

Introduction

- The device created emits vibrational pulses to help reduce the users' stress.
- Stress is a reaction that can negatively affect many people (Cleveland Clinic 1).
- Stress relieving activities such as exercising take time away from the task that is trying to be completed (HelpGuide 1).

Creating a Device that Reduces Stress by Using Vibrational Pulses

Conclusion

- Group 2, which received the heartbeat vibration pulses, scored a higher score on the summary by 12.5% than Group 1. A higher score by Group 2 was predicted.
 - This explains that Group 2 was more focused on the task. The participants in Group 2 who received the pulses were able to comprehend the article more discernively and was able to write a better summary based on the article compared to Group 1.
- The experimental group (Group 2), scored 4 more points on the responsiveness on the STAI Test than Group 1. A higher score for this test was not predicted.
 - Results explain that Group 2, which received the vibrations, was more stressed during the task compared Group 1, which did not receive the vibrations

Purpose

- The device aims to help reduce stress
- It is a cost efficient solution to reducing anxiety levels
- The solution of the device does not take away time from the task that is trying to be completed

Methods

Controlled Variables

- Tests were conducted in a quiet environment
- Every participant wore the device
- Same summary and STAI test was given
- 5 minute time period to write the summary for every participant
- Participants were around the same age of 14-15
- Vibration pulses were the same speed of 2 pulses every 800ms for every participant in Group 2

Materials

- Components are attached to Arduino Gemma M0 and placed inside 3D printed casing
- Silicone bands are attached to casing for wearability
- When device is powered on, it is coded to emit vibrations at 2 pulses every 800ms. Speed can be adjusted based on values inputted into the coding

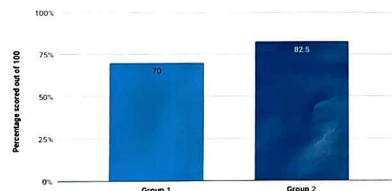
Discussion

- Research from (Scientific Reports, 2285) supports the results of the article summaries having higher scores for Group 2. In their experiment, participants gave a public speech while receiving vibrational pulses, which was graded. The group that had received the pulses also achieved a higher score on task with the assessment and receiving higher scores. Even though Group 2 achieved a higher score on the summary, their questionnaire score was lower. They were more stressed than Group 1 and the data suggests that the vibrations did not help lower stress levels for Group 2.
- Limitations
 - Vibration from the device were not very strong. Vibrations can be felt, put are not very distinguishable while completing the task
 - Sample size was low. More participants could have resulted in different findings
 - A five minute period to write the summary increased the difficulty of the task based on time and not the attention being given on the task

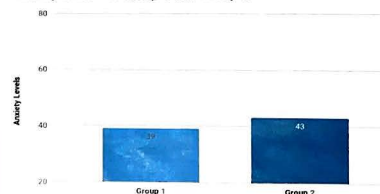
Literature Review

- A slow heartbeat pulse has a calming effect on the physiological sense of a person (Scientific Reports 2285).
- A fast rhythm creates a more energetic feeling while a slower rhythm creates a more calming feel (Motivation & Emotion 19).
- A resting heart rate is around 60-100 beats per minute (Mayo Clinic 1).
- State-Trait Anxiety Inventory (STAI) test can measure state anxiety and anxiety about an event. A higher numbered response concludes that the participant had greater anxiety (The Corsini Encyclopedia of Psychology 1).
- Vibrational pulses made people focus more clearly than without vibrations (Scientific Reports 2285).

Percentage Scored on Summary for Group 1 and Group 2



Anxiety Levels of Group 1 and Group 2



Implications

- Use a heart rate sensor for device to work automatically
 - Device will scan the participants' heart rate and emit pulses
 - The pulses will be a certain strength and tempo depending on the heart rate of the participant
- Create an application for other branded device that already have vibration motors
 - Will be more resourceful for consumers
 - Pulses can also be adjusted based on user preferences

Procedure

- Have an equal number of participants in Group 1 and Group 2
- For both groups, give participants the device for them to wear
- Give participants 5 minutes to read a chosen 6 page article and write a summary based on the reading. Have Group 2 receive the vibrational pulses from the device while completing the task
- After the 5 minutes is over, give participants the STAI test

Results

Summary Assessment

- Group 1 had a 70% average score
- Group 2 had a 82.5% average score
- Group 2 had a 12.5% higher score than Group 1

STAI Assessment

- Group 1 had a 39 point average
- Group 2 had a 43 point average
- Group 2 had 4 more points than Group 1 for anxiety levels

Pugh Matrix

| Criteria | Proposed | Alternative | Key: |
|----------------|----------|-------------|--------------------------------------------------------|
| | | | + : More efficient - : Less efficient 0 : Same |
| Compact | 0 | 0 | |
| Comfortable | 0 | 0 | |
| Pulse Strength | - | + | |
| Cost | + | - | Alternative: Doppit (Scientific Reports 2285) |
| Safe | 0 | 0 | |
| Easy to Use | 0 | 0 | |
| Total | 0 | 0 | |

Works Cited

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