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Brain and body activity in response to experiencing artworks

Submission date	Recruitment status	[_] Prospectively registered
27/01/2020	No longer recruiting	[_] Protocol
Registration date	**Overall study status**	[_] Statistical analysis plan
30/01/2020	Completed	[X] Results
Last Edited	**Condition category**	[_] Individual participant data
15/08/2022	Other	

Plain English summary of protocol

Background and study aims
Speculations on what is to be considered beautiful or artistic stimulated human thought from the beginning of time. Some researches carried out in past and recent years on experimental aesthetics on visual art was intended to verify the existence of a biological basis for aesthetic feeling, as postulated by Charles Darwin. The researchers hypothesize that in general there is a relationship between the aesthetic appreciation of an artwork and the neurophysiological and emotional response of the subject viewing it.

Who can participate?
Any visitor to the exhibition who can communicate in Italian, English, or French.

What does the study involve?
Volunteers will be asked to wear non-invasive instruments for recording: (a) neurophysiological (electroencephalography EEG - electrocardiography ECG) and emotional (electrodermal activity EDA) parameters, (b) the movement of the pupils (eye-tracking). Recording of data will be conducted while participants view 18 paintings in an exhibition for 60 seconds per painting.

What are the possible benefits and risks of participating?
This study will have no benefits or negative effects; however, it will help the researchers to better understand some cognitive processes and therefore also to study or consolidate international hypotheses on how the researchers can intervene both to improve the dissemination of artworks and to apply technical skills using portable equipment to other fields of interest.
Taking part in the research does not involve risks, as the sensors that will be applied are light and do not cause pain.

Where is the study run from?
1. CIAS - Interdepartmental Laboratory of University of Ferrara - Centro ricerche inquinamento ambienti alta sterilità, Italy
2. Estense Castle in Ferrara (“Painting the affections. Sacred art in Ferrara from ‘500 to ‘700”, hosted at the Estense Castle, in Ferrara (Italy), from January 26th to December 26th, 2019.

When is the study starting and how long is it expected to run for?
August 2019 to December 2019

Who is funding the study?
CIAS Research Centre of the University of Ferrara, Italy.

Who is the main contact?
Prof Sante Mazzacane
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Contact information

Type(s)
Public

Contact name
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Additional identifiers

Protocol serial number
NEVART_reg01

Study information

Scientific Title
Neuroaesthetics of the art vision: an experimental approach to the sense of beauty

Acronym
NEVART

Study objectives
There is a correlation between the aesthetic appreciation of an artwork and the neurophysiological and emotional response of the subjects involved in its vision.

Ethics approval required

Old ethics approval format

Ethics approval(s)
Approved 14/04/2019, Ethics Committee of “Area vasta Emilia Centro - Regione Emilia Romagna”, (University of Bologna, Via Albertoni 15, 40138, Bologna, Italy; +39 (0)532 236896; m. voci@ospfe.t), ref. 282/2019/Sper/UniFe

Primary study design
Observational

Study design
Observational ecological study

Study type(s)
Other

Health condition(s) or problem(s) studied
None

Interventions
The NEVArt study is based on general data collected upstream by the investigators, non-sensitive and anonymous data filled in by the volunteer in the first section of the NEVArt survey, the subjective evaluation by the visitor of the artworks viewed (in the second section of the survey) and the signal of a set of worn tools.

Detected bio-signals include: electroencephalography (EEG), electrocardiography (ECG), electrodermal activity (EDA), pupil movement and point of interest (eye-tracking) and the subjective response to specific questions, using the NEVArt interactive form.

The research foresaw two different scenarios, using different tools, because the study also compared the results (in term of signal detail and affordability) of different bio-signal outfits.

In scenario A, volunteers wear EEG caps with 64 dry touch-electrode sensors. Also the ANT system collects ECG and EDA signals (sensors are placed on the arms as in Scenario B).

In scenario B, more ecologic, volunteers wear Myndplay headsets, a commercial product mainly used in neuro-marketing, mindfulness and meditation. For ECG and EDA measures it has been chosen the BITalino, a versatile and scalable hardware platform for bio-signals acquisition and wireless transmission in real-time. All tools have been connected to a Surface Go laptop.

The NEVArt survey includes information about the actual context (number of visitors and thermal conditions), personal non-sensitive and anonymous data of the volunteer (age, gender, schooling, habit of attending exhibitions, possible performed art, music or sport activities, etc.), habits (last 3 hours) that can be related with specific EEG paths (coffee, alcohol, smoke), then the evaluation of each of the 18 selected paintings. The subjective evaluation of each artwork viewed (pleasure, perceived movement, familiarity to the subject) is made after 60 seconds of viewing the painting, using Visual Analog Scale (VAS) scales, to make a subjective assessment of the emotional state.

The time needed to install and calibrate the sensor to people (around 20 minutes in the A scenario and 10 minutes for B). The time required to view all of the paintings for 60 seconds and

collect other data will be 30 minutes. Overall the duration of each experiment is 50 minutes for the A scenario and 40 minutes for B.

Of the 54 paintings in the exhibition, 18 artworks have been selected based on three main exclusion criteria: nothing too small (to avoid the risk that the distance from the observer may affect the wide perception), no damaged paintings (because the observer may overlook some elements disconnected with art) and no painting related to a series (because people may have difficulties in sorting each single artwork).

All paintings have been also sorted using an external panel to give a first assessment of painting features, according to: movement minutes and static minutes perception, with a particular focus on portraits minutes (including 6 samples for each category).

At the end of the visit the volunteer may express a final judgement of all paintings selecting from 0 to 5 paintings in order of preference, through a deck of cards picturing the 18 selected samples. This last scrutiny has the purpose to analyse another kind of emotional activity, related to beauty but involving not just the present time of assessment (that may be partly affected by the need of giving to scientist a measure minutes of pleasantness) but also the memory minutes of paintings, typical of the visit of real exhibition.

Intervention Type
Behavioural

Primary outcome(s)
1. EEG signals measured during viewing artworks
2. ECG signals measured during viewing artworks
3. EDA signals measured during viewing artworks
4. Eye tracking data measured during viewing artworks
5. Survey data collected after viewing artworks

Key secondary outcome(s)
none

Completion date
31/05/2020

Eligibility

Key inclusion criteria
Any visitor to the exhibition who can communicate in Italian, English, or French

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Mixed

Sex

All

Key exclusion criteria
None

Date of first enrolment
15/08/2019

Date of final enrolment
26/12/2019

Locations

Countries of recruitment
Italy

Study participating centre
University of Ferrara
CIAS - Interdepartmental Laboratory of University of Ferrara - Centro ricerche inquinamento ambienti alta sterilità
Via Saragat 13
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Sponsor information

Organisation
University of Ferrara

ROR
https://ror.org/041zkgm14

Funder(s)

Funder type
University/education

Funder Name
CIAS Research Centre of the University of Ferrara

Results and Publications

Individual participant data (IPD) sharing plan

All data generated or analysed during this study will be included in the subsequent results publication

IPD sharing plan summary

Other

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Book results	EEG results	24/05/2022	15/08/2022	No	No
Other publications	Rationale and design	18/03/2020	12/08/2022	Yes	No
Other publications	Conference abstract describing rationale	17/07/2019	15/08/2022	No	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes
Study website	Study website	11/11/2025	11/11/2025	No	Yes