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Exploring the minimum number of trials needed to accurately detect concealed information using EEG

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Appendices

Appendix A - Health Screening Questionnaire

DEMOGRAPHICS QUESTIONNAIRE Date _____ Interviewer _____ **ID** _____

Date of birth _____ Sex: M / F

How many years of formal education have you had: _____ years Degree(s)

- **Up to secondary school (16 years old) = 11 years**
- **Up to 6th form (A-levels) = 13 years**
- **Up to University Degree = 16 years**

_____
_____
_____

Is English your first language? ***If "N":*** Y☐ N☐

- What is your country of birth? _____
- At what age did you come to the U.K.? _____
- At what age did you learn to speak English? _____

As a child, were any languages other than English spoken in your home? ***If "Y" list:*** Y☐ N☐

_____

Is your vision corrected? Y☐ N☐

If "N,": Is your vision 20/20? Y☐ N☐

- Is there anything you have difficulty seeing (e.g., while driving, reading, or watching TV)? Y☐ N☐

If "Y" explain: _____

If "Y,": Do you wear Glasses or Contact Lenses & which ones? GL☐ CL☐

- Do your glasses/contacts correct your vision to 20/20? Y☐ N☐

Your last eye exam occurred (*circle one*): within the last 6 months. within the last year. within the last 2 years. more than 2 years ago. Or Date of current prescription _____ *(Circle one)*

It was performed by: optician (a technician at an optical store). optometrist (Dr. who performs eye exams). ophthalmologist (Dr. who treats eye diseases, performs eye surgery, & may perform eye exams). Other. *Explain*: _____ *(Circle one)*

Rate the quality of your **near** vision: Excellent Good Fair Poor *(Circle one)*

Rate the quality of your **far** vision: Excellent Good Fair Poor *(Circle one)*

Is your vision in one eye better than the other? Y☐ N☐

If "Y": Which eye is better? R☐ L☐

What difficulty are you having with the other eye? _____

Do you currently have or have you ever had:

Glaucoma? Y☐ N☐

If "Y": In which eye(s)? R☐ L☐

Cataracts? Y☐ N☐

If "Y": In which eye(s)? R☐ L☐

Have you had corrective surgery? Y☐ N☐

If "Y": In which eye(s)? R☐ L☐

Lazy eye? Y☐ N☐

If "Y": In which eye? R☐ L☐

Have you had corrective surgery? Y☐ N☐

Colour-blindness? Y☐ N☐

Other vision problems or eye injuries? Y☐ N☐

If "Y" explain: _____

Have you ever seen a neurologist, psychiatrist, or psychologist for any reason? Y☐ N☐

If "Y" complete the following: Type of Doctor _____

Reason for Visit _____

At what age? _____ Duration _____ Currently seeing? Y☐ N☐

Have you ever taken any type of psychological tests (e.g., for another study, as part of job counseling, or for psychological or neuropsychological evaluation)? Y☐ N☐

If "Y" complete the following: Year Taken _____

Describe

Have you ever had an EEG, MEG; CT, PET, or MRI scan; or head X-ray? Y☐ N☐

***If "Y"** complete the following*: At what age? _____
Type of Test _____
Reason for Test
Have you ever been in a car accident? Y☐ N☐
Have you ever been in any other type of serious accident? Y☐ N☐
***If "Y"** complete the following* (circle one or both):
Describe Car Accident Other Accident
At what age?
Hospitalized?
Did you lose consciousness? Y☐ N☐
***If "Y"**, for how long? _____
Concussion? Y☐ N☐
Nausea & vomiting? Y☐ N☐
Medications prescribed? Y☐ N☐
Name
Dosage
Persistent problems? Memory Loss, Head Ache, Changes in vision (e.g., blurred or double vision), Changes in hearing (e.g., tinnitus)? Other lasting effects _____ *Report if any*
Have you ever hit your head and been knocked out, suffered a blow to the head and lost consciousness, or injured your head in any other way? Y☐ N☐
***If "Y"** complete the following*: Incident One Incident Two
Describe
At what age?
Hospitalized?
Did you lose consciousness? Y☐ N☐
***If "Y"**, for how long? _____
Concussion? Y☐ N☐
Nausea & vomiting? Y☐ N☐
Meds prescribed? Name Dosage
Persistent problems? Memory Loss, Head Ache, Changes in vision (e.g., blurred or double vision), Changes in hearing (e.g., tinnitus)? Other lasting effects _____ *Report if any*
Have you ever been unconscious at any (other) time in your life? Y☐ N☐
***If "Y"** report duration*: _____
Have you ever had a seizure or convulsion of any kind? ***If "Y"***: What was the cause of your seizure/convulsion? _____ _____ Y☐ N☐
*For **females** only:* Are you taking Hormone Replacement Therapy? Y☐ N☐
If "Y": What are the medications, dosages, frequency of meds? _____
_____
What was the date of your last period? _____
How frequently do you have your period? every _____ days

Do you have or have you ever had:	Y	N	List/Explain
Claustrophobia?	☐	☐	_____
A seizure disorder or epilepsy?	☐	☐	_____
A stroke (CVA) or mini-strokes (TIA)?	☐	☐	_____
Heart disease or heart problems?	☐	☐	_____
Lung problems?	☐	☐	_____
Thyroid problems?	☐	☐	_____
Kidney problems?	☐	☐	_____
Urinary or bowel disorder?	☐	☐	_____
Cancer or tumours?	☐	☐	_____
Diabetes?	☐	☐	_____

High blood pressure or hypertension? ☐ ☐ _____
Severe headaches? ☐ ☐ _____
Diagnosis of attention deficit disorder? ☐ ☐ _____
Diagnosis of autism or Asperger's syndrome? ☐ ☐ _____
Diagnosis of Alzheimer's disease (AD), probable AD, dementia, or other neurological disorder? ☐ ☐ _____
Diagnosis of psychiatric or psychological disorder? ☐ ☐ _____

Have you ever been diagnosed with a learning disorder? ***If "Y" explain:*** Y☐ N☐

_____

Did anyone ever suspect that you might have a learning disability, such as dyslexia? Y☐ N☐

If "Y" explain: _____

Have you ever had emotional problems requiring treatment (e.g., depression, anxiety, nervous breakdown)? Y☐ N☐

If "Y" *list age/date(s) and describe problem(s)*: _____

_____

If "N,": Have you ever felt seriously depressed or sad for 2 weeks or more? Y☐ N☐

If "Y" *complete the following*:

- Describe Period One Period Two

At what age?
When did you last feel that way?
Longest period of feeling that way?

- Have you been feeling depressed, sad, or anxious at all lately? Y☐ N☐
  If "Y": How long have you been feeling this way? _____
  If "N,": How would describe your mood recently? _____

_____

Have you ever been hospitalized for any (other) reason in your lifetime? (include Emergency Room.) ***If "Y"*** *list date(s) & reason(s)*: Y☐ N☐

_____

Have you ever consumed alcoholic beverages? Y☐ N☐
Do you currently consume alcoholic beverages? ***If "Y"***: Y☐ N☐

- What kind of drink(s) do you usually consume? _____
- How many drinks per week do you usually consume?
  0 <1 1-5 6-10 11-15 16-20 21+ *(Circle one)*
- Has there ever been a period of time where you typically drank a lot more than the amount you described? ***If "Y"***:
  - How many days per week did you drink? _____ Y☐ N☐
  - How many drinks per day of consumption? _____
  - Duration of this pattern? _____ *(Circle one)*
  - Type: Beer Wine Mixed drinks Liquor PF Y☐ N☐
- Have you ever experienced blackouts while drinking? Y☐ N☐
- Have you ever experienced withdrawal symptoms when you tried to quit or cut down on your drinking? Y☐ N☐
- Have you ever thought that you were an alcoholic? Y☐ N☐
- Have you ever been treated for alcoholism?
  If "Y" *list date(s) & length of sobriety*: _____ Y☐ N☐
- Have you ever participated in Alcoholics Anonymous or rehab programs?
  If "Y" *list duration & length of sobriety*: _____

When was the last time you had a drink? _____

Do you smoke? ***If "Y"***: How many packs of cigarettes do you smoke per week? Y☐ N☐
0 <1 1-5 6-10 11-15 16-20 21+ *(Circle one)*

Have you ever been addicted to a drug other than alcohol? Y☐ N☐

***If "Y"** complete the following:*

Name of Drug
Frequency—How many:
Date Last Used
Days Per Week?
No. of years?

Have you ever participated in a drug treatment program? ***If "Y"** complete the following:* Y☐ N☐

Dates

Are there any medications that you take on a regular basis? (Please include medications such as aspirin, ibuprofen, vitamins, and herbal supplements.) ***If "Y"**:* Y☐ N☐

Name Dosage Reason Prescribed

1.
2.
3.
4.

Have you ever had any serious accident or illness other than those already discussed?

***If "Y"** list or explain:* _____ Y☐ N☐

When you were in grade school, did you have any particular problems with spelling, reading, or mathematics? ***If "Y"** describe:* _____ Y☐ N☐

_____

Were you ever placed in any type of "special class"? ***If "Y"** explain:* _____ Y☐ N☐

_____

Did you ever repeat a grade? ***If "Y"** explain:* _____ Y☐ N☐

_____

As a child, were you considered to have a behaviour problem because of restlessness, distractibility, hyperactivity, acting out, or fighting? ***If "Y"** the following:* Y☐ N☐

At What Age?
Describe

Is your hearing impaired in any way or do you have tinnitus (ringing)? Y☐ N☐

***If "Y"** explain:* _____

Do you have a dermatological or other condition that might result in an adverse reaction to salty gel or surgical tape? ***If "Y"** explain:* _____ Y☐ N☐

Do you have any metal jewelry (i.e., piercings)? ***If "Y"** explain where and indicate whether you can remove these for the EEG session (if unremovable anywhere on head, then exclude):* _____ Y☐ N☐

Additional Comments: _____

_____

_____

_____

Handedness You are (please circle) : **Left Handed** **Right Handed** **Ambidextrous**

In the following table please cross your preferred hand for each of the activities or objects. Mark with a single X for a significant preference, or XX if you would be incapable of using the other hand. An X in both hands would indicate that you have no preference.

	L	R		L	R
writing			tennis racket		
drawing			golf club		
throwing			screwdriver		
scissors			hammer		
comb			spoon		
brushing teeth			knife		

Appendix B

Brief

BRIEF

Project Title: Exploring the minimum number of trials needed to accurately detect concealed information using EEG.

Supervisor: Dr Giorgio Ganis, University of Plymouth, School of Psychology

Objective: The aim of this study is to investigate the minimum number of trials needed to accurately detect the P300 response in recognising concealed dates, using electrophysiological measures.

Procedure: We will be taking recordings using EEG (electroencephalogram) whilst we ask you to engage in some simple decision-making processes on dates. This will involve placing an electrode cap on your head.

Study sessions will take up to an hour, of which up to 5 - 10 minutes will be needed to place the EEG electrodes on your head. The remaining time will contain visual study tasks. These tasks will take place during the EEG recording session and will take about 30 minutes in order to obtain sufficient information for a clear interpretation of the results.

Instructions will be given to you on how to complete the task verbally, and you can also follow instructions on the screen. If you have any questions, feel free to ask the experimenter and they will remind you.

After the experimental procedure, you will be debriefed, and an examiner will remove the electrode cap. You will receive 1 participation point per 30 minutes.

If you are willing to take part in this study, please consent by signing your name and the date on the form below. Your details will remain confidential.

UNIVERSITY OF PLYMOUTH

FACULTY OF HEALTH: MEDICINE, DENTISTRY, AND HUMAN SCIENCES

CONSENT TO PARTICIPATE IN RESEARCH PROJECT

Name of Principal Investigator

Dr. Giorgio Ganis

Appendix C - Consent Form

UNIVERSITY OF PLYMOUTH

FACULTY OF HEALTH: MEDICINE, DENTISTRY, AND HUMAN SCIENCES

CONSENT TO PARTICIPATE IN RESEARCH PROJECT

Name of Principal Investigator

Dr. Giorgio Ganis

Exploring the minimum number of trials needed to accurately detect concealed information using EEG.

Brief statement of purpose of work:

In this study we aim to investigate the neural processes involved in recognising dates. To gain a better understanding of how the brain can produce these responses we will use an Electroencephalogram (EEG) to measure the electrical activity during these tasks, specifically the P300.

This EEG procedure is both non-invasive and passive and involves the placement of small electrodes on various locations on your scalp. The procedure used in this experiment is as follows:

1 – You will be fitted with an elastic cap with electrodes.

2 –Each of the electrodes have small sponges attached to them and are soaked with a saline solution to create an electrical connection with the skin. Additional saline solution may be used to improve the connection. The saline solution is hypoallergenic, but let the experimenter know if you feel any discomfort during the procedure.

In addition to the collection of EEG information you will also be asked to fill in a questionnaire used to ascertain basic information related to health, handedness, and education. Full reporting is essential, especially for matters of health, and you will not be penalised if safety concerns preclude your participation in this study.

3 – COVID-related. All procedures will use PPEs, as prescribed by Government regulations: both experimenter(s) and participant will wear face coverings and will minimise talking; the experimenter will also wear a disposable plastic apron and nitrile gloves; the cap and sponges will be disinfected after each use with isopropyl alcohol (70% concentration) or other approved solution (e.g. Sekusept). Participants' temperature will be taken with a disposable thermometer before entering the lab; participants with a temperature higher than 37.8C will not be tested. Similarly, participants with a cough and/or a loss or change to their sense of smell or taste will not be tested.

If you have questions related to any of these procedures the experimenter will be happy to give you further information. Also, in the event of complications arising from the experimental procedure please inform the experimenter as soon possible.

PLEASE TICK AS APPROPRIATE, AND SIGN & DATE THE FORM

☐ The objectives of this research have been explained to me.

☐ I understand that I am free to withdraw from the research at any stage, and ask for my data to be destroyed if I wish.

☐ I understand that my anonymity is guaranteed.

☐ I understand that the Principal Investigator of this work will have attempted, as far as possible, to avoid any risks, and that safety and health risks will have been separately assessed by appropriate authorities (e.g. under COSSH regulations).

Under these circumstances, I agree to participate in the research.

Name: .....

Signature: ..... Date: .....

Appendix D - Debrief

Debrief

Exploring the minimum number of trials needed to accurately detect concealed information using EEG.

The experiment you have just taken part in was testing whether the amplitude of a specific event-related potential component, the P300, correlates with visual recognition of the stimuli you saw. Usually, the P300 is larger for familiar than unfamiliar stimuli, which is what we expect to find. This should allow us to use the P300 to identify the recognition of concealed dates, which infers a lie. We also examined the minimum number of trials needed to produce accurate P300 responses.

This experiment was loosely based upon the work of Rosenfeld (2019).

Please contact Giorgio Ganis at giorgio.ganis@plymouth.ac.uk if you have any questions regarding the experiment.

Thank you for your cooperation

Rosenfeld JP. P300 in detecting concealed information and deception: A review. Psychophysiology. 2019;e13362. https://doi.org/10.1111/psyp.13362