

2011

# The use of Near Infrared Spectroscopy in measuring haemodynamic response of the primary visual cortex to a visual bullseye stimulus with various spatial and temporal frequencies

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Perkins, L. (2011) ' The use of Near Infrared Spectroscopy in measuring haemodynamic response of the primary visual cortex to a visual bullseye stimulus with various spatial and temporal frequencies', The Plymouth Student Scientist, 4(2), p. 131-154.

<http://hdl.handle.net/10026.1/13953>

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The Plymouth Student Scientist  
University of Plymouth

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## **Appendix A**

### **Brief**

In this experiment, we are aiming to replicate previous findings looking at the effect of flicker rate and spatial frequency of visual stimuli on the activation of areas of the visual cortex. We also aim to validate the measurement of absolute changes in oxyhaemoglobin and deoxyhaemoglobin concentration in the blood using near infra-red spectroscopy (NIRS) in response to the effects of the stimuli. In this experiment, you will be randomly assigned to one of two conditions, one where you will be shown a coarse pattern (low spatial frequency) or a fine pattern (high spatial frequency). We will attach the NIRS probe to the back of your head, using a headband, and you will be asked to fixate on a fixation point on a computer screen. When the experiment starts, you will be shown an on/off visual stimulus for approximately 20 minutes whilst remaining fixated on the fixation point. After the experiment, the probe will be removed and you will be debriefed. You will only be able to take part in this study if you have normal or corrected-to-normal vision and if you **DO NOT HAVE FLICKER INDUCED EPILEPTIC SEIZURES**. You will not be deceived in any way during the experiment and you will be at no known risk of psychological or physical harm. The data you provide will not be identifiable by name and you will be given a participation number which will be stored on a computer that can only be accessed by myself and my supervisor, William Simpson. You also have the right to withdraw from the experiment at any time, in which case all collected data will be destroyed. I give my consent to take part in this study and for my data to be used.

Signed.....

Print Name.....

Date.....

## Appendix B

Table to show the order of frequencies given to each participant

Participant I.D	SF	Temporal Frequency (Hz)								
1	Fine	1.88	30.00	.94	3.77	7.55	15.00			
	Coarse	15.00	1.88	7.55	3.77	30.00	.94			
2	Fine	7.55	.94	30.00	.94	30.00	3.77			
	Coarse	30.00	7.55	.94	7.55	.94	30.00			
3	Fine	7.55	3.77	.94	30.00	.94	30.00	7.55	3.77	
	Coarse	Participant did not take part in this second part								
4	Fine	30.00	3.77	.94	7.55	7.55	.94	30.00	3.77	
	Coarse	3.77	.94	30.00	7.55	3.77	7.55	.94	30.00	
5	Fine	7.55	30.00	.94	30.00	7.55	.94			
	Coarse	7.55	30.00	3.77	.94	.94	7.55	30.00	3.77	
6	Fine	7.55	30.00	3.77	.94	.94	3.77	30.00	7.55	
	Coarse	30.00	7.55	.94	3.77	.94	7.55	30.00	3.77	
7	Fine	30.00	3.77	.94	7.55	7.55	.94	30.00	3.77	
	Coarse	.94	3.77	30.00	7.55	.94	3.77	7.55	30.00	
8	Fine	7.55	30.00	3.77	.94	7.55	.94	30.00	3.77	
	Coarse	7.55	3.77	.94	30.00	7.55	30.00	.94	3.77	

## Appendix C

### Debrief

Thank you for taking part in our study .In the results, we hope to find that as the spatial frequency increases, the threshold for participants to see contrast will also increase. We also hope to see whilst the visual stimulus is being shown on the computer screen during the 'on' phase, the NIRS equipment will record an increase in oxyhaemoglobin and a decrease in deoxyhaemoglobin. I would just like to reiterate that you have not been deceived in any way during the experiment. The data you have provided will not be identifiable by name and you will be given a participation number which will be stored on a computer that can only be accessed by myself and my supervisor, William Simpson. You also have the right to withdraw from the experiment at any time, in which case all collected data will be destroyed. If you have any further questions or would like any more information on the experiment, please don't hesitate to contact me or my supervisor. Our details are given below.

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