MSc in Computational Cognitive Neuroscience

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Exploratory study: Investigating the impact of music and synchrony in fear responses

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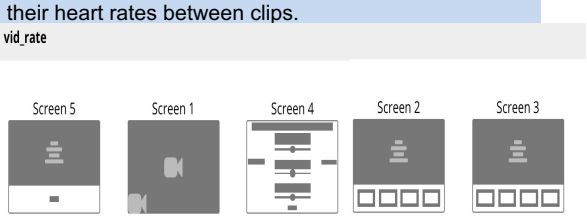
Introduction

The paradox of horror, why people enjoy horror movies, has been researched extensively (Lehne and Koelsch, 2015) . However, there is a gap in our understanding how these films have a significant influence on emotion. This study focuses on one primary technique well-established in horror movie (jump scares) and investigates how audio manipulation influences not only fear experiences but their perception of what is scary.

This exploratory study will be investigating inter-subject similarities/differences in a fear-inducing setting. Previous studies suggest there is a relationship between sound and the experience of fear in horror movies however they only utilize self-report. There is a lack of research that empirically shows the impact of auditory stimulation on fear within the genre. Grab Heart will be used to track hear rate changes of participants. OpenFace will be used to measure facial movement throughout the experiment. Both modalities were chosen for the significant advantage of being virtual and their ease of use.

Methods:

Around 300 participants will be recruited online using prolific, they will be monetarily compensated for their time. Their emotion regulation will be assessed through self report. Heart rate and video responses are collected during the experiment. Participants view 10/16 randomized video clips, 3 of which are horror movies with Jump scares. The remainder are 'filler' clips from other genres designed to blind participants. They are also required to answer a series of questions between each clip as an attention check and to calm their heart rates between clips.



Aim: To what extent does manipulating the timing and synchrony of jump scares in horror media influence fear responses?

H1: Self-reported fear will be positively and linearly associated with heart rate showing high arousal from the stimulus (manipulated audio).

H2: Audio played prior to the image will evoke a larger fear response

H3: Individuals with a higher nervous predisposition will show respond more significantly to the manipulation

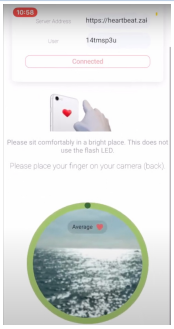
Data collection and Analysis:

Two measures of fear response will be used. Grab Heart is a smart phone application which allows heart rate to be measured remotely using the LED lights on the user's device. Recordings are stored on a unique server specific for the experiment.

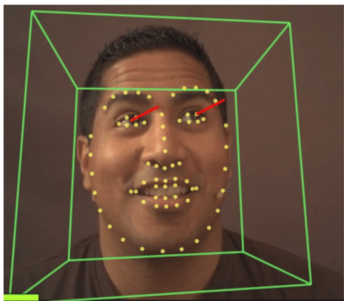
OpenFace is an opensource toolkit that enables facial behavior to be analyzed. Participant's head pose (translation and orientation) and facial responses can be detected from the webcam files to supplement the heart rate data. Data can then be extracted and analyzed using MATLAB/Python.

The heart rate signals, and facial behavior will be analyzed by synchronizing the measures with the participant protocol. Participant data will be grouped according to the manipulations they participated in. Both between subject and within subject quantitative and qualitative outcomes will be analyzed.

Grab Heart: Heart rate measured using LED light on smart phone



OpenFace: measuring the extent of fear responses



Inter-subject correlation will be used to assess similarities in physiological responses across viewers brains, this can be found for each subject as the average Pearson's Correlation compared to other participants

Summary

This project extends previous research into arousal and fear responses within psycho-cinematics by isolating a single aspect of horror-media to gain further insight into perception.

Horror moves rely on both visual and auditory stimulation so isolating components will provide an insight into how virtual stimuli influence fear – whether both stimuli are required for effective responses.

Future Direction

Expand the study to be more immersive using face-to-face methodologies and utilizing *emotibot* for real time data collection

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Reference:

Lehne, M. and Koelsch, S., 2015. Toward a general psychological model of tension and suspense. Frontiers in Psychology, 6.

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