# Evoking Social Evaluative Threat Through Dance in a Virtual Environment

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## Introduction and Objective

- The stress response can be objectively measured
- Elevated heart rate (HR) and low respiratory sinus arrhythmia (RSA) indicates a stress response
- Cortisol is a major stress biomarker[1], rising in response to stressful stimuli
- Stressors incorporating elements of unpredictability, uncontrollability, and social evaluative threat (SET) are known to elicit rises cortisol levels[2]
- Competitive dance has been shown to trigger a stress response reflected by cortisol levels[5]
- Psychological stress experiments have extended to the realm of virtual reality (VR) environments[4]
- We hypothesized that our competitive VR dance will elicit a measurable stress response

Objective:

- Collect cortisol, RSA, and HR data to measure stress response from SET via dancing in VR

## Methods and Measures

Outcome measures:

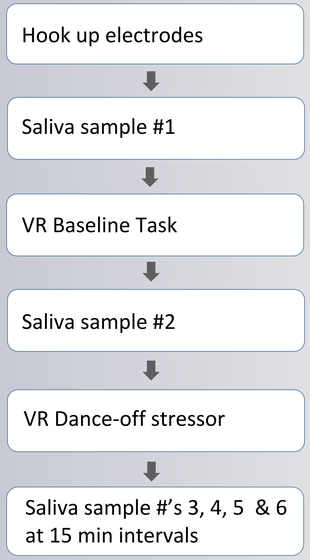
- HR via ambulatory electrocardiogram
- RSA derived from HR data
- Cortisol via enzyme-immunoassay

Experimental task:

- Control task involved throwing objects around a virtual room.
- Stress task involved dancing in front of a virtual audience 3 times.

Participants:

- 18 participants ranging in age from 18 to 40 years old




## Social Evaluative Threat

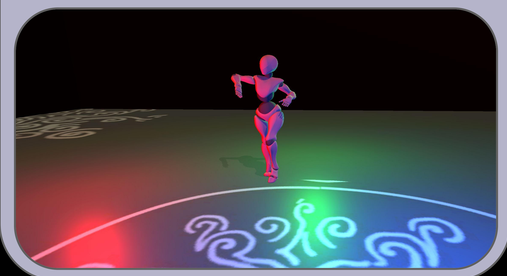
Social evaluative threat (SET), is the feeling of being judged. Existing evidence suggests that SET can elicit a powerful stress response, especially cortisol.[2]

## Uncontrollability

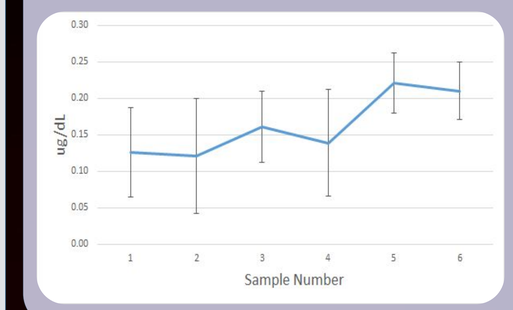
Uncontrollability is an essential component because it causes anxiety, increasing the activity in the amygdala.[2]


## Unpredictability

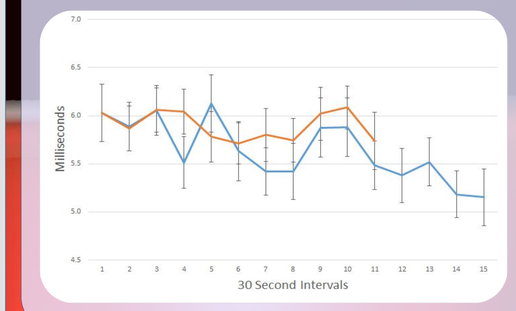
Unpredictability, has been proven to to be a powerful ingredient in stress tasks.[3]



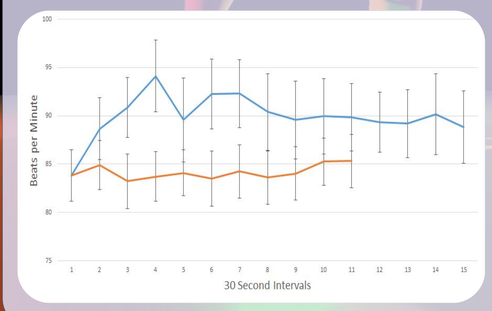
## Cortisol Reactivity p = 0.104




## RSA Reactivity p= 0.003




## HR Reactivity p= 0.001




## Discussion

- Results suggest that VR can be used to provoke a stress response
- Stressor task was more successful at triggering an autonomic response, but the HPA axis was also triggered in a majority of participants
- We suspect that the arrival and the electrode installation event may have also triggered a stress response
- Future work
  - Alternative VR stress tasks
  - Minimizing noise in the data
  - Analyze pre-ejection period data

Citations:

1. (Shirtcliff, Peres, Dismukes, Lee, & Phan, 2014; Rohleder, Beulen, Chen, Wolf, & Kirschbaum, 2007; Boyce & Ellis, 2005)
2. (Dickerson & Kemeny, 2004; Rohleder, Beulen, Chen, Wolf, & Kirschbaum, 2007; Corbett & Simon, 2015)
3. (Mason 1968; Corbett & Simon, 2015)
4. (Slater, Pertaub, Barker, & Clark, 2006)
5. (Rohleder, Beulen, Chen, Wolf, & Kirschbaum, 2007)