A video game to help improve young people’s mental health

Giving people skills to manage their emotions through regulated breathing
We are developing a video game that interacts with players’ real-life emotional states, teaching players to manage their emotional responses using their breathing.

The need

Young people’s ability to control their emotional responses is very consequential, whether they are sitting an exam, dealing with unstable family life, getting bullied in school or being tempted by friends into risky situations.

Childhood and adolescence are critical times for developing the skills to effectively regulate emotions and deal with stressful situations. Teaching young people to manage stress and develop their emotional resilience can increase their wellbeing and ultimately help reduce the incidence of mental health problems. Half of common mental health disorders in the UK start by the age of 14, and ultimately affect 1 in 4 people at some point in their lives.

However, despite the existence of proven methods for managing emotional responses using simple behaviours such as regulated breathing, there are almost no effective, mass scale, non-stigmatised interventions to help young people learn these methods.

The solution

Shift, formerly known as We Are What We Do, is developing a video game that interacts with players’ real-life emotional states, teaching players to manage their emotional responses using their breathing. The more in control of their breathing and heart rate the player is, the better they do in the game. Players are rewarded for staying calm under pressure, creating a feedback loop which fosters habits of emotional self-control, crucial in the development and maintenance of good mental health.

The game uses wearable sensors to measure and analyse players’ breathing and heart rate, with the data then fed back to the player in real time so that they learn what their body is doing and the effect that their controlled breathing is having on their heart rate variability (HRV).

HRV is the variation in the length of time between heartbeats. An increased HRV shows that the heart is more responsive to messages from the body and environment, speeding up and slowing down more easily and quickly. Higher HRV shows that a person’s nervous system is better able to cope with, and adapt to, physical and emotional stress and is associated with better physical and mental health. HRV can be increased by regulated breathing, which has also been shown to have an independent positive effect on people’s anxiety levels and is recommended as a relaxation technique by the NHS¹ and Bupa².

Benefits

Preventative

The game can be used by anyone to improve their wellbeing (and is not targeted at individuals with existing mental health issues). Increased wellbeing levels have been found to buffer the impact of stress³ and prevent the onset of mental illness⁴, and they are associated with better physical health and longevity⁵,⁶, and improved immune system functioning⁷.

Relevant and stigma-free

Stigma around mental health issues still exists, preventing some young people from seeking help. By embedding the breathing intervention into a video game, and not advertising the health benefits of the game to young people, we are reaching young people who are not looking for mental health products, but can still benefit from the increase in wellbeing.

Habit-forming

Video games are designed to be enjoyable, and to encourage young people to play frequently. Building in the breathing intervention into a video game increases the likelihood that young people will practice regularly.

Scalable

9 in 10 children aged 5 -15 use some form of device to play video games at home and young people spend an average of 8.7 hours a week gaming⁸. Embedding emotional regulation training into a video game has the potential to reach a huge number of young people.

Evidence-based

The game is underpinned by a substantial clinical evidence base demonstrating the effect that regulated breathing can have on stress and anxiety, the relationship between wellbeing and HRV, and the impact of HRV biofeedback interventions⁹.

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What we’ve done so far

Research
The development of the game has been based on a review of the literature on the relationship between HRV, breathing, emotional regulation and wellbeing. We have also worked with video games expert Tom Chatfield to assess how the engaging and addictive qualities of video games could be harnessed to encourage wellbeing activities centred around breathing and emotional regulation.

Interviews with teachers, youth workers, mental health paediatricians and young people themselves have helped us understand the challenges young people face in developing wellbeing, and managing stress and anxiety.

Concept testing
We tested the concept of a video game that is controlled through breathing and heart rate through structured discussions with several sets of 12-13 year old boys. This established that young people find the idea appealing. We also used this testing to select a game storyline that was relevant and intuitive for our audience.

Prototype development
Through an iterative development process, we have created a working, playable prototype game which uses live data from a wearable heart rate monitor to affect game play.

Testing
In September and October 2014, we worked with 60 12-13 year old boys at The Billericay school in Essex to evaluate the playability of the game, and its effect on young people’s self-reported wellbeing, as well as their HRV.

Partners and Support
To do this, we have partnered with:

Playlab London
A development studio which specialises in games that produce measurable positive changes. Playlab London is our game development partner, and they have led the design, development, animation and analytics of the game.

2CV
An international research agency with specialisms in gaming and digital research. 2CV have been involved in game testing and evaluation, bringing the rigorous games research used by larger game manufacturers to the project.

Complete Coherence Ltd
A leadership development consultancy which specialises in applying cutting edge research in neuroscience, physiology and psychology to improve performance in both business and sport. Complete Coherence have brought to the project the medical expertise and data analytics needed to deliver a simple but effective intervention to young people.

The Nominet Trust
The development to date has been supported by The Nominet Trust.

Next steps
The game was a finalist in the 2014 Google Impact Challenge, securing resources for a second stage of research and development. This will include:

- Product development
- Usability testing
- Impact testing with 1000 school students
- Making an HRV API public

We are also developing partnerships that will allow us to:

- Roll the project out across a large number of schools and other institutions
- Conduct clinical trials with a range of different user groups.

Please get in touch if you are interested in exploring either of these two options.
Appendix

Explaining HRV and HRV biofeedback
HRV biofeedback is a technique where a person is shown their HRV on a screen so that they can see how it changes in response to their breath. This allows them to find the breathing rate that has the highest HRV and stay breathing at this rate. Researchers have found that if participants undertook regular HRV biofeedback training they were able to increase their HRV both during the biofeedback sessions and also after the study has finished.

As higher HRV is associated with better health outcomes, increasing HRV is seen to be beneficial. Research on the impact of using HRV biofeedback has shown it can reduce symptoms of various physical illnesses including heart failure and COPD. In the field of mental health and wellbeing, studies have found that HRV biofeedback reduced the anxiety levels of college students when used on its own or in conjunction with counselling and that it was effective in reducing participants’ levels of depression, with this improved level remaining after the treatment.

What is HRV?

Heart rate variability (HRV) is a measure of how different the gaps are between each individual heartbeat. A large difference in the size of the gaps shows that the body is able to respond quickly to different signals that the nervous system is continuously sending to the brain and the heart. This has positive health implications.

How is HRV linked to health?

A person’s HRV has shown to be associated with a number of different health outcomes:

**Physical health**

Studies have shown that HRV is lower in populations with conditions including hypertension, asthma and diabetes. Lower HRV is also associated with an increased risk of sudden death from heart attacks.

**Mental health**

Research has shown that HRV is lower in populations with Major Depressive Disorder, social anxiety disorders and alcohol addiction compared to healthy populations. HRV has also been associated with good mental health/ wellbeing. For example, one study found that increased HRV was associated with higher levels of cheerfulness and calmness.

**Emotional regulation**

The ability to regulate one’s emotions, a key component of creating and maintaining wellbeing, has also been shown to have a relationship with HRV, with studies finding lower HRV in populations who later reported difficulty with regulating their emotions. Studies have also shown that HRV appears to be increased during successful performance on emotion regulation tasks.

The associations between HRV, a biological measurement, and psychological states have led to HRV being called a psychophysiological marker of mental wellbeing.

Can a person’s HRV be increased?

A person can alter their HRV through regulated breathing. Each person has a unique breathing rate at which their HRV is highest. Studies have shown that you can get people to breathe at their unique rate using HRV biofeedback.

Contact Kathleen for more information

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