STEAM It Up! Citizen Neuroscience in Suborbital Flight

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Abstract

Imagine space tourists, 70 miles above the Earth. Imagine you and your child, seeing what the space tourists see, how they feel, and, perhaps most importantly, how you and your child feel.

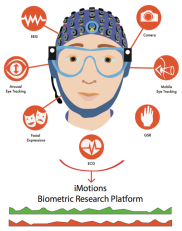
STEAM It Up! is an EPO catalyst to explore the neuroscience of positive emotions in space (**STEM**) and disseminate the results using the **Art** of storytelling.

What Moves Us

"I wish everybody could go up there, …everybody in the world, and look out that window. The world would be a different place." Astronaut Karen Nyberg.

Yes! but we can't all go. Not to the ISS and neither to space as a tourist.

While VT (virtual reality) technology will unlock a unique door to 'experience' space, experiments using SR (shared reality) create experiences in which citizen scientists can contribute to both space exploration and the growing base of knowledge about awe and its effect on us.



At the 2015 and 2016 ISS R&D Conferences, I proposed that an astronaut in the ISS cupola wear biosensors to record her emotions while a videocamera records her view. Her biometrics would be synced and analyzed in real-time using the iMotions platform. Results would be live-streamed to classes of citizen scientists on Earth also wearing biosensors.

The citizen scientists would compare the reactions of the astronaut to their own and each other's. Storytellers would coach them to share their emotional and scientific findings via effective and compelling oral narratives. The craft of in-person storytelling, perhaps more than that of written, can transform data into another type of shared reality, so interpersonal that it's capable of effecting the physical manifestation of a shared emotion, that is, goosebumps.

Preliminary Biometric Results

Using a six minute film, *The Overview: Beyond Borders,* in which the quotes of astronauts are narrated by children, we recreated the narrative of what it's like to leave Earth, see her from space, and return. With the help of iMotions in Boston, participants watched the film in a preliminary experiment. They wore biosensors to monitor electrical activity in their brains (EEG); changes in the electrical resistance of their skin caused by arousal of their emotions (GSR); eye movement and pupil dilation; as well as facial expressions at the micro level.

Participants reported feelings of awe, wonder and peacefulness, similar to those recorded by astronauts. They also reported an increase in overall interest in learning about space and the ISS; seeing more photos of Earth from space; and sharing what they had seen with others.

The iMotions biometrics confirmed statistically significant effects on engagement as well as meditation and relaxation. A sample from one participant is located at http://bit.ly/2fZJQ8b.

Conclusion

I propose that similar experiments be made with future space tourists and students of all ages on Earth in order to add to the growing base of knowledge of neuroscience in space and experiments on awe in general.

The experience of positive emotions from listening to story have been shown to have long-term, subtle effects on future decision making. A longitudinal study on the effect of listening to astronaut and space tourist stories combined with those of citizen scientists is called for.

Let's work together and fill one another with awe.