

Using multi-method measures in consumer research investigating eye-tracking, electro-dermal activity and self report

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Publication date:
2012

Document Version
Early version, also known as pre-print

Citation for published version (APA):
Mattsson, J., Sparks, B., Perkins, H., Wang, Y., & Shao, W. (2012). *Using multi-method measures in consumer research investigating eye-tracking, electro-dermal activity and self report*. Paper presented at 30th International Congress of Psychology, Capetown, South Africa.

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Using multi-method measures in consumer research investigating eye-tracking, electro-dermal activity and self report

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ICP 2012



AIM TODAY:

Description of problem

Discussion of eye-tracking, EDA and self report

Reporting on a pilot study

Implications for future research



Background

- Attention and emotional responses to experiences
- A reliance of self report verbal indicators
- Wanted to look at alternative and/or complementary approaches
- Led to combining:
 - ▶ eye-tracking
 - ▶ electro-dermal activity
 - ▶ self report

Introduction

- *Emotions*

Background to rationale for our research

One of the drivers of our research was an interest in the emotional component of tourism experiences

Feeling side for the experience

Key issue:

How do the emotions relate to material experienced in an online context?

Introduction

- *Stimulus – Why online materials?*



Online marketing - **used** by business and not-for-profit organisations **to promote their products and causes.**

Information is widely distributed via the Internet - ready for potential consumer evaluation as **part of the decision process** in product purchase or contribution to a cause.

What people **attend to** and **respond to** (emotionally) **affects attitude and decision making**

Introduction

- *Stimulus could vary*



Visual material: web page, advertisement, policy document, photographs, video material etc.

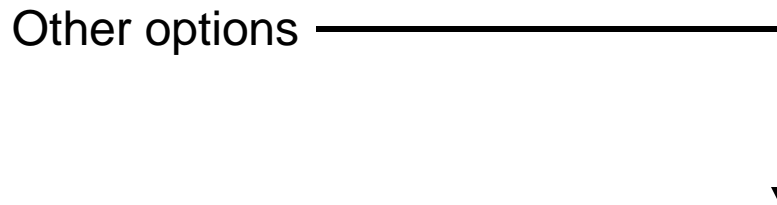
The communication may be predominantly logical or emotional or a combination of both.

Introduction – to measure emotions: what methods could we use?

- *Self-report*



Self report data is commonplace



- *Observation*



Observe people in natural environment

Observe gaze

Observe recordings of physiological fluctuations in bodily responses

Problem

Want to **better understand** how potential consumers **attend to / respond to (emotionally) various (pre-existing) promotional materials** in the form of video and or images/text.

Triangulation:

Collect self report data in respect of some target stimulus (online)

Explore eye movement (gaze plots), eye fixation (heat maps)

At the same time observe any variations in skin conductance

Approach

- *Self-report*

Measuring: self-reported emotions, fascination

Compiled a range of items to measure what people attended to and how they felt about the material

Using Qualtrics we designed an online survey

Eye tracking

- Flow of visual attention – time, space
- Sequence and focus of attention
 - What is attended to first?
 - What is not attended to at all?
 - What elements are focussed on for long periods?
 - Saccades, fixations, heat maps

More About Elements of the Approach – Eye-tracking

We used eye-tracking to **investigate gaze**. What people are looking at.

Can **track the gaze** – what patterns exist (look at gaze path).

Can look at points of **fixation** – where people tend look for longer periods.

This can be done for an **individual** or a **group**.

Studies have found eye-tracking to be associated with **attention, memory and information processing**.

We wanted to look at **attention and emotional experiences**.

Eye tracking is visual attention

- Doesn't tell us whether there is an emotional response
- Doesn't provide information about the valence of response
- [Note: some information provided via video]

Electro-dermal Activity (Affectiva)

- **Electrodermal activity** = electrical changes measured at the surface of the skin that arise when the skin receives innervating signals from the brain.
- Emotional arousal, increased cognitive workload or physical exertion, your brain sends signals to the skin to increase the level of sweating.
- The Affectiva Q sensor (that we used) provides a way to capture electrical conductance across the skin.

Approach – skin conductance



- *Skin conductance*

Q-Sensor:

A small device attached to a wrist band and worn on the arm. The device has EDA sensors, temperature sensors and motion sensors. Information is collected and later downloaded to the computer.

Skin conductance is based on the analysis of subtle changes in galvanic skin responses when the autonomic nervous system (ANS) is activated (**arousal**).

Combining approaches

- Synchronise the eye-tracking and EDA

- Our pilot study



Our specific project description



Participants viewed selected tourism video of varying emotional content using the eye-tracking computer.

Participant wore a Q-sensor wrist band (to collect bio-sensor data).

On conclusion of each web page review self report data on the emotional responses were sought and a short qualitative interview recorded.

The eye-tracking, bio sensor and self report data are compared and synthesized to evaluate the video emotional impact.

Method

- *Task – videos whale watching Ningaloo; Visit Britain – You're Invited*



- *Sample: 10 respondents in the pilot phase; four male*

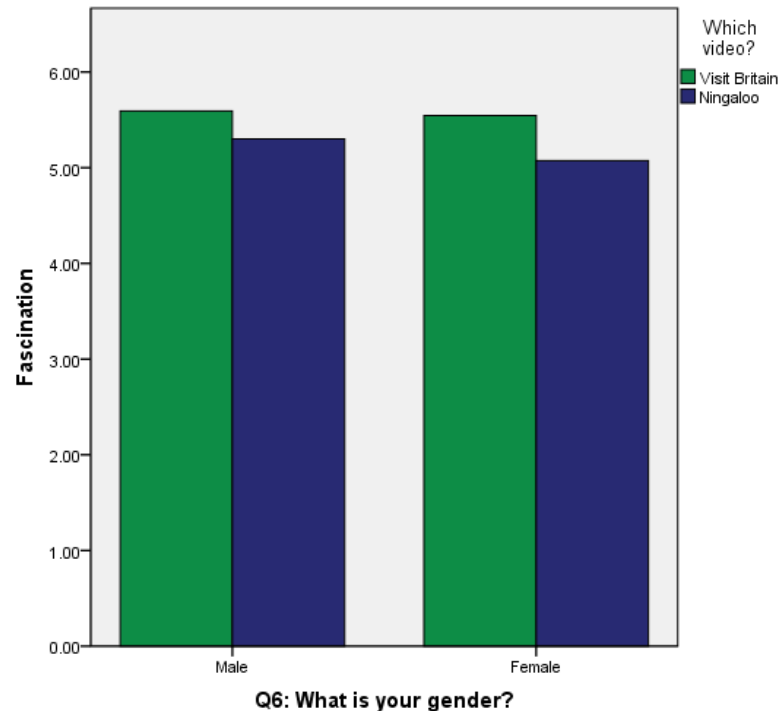
- *Procedure: Convenience sample; informed consent; calibration; wrist band; view video; complete questionnaire; entered in prize draw*

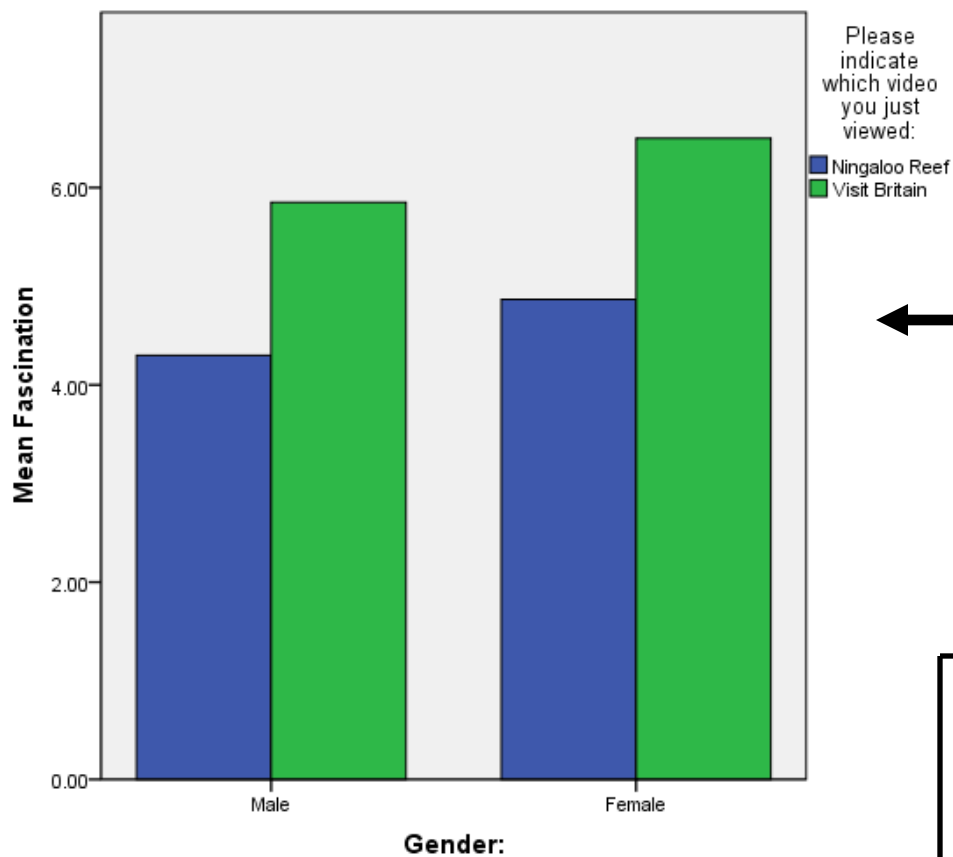
Self reported fascination

- Six items measuring the restorative components of environments (Laumann, Garling, Stormark, 2001) - to assess fascination with settings viewed in video.
- Items were adapted to suit the video experience stimuli.
- An example item is: “There seems to be plenty here that I would like to linger on”. 1 (*sd*) to 7 (*sa*).
- Composite scale computed. Higher scores = more fascination with the virtual experience.

Prior to main study

- We conducted a simple study using student groups (N= 72) to check which video was more fascinating





Main study N=20 (10 each group)

Greater agreement that Visit Britain was more fascinating



In the open ended question people mentioned the castle/heritage buildings (7), green grass/gardens (5), maze (1) – no-one mentioned the narrator



Results – You're Invited



•Self report data

Considering the video you have just viewed, please answer the following:

First, considering spoken material in this video please answer the following questions:

	Strongly Disagree	Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Agree	Strongly Agree
Is the dialogue engaging?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is the dialogue easy to listen to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Is the dialogue well paced (not too fast or too slow)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Does the dialogue tell an interesting story?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Does the dialogue have meaning for you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Does the dialogue make you feel excited?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I would be very curious about the different aspects of settings like this

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 5	1	10.0	10.0	10.0
6	6	60.0	60.0	
7	3	30.0	50.0	100.0
Total	10	100.0	100.0	

90% indicated high curiosity

1 = SD and 7 = SA

I feel I would be quite emotional during this sort of experience

50% indicated high emotional response

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 3	1	10.0	10.0	10.0
4	4	40.0	40.0	50.0
6	2	20.0	20.0	70.0
7	3	30.0	30.0	100.0
Total	10	100.0	100.0	

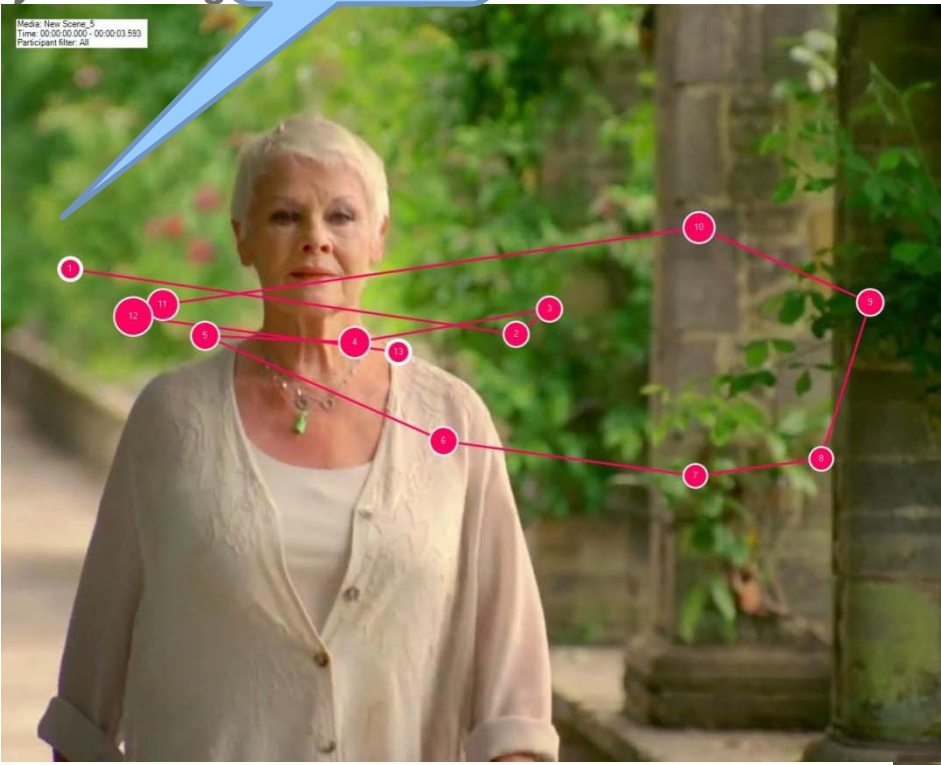
1 = SD and 7 = SA

Results

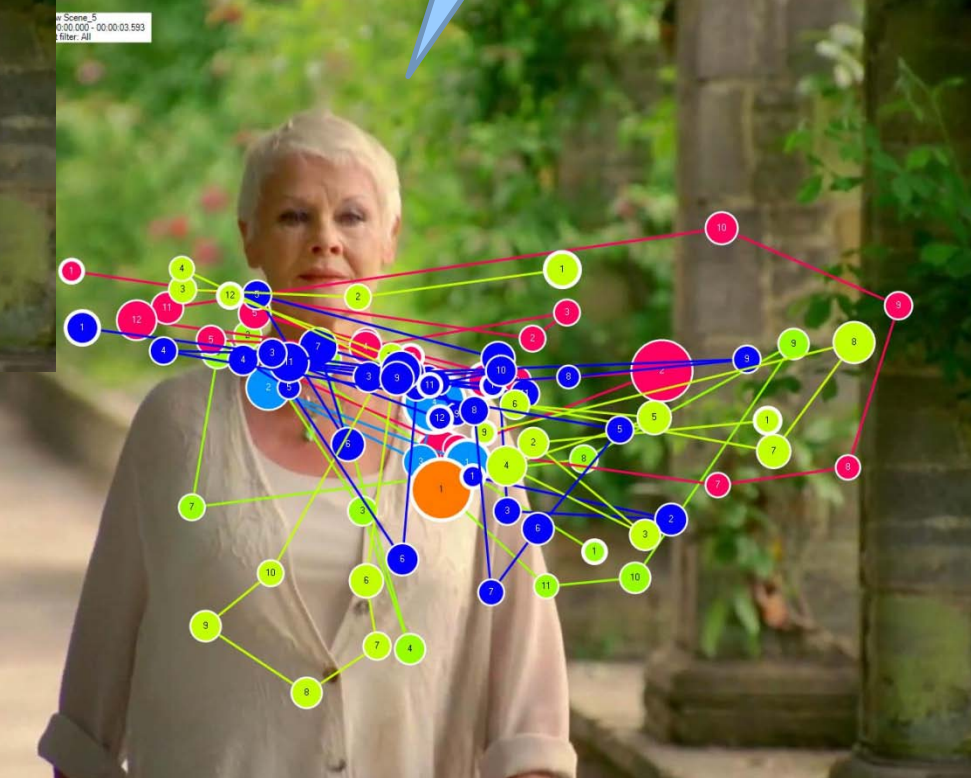


Individual gaze plot

• Eye-tracking



Group gaze plot



Heat map shows highest number of fixations in red

In a fixation heat map, red indicates a high level of fixation, while yellow and green indicate decreasing levels of fixation



Qualitative analysis of participant data

- We tracked the data for each participant and undertook a thematic analysis:
- Attention to the presenter and then explore scene
- Focus on presenter face
- Correspondence between content of talk and object attended to (e.g. maze)
- Building were of interest

EDA

- Skin Conductance Response (SCR)
 - Reflects situational levels of arousal/activation or responsiveness/attentiveness

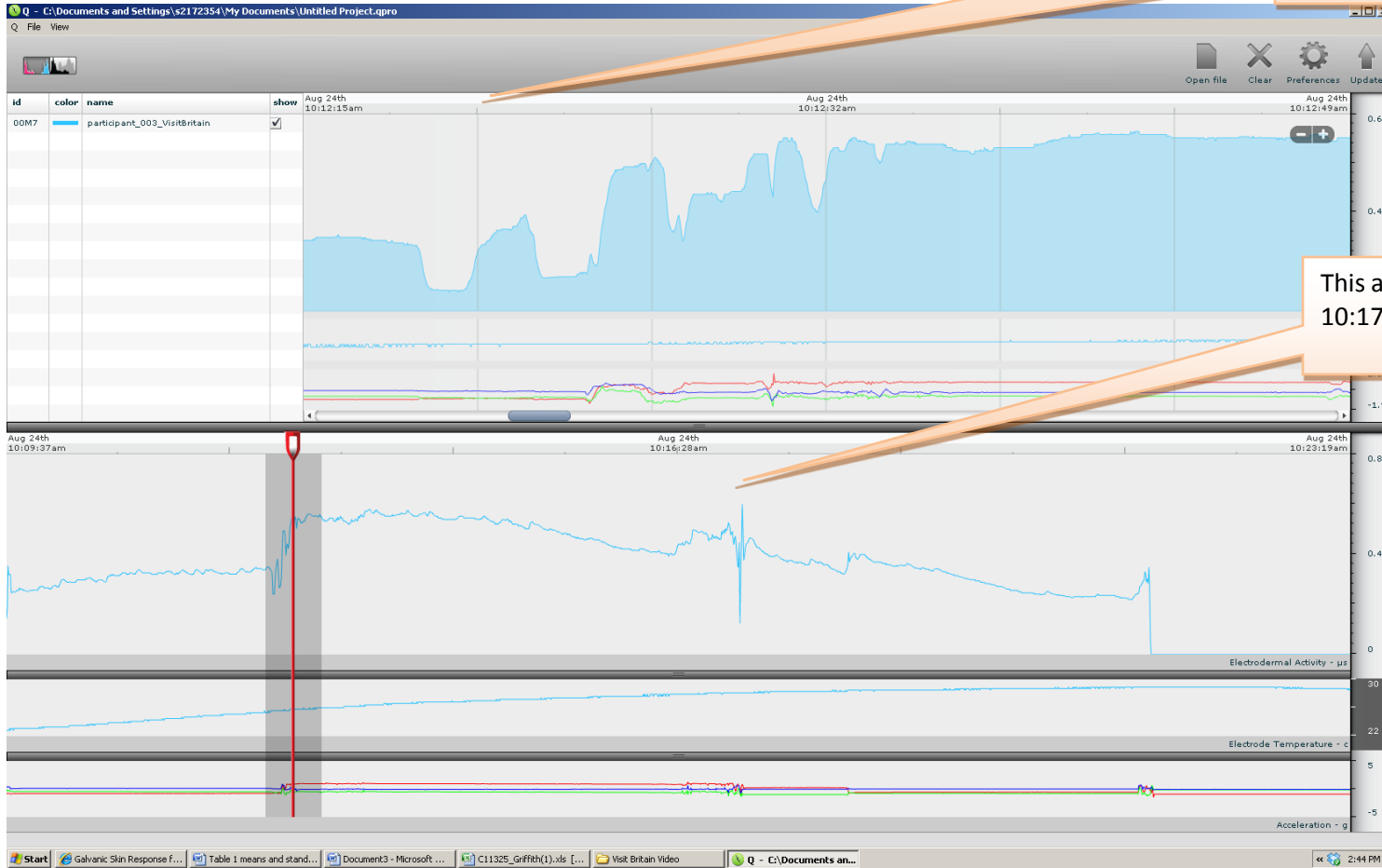
Results



Video started – 10:09:37am and first 'spike' (as displayed) was at 10:12:21am

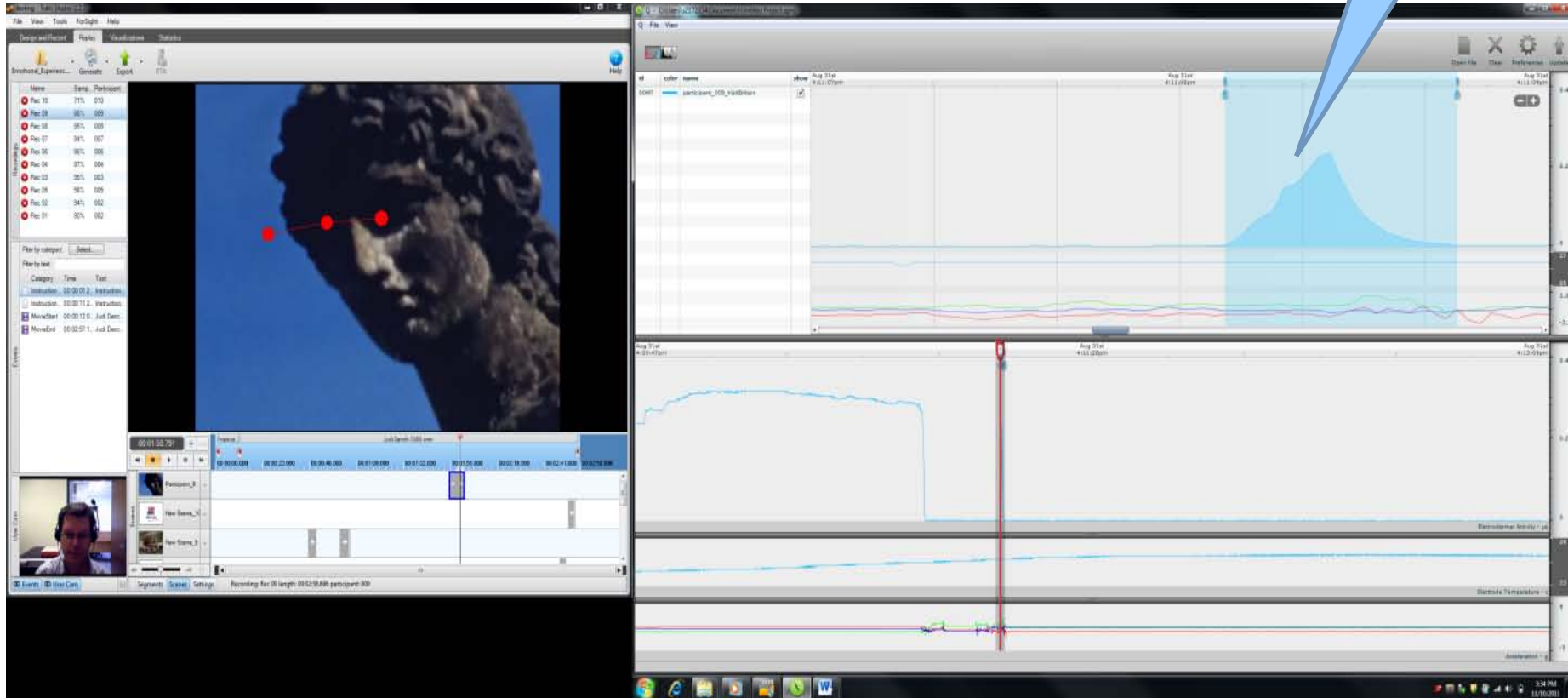
This activity was at 10:17:07am

•Skin conductance



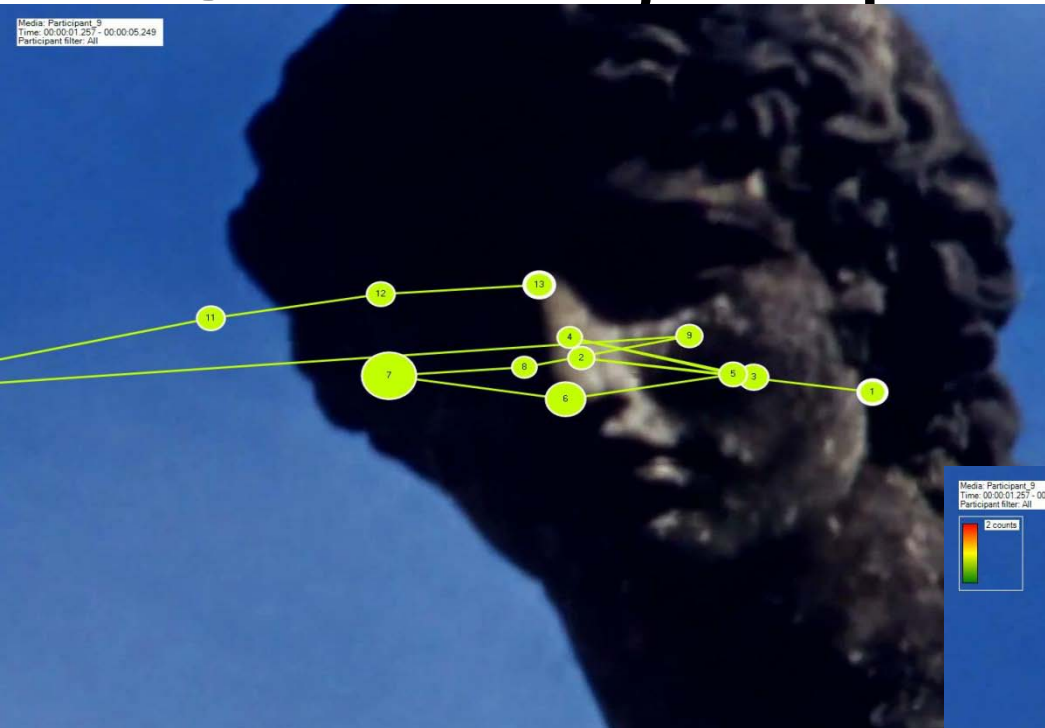
Analysis of one participant

EDA

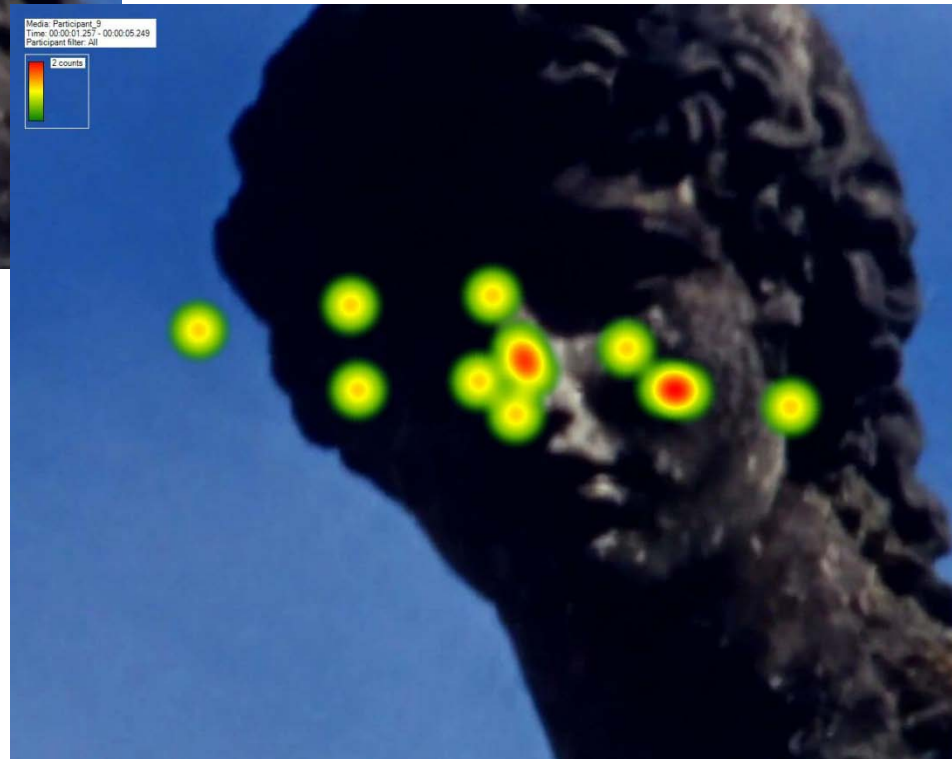


Electrodermal activity refers to electrical changes measured at the surface of the skin that arise when the skin receives innervating signals from the brain. ... experience emotional arousal, ..., your brain sends signals to the skin to increase the level of sweating. You may not feel any sweat on the surface of the skin, but the electrical conductance increases in a measurably significant way as the pores begin to fill below the surface. (Affectiva site)

Statue – gaze path and heat map



Single participant



Summary three types of data

- Material was rated as highly emotionally engaging
- Recall focussed mainly on colour green, serenity, castle, maze
- Eye movements tend to focus on presenter, follow to highlighted images but also search out other features of scene, British flag point of focus
- EDA showed some spikes – e.g. statue

Discussion

- *Difficulties / challenges*



Correlating the data from the three methods quite difficult

Video for eye-tracking is more difficult to analyse than static image; verbal content also influences gaze paths / fixations

Q-Senor data not all respondents had 'spikes'; synchronisation issues

Applying eye-tracking and EDA to consumer research

- Reviewing social media material
- Investigating responses to tourism images
- Tracking virtual services (hotel tours)
- Investigating advertising messages
- Engagement with web pages
- E-Marketing campaigns

