

The Meditation Chamber : A Debriefing

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Introduction

During the Emerging Technologies exhibition at Siggraph 2001, over 400 attendees experienced The Meditation Chamber. This immersive, bio-interactive environment was designed to use visual, audio, and tactile cues to create, guide, and maintain a user's guided relaxation and meditation experience. During this sketch, the project's producers will discuss the design and implementation of this unique installation. We will also show footage from the experience and discuss the subjective relaxation measures and the GSR, heart rate and respiration data generated by 411 Siggraph attendees.

Design and Instrumentation

The system was designed over a period of several months by an interdisciplinary team of computer scientists, psychologists, artists, and educators. The end product was a three phase experience that offered a sampling of basic meditation and relaxation techniques to a user wearing a head-mounted display and a collection of biometric sensors. The three phases included an initial relaxation phase, a progressive muscle relaxation phase, and closed with an extended meditation called "following your breath". Galvanic skin response, respiration, and blood volume pulse were collected using the ProComp+, a commercially available device produced by Thought Technologies. The real-time biometric data was used to partially control the environment, shaping the user's experience.

Subjective and Objective Results

A t-test showed that self report, post-session relaxation ratings ($M=8.00$, $SD=1.69$) were significantly higher than pre-session ratings ($M=5.63$, $SD=1.75$), $t(410)=-24.45$, $p=.0001$. A ten-point Likert-type scale was used. Forty-nine of the 411 participants reported equal or lower levels of relaxation following the experience, with 18 of these reporting the same level, and 30 reporting decreases in relaxation of 1-3 scale points. The other 362 participants reported levels of relaxation 1-8 points higher following the experience, with a mean difference of 2.88 scale points between pre and post session ratings. There were no gender differences on either relaxation rating.

With respect to objective measures, preliminary analyses show that two general patterns of GSR profile can account for nearly 75% of the generated data and are each generally accompanied by two distinct respiration profiles. Just over half of the participants exhibit what can be called a novice GSR profile. This means that their GSR level starts relatively high, descends through the first phase of the experience, picks back up and shows peaks in the muscle relaxation phase, and then begins to decline again in the final phase, ending up at or beneath the low established in the first phase. Breathing patterns in individuals exhibiting the novice profile tend to be steadier and deeper in the final phase than in the first phase.

The second profile, which accounts for nearly a quarter of the GSR data, is termed the expert profile. Individuals exhibiting this profile show precipitous drops in GSR during the first phase, entering a very low and often flat GSR state before the muscle relaxation phase begins. This flat-line state is typically maintained throughout the remaining two phases of the experience, and is accompanied by a very steady but not necessarily deep breathing pattern. Individuals exhibiting the expert GSR profile also show very consistent respiration rate and amplitude throughout the experience. As we move forward, we plan to employ Principal Component Analysis to verify these preliminary findings.



Images clockwise from top: 1) A sunset image from the first phase of the experience where the user's GSR controlled the speed of the sunset. 2) A first person perspective of the male arm-flex exercise from the progressive muscle relaxation phase. 3) A third person perspective of the female eye-flex exercise from the progressive muscle relaxation phase.