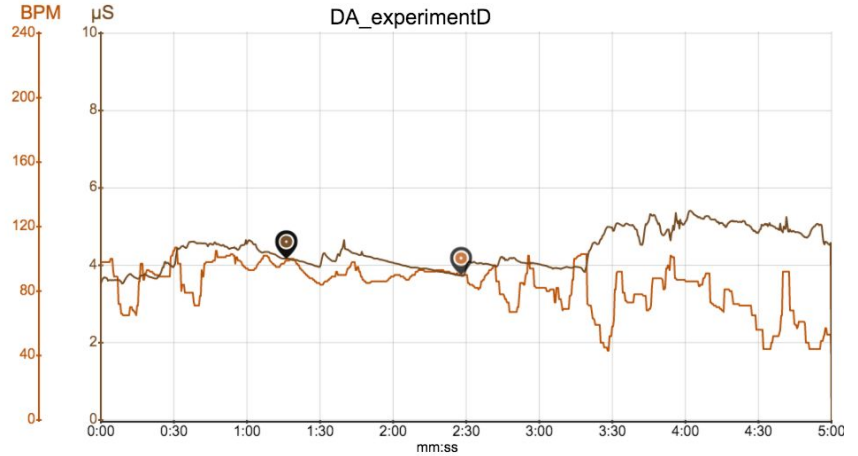
AC\_ExperimentZ AM\_ExperimentZ CW\_ExperimentZ KB\_experimentZ  
NZ\_ExperimentZ RM\_ExperimentZ SL\_ExperimentZ SS\_experimentZ

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# Data



Negative stimulus first



Positive stimulus first

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# Data

## *Participant Comments: Group D*

- Jump scare startled them initially, but were immediately relieved once the puppy visual registered as nonthreatening
  - Viewing the puppy first led anticipation to something else appearing the second time, therefore not as startled by the scary stimuli
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# Data

## *Participant Comments: Group Z*

- Higher likelihood to comment on displeasure for anxiety inducing experiment, much stronger visual and physical (jumping, turning away, etc.)
  - Conditioned to expect scary stimulus to occur again in the second round
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# Data - Questionnaire Results

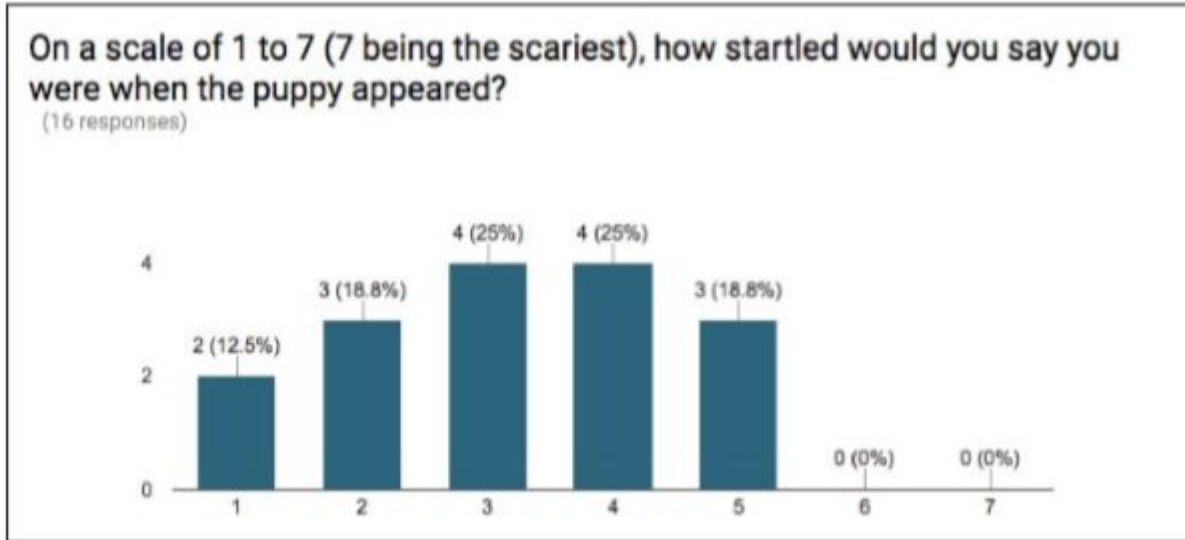


Figure 8.2: Results of the question “On a scale of 1 to 7 (7 being the scariest), how startled would you say you were when the puppy appeared?”

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# Data - Questionnaire Results

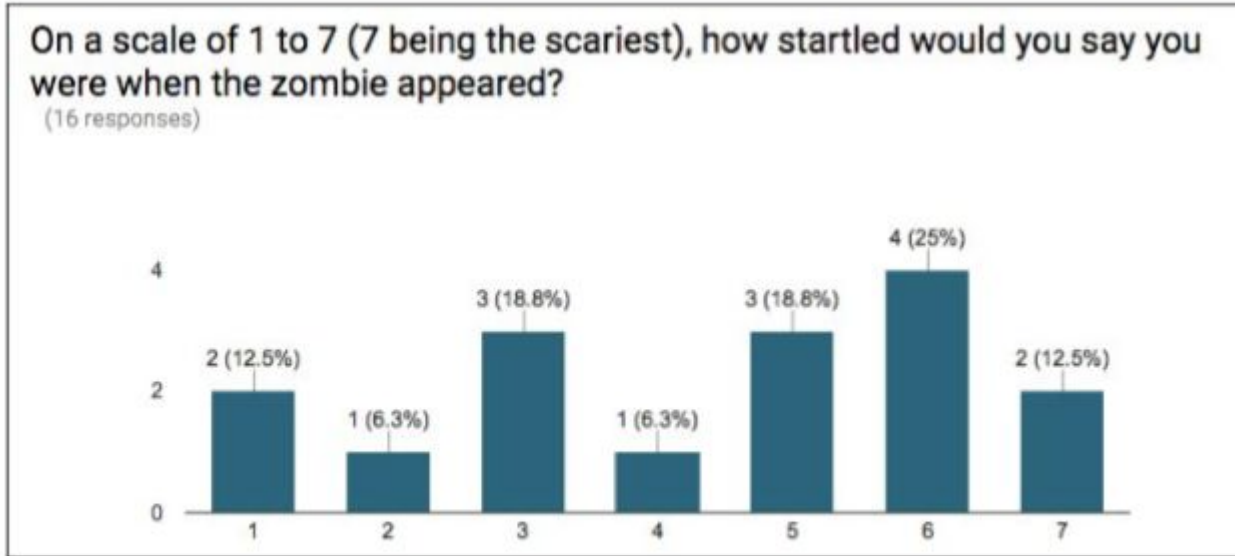


Figure 8.3: Results of the question “On a scale of 1 to 7 (7 being the scariest), how startled would you say you were when the zombie appeared?”

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# Data - Questionnaire Results

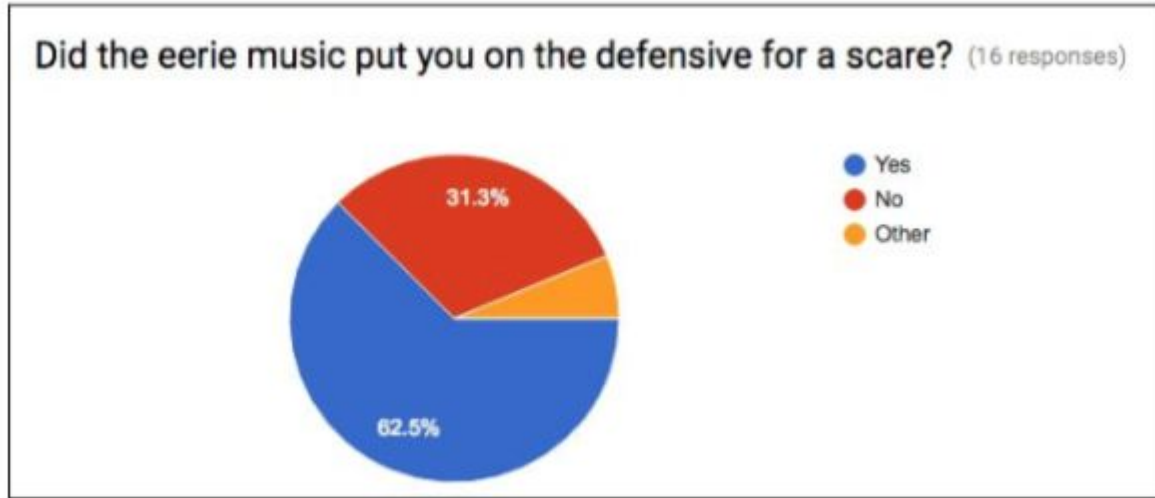


Figure 8.4: Results of the question "Did the eerie music put you on the defensive for a scare?"

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# Data - Questionnaire Results

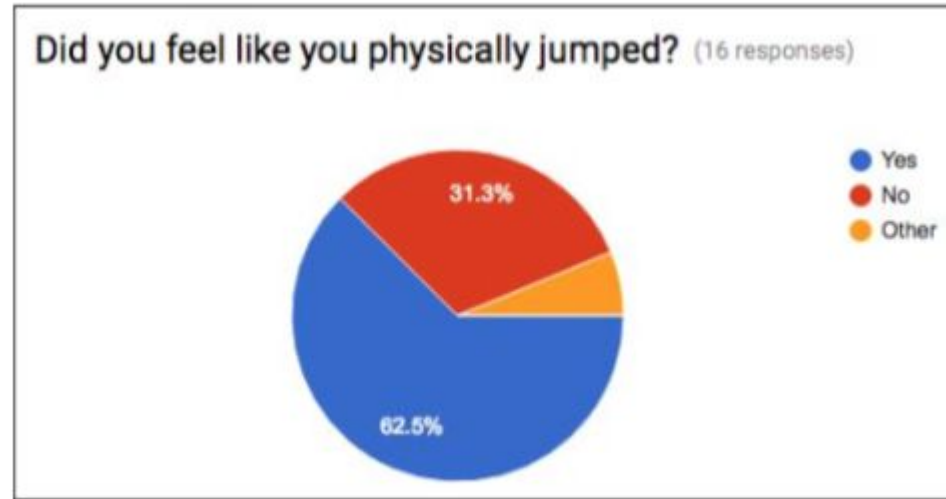


Figure 8.5: Results of the question "Did you feel like you physically jumped?"

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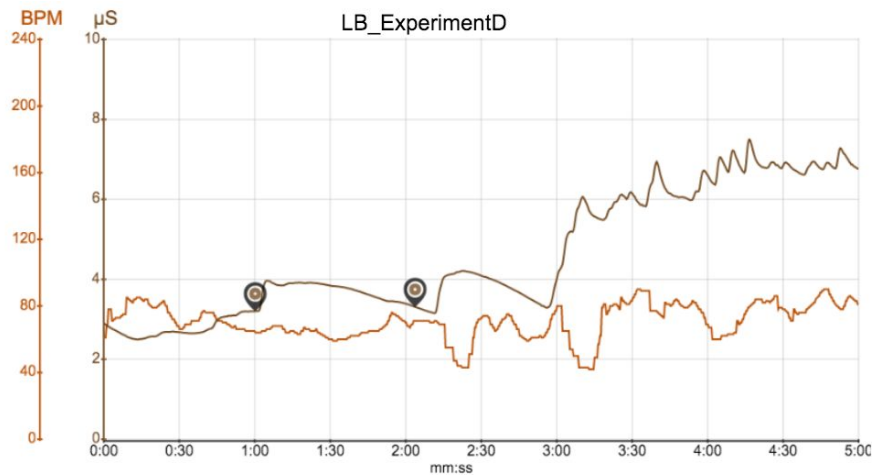
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# Discussion

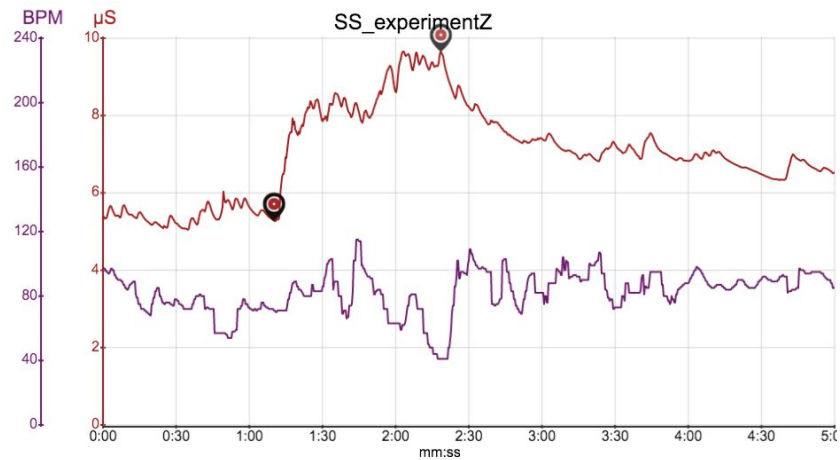
As anticipated: participants experience less drastic changes in biometrics to positive stimulus as opposed to negative stimulus

Findings are consistent and support the original hypothesis of the experiment

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Positive stimulus first



Negative stimulus first

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# Discussion

## *Relation to the media experience:*

The stimulus presented in an anxious environment can impact a user's emotional state for the duration of the experience

Users can be manipulated by external factors regardless of the stimuli that is intended, and can be primed to be less affected by stimulus meant to be uncomfortable by first presenting the user with more comfortable stimulus

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# Conclusion

It is possible to mitigate the stress levels of users in a high anxiety state with regard to startling sensations such as jump scares.

The results from this experiment can help researchers better understand how to condition fear. As fear is an adaptive trait, it is malleable and can be altered over time with new experiences.

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# Limitations

- NeuLog sensors were difficult to place perfectly on users, especially when participants were physically startled
  - NeuLog software was difficult to customize
  - Personal bias was not factored into the study
  - Zombie image was a still image, and the puppies were moving image
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# Future Research

1. Run the experiment in a more controlled environment
  2. Add an additional experimental group
  3. Keep the experimental design more consistent
  4. Remove music and note the music's effect
  5. Add a third experimental group (group ZZ) that watched negative stimulus both times
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# Questions?