

Levels of processing in a recognition test

Abstract

This study looked at levels of processing in a recognition test. This is a partial replication of Craik & Lockhart's (1974) study. We predicted that the deeper level of process the better we will remember the information. 21 participants 4 males 17 females 20-53 years old they were shown 45 words and were then given a recognition task to carry out. The results showed there was significant difference between condition 1 (shallow) processing and condition 3 (Deep) processing supporting our hypotheses that there would be a significant difference, we didn't find a significant difference between condition 1 (shallow) and condition 2 (intermediate). Showing that we are more likely to remember. This research is important for educational purposes and remembering things in day to day life.

Introduction

The theory we will be looking at during this experiment is processing levels the prediction is that the deeper level of processing results in you being able to be more able to remember later but shallow levels of processing results in a less likely chance that we can retrieve them later agreed Craik and Lockhart's (1972). This is a partial replication of Craik & Lockhart's (1974) study. The hypothesis during this experiment was that words learnt in semantic order would be recollected better than structural and semantic processing. There are different levels of processing first one is structural (shallow) e.g. is the word in capital letters, next is Phonological (intermediate) e.g. does the word rhyme? And last is Semantic (deep) e.g. will the word fit in the sentence. The level of processing model was proposed by Craik and Lockhart (1972) the theory is that the stimulus inputs undergo successive processing and depending on the stages of processing "shallow is called maintenance rehearsal this is classified as "shallow" processing, participants were shown 45 words one at a time, then answer one of three they were then shown a corresponding word for a small period of time after the 45 questions were answered they were given a recognition test which was a list of 105 words where they had to pick the original 45 word. Craik and Tulving (1975) study also looked at the processing levels they carried out an experiment in where 10 experiments were done aimed to study the levels of processing structure for human memory research looking further into the study by Craik and Lockhart (1972). The key concept is that the episodic memory trace can be thought of as a rather automatic processing process that is carried out by the cognitive system and that the strength of the trace is a positive function of "depth" of level processing, where depth signifies to greater measures of semantic involvement (Craik and Tulving (1975). Participants were stimulated to process words to different depths by answering a number of different questions about the words at different levels of processing shallow, intermediate and deep. After the encoding stage was finished, participants were unexpectedly given a recognition test for the words. Overall, deeper encodings took longer to achieve and were related with higher levels of performance on the subsequent memory test.

Furthermore, questions leading to positive responses were associated with higher recollection levels than questions leading to negative responses, when at a deeper level of encoding. Hyde and Jenkins (1973) similarly conducted a study using the incidental learning (informal learning) technique. They separated the participants into separate groups and carried out one of five tasks on each, they were then given a surprise recognition test, the results showed that the task had a better recognition which meant a deeper level of processing. The rationale of this study is important for education purposes, to help learn on a deeper level which is important when it comes to learning new things leading to a better academic performance.

Aim

The aim of the study was to explore the effects of levels of processing looking at structure processing (shallow), phonemic processing (intermediate) and semantic processing (deep).

Methodology

Design

A repeated measures design was used, there were 3 conditions in this study which were structural processing(shallow) e.g. is this word in capital letters, phonological processing(intermediate) e.g. does the word rhyme with boy? and semantic processing (deep) e.g. giving words a meaning. There was 1 independent variable (IV) this was the depth of processing. There was 1 dependant variable (DV) in this study was the number of words that were recognised. The study was done in a in a classroom setting, words were presented on a white board screen there were 45 words with a blue background and black writing. 36 Helvetian neuw font size was used. Each slide was 6 seconds long before it changes to the next slide. 45 words were shown.15 shallow words, 15 intermediate words, and 15 deep words.

Participants

21 participants took part in the study which consisted of 4 male and 17 females from the ages 20 – 53 years old. All participants were undergraduates from a wales university, so consent was assumed. Each participant had the right to withdraw at any time during the experiment.

Materials

- Words were shown on a PowerPoint with black writing and a blue background.
- 15 phonological words (see appendix 1).
- 15 structural words (see appendix 1).
- 15 semantic words (see appendix 1).
- Text size 36" font Helvetian neuw.
- Pen and A4 sheet of paper.

Results

The results show that the pairwise differences were present for conditions 1 and 3 and two and three. The significant pairwise differences for conditions one and three ($P=0.05$). There was also significant pairwise difference between 1 and 3 ($P=0.05$). Conditions 1 and 2 showed there were no significant pairwise difference ($P=0.00$). A one-way repeated measures analysis of variance ($N=21$) significant effect of processing ($P=0.80$) $F(2,40) = 129.057$ $P < 0.05$

Table 1 shows the means and standard deviation (SD) for all 3 conditions structural (shallow), phonological (intermediate), and semantic (deep).

Table 1

Means and SD for the 3 conditions shallow, intermediate and deep.

Condition	Mean	SD
Shallow	2.86	2.70
Intermediate	4.19	2.35
Deep	11.00	2.25

To test whether significant differences were present between the 3 conditions a one-way ANOVA was carried out

Discussion

The aim of the study was to explore the effects of levels of processing looking at structure processing (shallow), phonemic processing (intermediate) and semantic processing (deep) meaning that depending on the level of process that we are learning/showed words if the processing level is shallow e.g. capital letters we might not remember it as much as if the process level while learning is deep e.g. words that fit in a sentence. The results of the present study showed a significant difference between structural (shallow) and semantic (deep) when it comes to recollection of words, therefore supporting the hypothesis of this study during this experiment was that words learnt in semantic order would be recollected better than structured and semantic processing This was an important study as it was the benefits for education can be great first recognised by Craik and Lockhart (1972), White (1983), surveying publications in cognitive psychology and their citation rates, comments that the Craik and Lockhart article "undoubtedly has had the greatest influence of any single contribution published in the 1970's". This is a partial reparation of Craik & Lockhart's (1974) study that, showing the findings of the study do supported the finding of their study the present research also supports previous research from Craik and Tulving (1975) that studying material by looking at its meaning and linking it to semantically associated words which is elaborative rehearsal which is classified as deep processing level the results from Craik and Tulving that 17% of visual questions were recognised, 37% in auditory condition and 65% in the semantic condition. The results also support the findings in Hyde and Jenkins (1973) study that a deeper processing level is involved in a better recognition test. These

findings have important implications for educational system and all students and the purpose these studies can help teachers and lecturers to find new ways of teaching children and students and changing how they are teaching. It also can be helpful when it comes to students and remembering subjects easier and for a longer period e.g. when revising for tests. Teachers and lectures could be taught a new way of teaching their student, so they remember more in class/lectures. It can also help in day to day life with a person with bad memory remember certain things better. The limitations during the present study was that the findings didn't find a significant difference between conditions 1 and 2 ($P=0.00$), The study also does not distinguish 'deep processing' because there is no satisfactory way to measure the depth of processing levels. Other limitations are that participants may be more familiar with the words than other participants. There were also more females than males so in future research the female and male ratio could be more even.

Conclusion

After, the experiment turned out to be a success as the findings were in correlation with Craik and Lockhart's findings. As the results showed that deep processing, that when learning at a deep level of processing will generally result in better recollection.

References

Fergus, I. M. C., & Tulving, E. (1975). *Depth of processing and the Retention of words in Episodic Memory*. Journal of experimental psychology: general, 104 (3), 268-294.

Fergus, I. M. C., & Lockhart, R. S. (1972). *Levels of processing: A framework for memory research*. Journal of verbal learning and verbal behaviour, 11, 671-684.

Lockhart, R. S., & Craik, F. I. M. (1990). *Levels of processing: A retrospective commentary on a framework for memory research*. Canadian Journal of Psychology/Revue Canadienne de psychologie, 44(1), 87-112.

Appendices

Appendix 1

Form 1- answer sheet

Put a cross on YES or NO in response to what you see on the screen

1.	YES	NO
2.	YES	NO
3.	YES	NO
4.	YES	NO
5.	YES	NO
6.	YES	NO
7.	YES	NO
8.	YES	NO
9.	YES	NO
10.	YES	NO
11.	YES	NO
12.	YES	NO
13.	YES	NO
14.	YES	NO
15.	YES	NO
16.	YES	NO
17.	YES	NO
18.	YES	NO
19.	YES	NO
20.	YES	NO
21.	YES	NO
22.	YES	NO
23.	YES	NO
24.	YES	NO
25.	YES	NO
26.	YES	NO
27.	YES	NO
28.	YES	NO
29.	YES	NO
30.	YES	NO
31.	YES	NO
32.	YES	NO
33.	YES	NO
34.	YES	NO

35	YES	NO
36.	YES	NO
37.	YES	NO
38.	YES	NO
39.	YES	NO
40.	YES	NO
41.	YES	NO
42.	YES	NO
43.	YES	NO
44.	YES	NO
45.	YES	NO

Appendix 2

LOP- Word list

Put a cross by all the original words that you saw when answering the questions

HOUSE	LOUD	RULE
COAT	LOST	FIDDLE
SNAIL	ELEPHANT	MUDDLE
DESK	CHEEK	CARROT
PHONE	TIGER	MINCE
FINGER	FISH	CREAM
LOSE	TROWEL	FLOWER
RUBBER	JUICE	HOSE
THROW	CROWD	JUMPER
BROOM	MATCH	GRASS
LION	SKIRT	LAST
SHIRT	FRAME	LAMP
TEXT	RAIL	TANK
GLOVE	JUMP	SKETCH
KNIFE	ROPE	COAL
REST	TRAM	SWEATER
RICE	RACK	ROCK
TONE	TACK	TOWEL
CHAIR	HELLO	COTTON
ARM	RAKE	AEROPLANE
PAINT	HAND	ROSES
TIME	MOWER	MAZE
LEG	LADDER	BAKE
TRAIN	CHEST	TOWER
BOOK	REST	GLASS
CLIP	PEN	PLAY
PEPPER	POND	LINE
PEAR	MOTOR	OUNCE
NECK	FOOT	HAT
PAPER	CART	APPLE
DRILL	LAZER	PRIEST
LIGHT	NAIL	FARM
CASE	HARM	CLOVER
TABLET	LIST	RAZOR
KNEE	ICE	RACE

Appendix 4**General Linear Model**

Notes		
Output Created		05-NOV-2018 15:53:24
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	21
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.
Syntax		GLM shallow intermediate deep /WSFACTOR=conditions 3 Polynomial /METHOD=SSTYPE (3) /EMMEANS=TABLES(OVERALL) /EMMEANS=TABLES (conditions) COMPARE ADJ(BONFERRONI) /PRINT=DESCRIPTIVE ETASQ OPOWER /CRITERIA=ALPHA (.05) /WSDSIGN=conditions.
Resources	Processor Time	00:00:00.00
	Elapsed Time	00:00:00.03

[DataSet0]

Within-Subjects Factors

Measure: MEASURE_1

conditions	Dependent Variable
1	shallow
2	intermediate
3	deep

Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Nocent. Parameter	Observed Power ^c
s	Pillai's Trace	.933	132.27	2.000	19.000	.000	.933	264.543	1.000
			1 ^b						
	Wilks' Lambda	.067	132.27	2.000	19.000	.000	.933	264.543	1.000
			1 ^b						
	Hotelling's Trace	13.923	132.27	2.000	19.000	.000	.933	264.543	1.000
			1 ^b						
	Roy's Largest Root	13.923	132.27	2.000	19.000	.000	.933	264.543	1.000
			1 ^b						

a. Design: Intercept

Within Subjects Design: conditions

b. Exact statistic

c. Computed using alpha = .05

```
GLM shallow intermediate deep
  /WSFACTOR=conditions 3 Polynomial
  /METHOD=SSTYPE (3)
  /EMMEANS=TABLES (OVERALL)
  /EMMEANS=TABLES (conditions) COMPARE ADJ(BONFERRONI)
  /PRINT=DESCRIPTIVE ETASQ OPOWER
  /CRITERIA=ALPHA (.05)
  /WSDESIGN=conditions.
```

Descriptive Statistics

	Mean	Std. Deviation	N
shallow	3.29	3.227	21
intermediate	4.14	2.393	21
deep	11.19	2.064	21

Mauchly's Test of Sphericity^a

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Greenhouse-Geisser	Epsilon ^b Huynh-Feldt	Lower-bound
conditions	.777	4.797	2	.091	.818	.880	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept

Within Subjects Design: conditions

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^a
conditions	Sphericity Assumed	790.222	2	395.111	84.466	.000	.809	168.931	1.000
	Greenhouse- Geisser	790.222	1.635	483.269	84.466	.000	.809	138.115	1.000
	Huynh-Feldt	790.222	1.761	448.764	84.466	.000	.809	148.734	1.000
	Lower-bound	790.222	1.000	790.222	84.466	.000	.809	84.466	1.000
Error(conditions)	Sphericity Assumed	187.111	40	4.678					
	Greenhouse- Geisser	187.111	32.703	5.721					
	Huynh-Feldt	187.111	35.218	5.313					
	Lower-bound	187.111	20.000	9.356					
Source									
conditions									
Error(conditions)									
a. Computed using alpha = .05									

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^a
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Intercept	2426.683	1	2426.683	219.625	.000	.917	219.625	1.000
Error	220.984	20	11.049					

a. Computed using alpha = .05

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
6.206	.419	5.333	7.080

2. conditions

Estimates

Measure: MEASURE_1

conditions	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	3.286	.704	1.817	4.755
2	4.143	.522	3.053	5.232
3	11.190	.450	10.251	12.130

Pairwise Comparisons

Measure: MEASURE_1

(I) conditions	(J) conditions	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
					Lower Bound	Upper Bound
1	2	-.857	.775	.846	-2.883	1.169
	3	-7.905*	.700	.000	-9.734	-6.076
2	1	.857	.775	.846	-1.169	2.883
	3	-7.048*	.495	.000	-8.341	-5.754
3	1	7.905*	.700	.000	6.076	9.734

2	7.048*	.495	.000	5.754	8.341
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Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power ^b
Pillai's trace	.933	132.27 1 ^a	2.000	19.000	.000	.933	264.543	1.000
Wilks' lambda	.067	132.27 1 ^a	2.000	19.000	.000	.933	264.543	1.000
Hotelling's trace	13.923	132.27 1 ^a	2.000	19.000	.000	.933	264.543	1.000
Roy's largest root	13.923	132.27 1 ^a	2.000	19.000	.000	.933	264.543	1.000

Each F tests the multivariate effect of conditions. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

b. Computed using alpha = .05

Appendix 6

Ethics form

APPLICATION FOR ETHICAL APPROVAL

In order for research to result in benefit and minimise risk of harm, it must be conducted ethically. A researcher may not be covered by the University's insurance if ethical approval has not been obtained prior to commencement.

The University follows the OECD Frascati manual definition of **research activity**: “creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications”. As such this covers activities undertaken by members of staff, postgraduate research students, and both taught postgraduate and undergraduate students working on dissertations/projects.

The individual undertaking the research activity is known as the “principal researcher”.

Ethical approval is not required for routine audits, performance reviews, quality assurance studies, testing within normal educational requirements, and literary or artistic criticism.

Please read the notes for guidance before completing ALL sections of the form.

This form must be completed and approved prior to undertaking any research activity.
Please see Checklist for details of process for different categories of application.

SECTION A: About You (Principal Researcher)

Full Name:	Charlotte Greenway				
Tick all boxes which apply:					
Member of staff:	☒	Student:	☐	Honorary research fellow:	☐

Faculty/School/Centre:	Psychology		
Campus:	Carmarthen		
E-mail address:	c.greenway@uwtsd.ac.uk		
Contact Telephone Number:	01267676923		
For students:			
Student Number:		Undergraduate	☐
Programme of Study:		Taught Postgraduate	☐
Director of Studies/Supervisor:		Research	☐

SECTION B: Approval for Research Activity

Has the research activity received approval in principle? (please check the Guidance Notes as to the appropriate approval process for different levels of research by different categories of individual)		YES	☒	NO	☐
					Date
If Yes, please indicate source of approval (and date where known):	Research Degrees Committee		☐		
	Faculty Research Committee		☐		
	Other (write in) School ethics board		☒		03.09.18

Approval in principle **must** be obtained from the relevant source prior to seeking ethical approval.

SECTION C: External Ethical Guidance Materials

Please list the core ethical guidance documents that have been referred to during the completion of this form (including any discipline-specific codes of research ethics, and also any specific ethical guidance relating to the proposed methodology). Please tick to confirm that your research proposal adheres to these codes and guidelines.	
Code of Ethics and Conduct (2018)	☒
BPS Code of Human Research Ethics (2nd edition, 2014)	☒
The General Data Protection Regulation (GDPR)	☒

SECTION D: External Collaborative Research Activity

Does the research activity involve collaborators outside of the University?	YES	☐	NO	☒
If Yes, please provide the name of the external organisation and name and contact details for the main contact person:				
Institution				
Contact person name				
Contact person e-mail address				

Where research activity is carried out in collaboration with an external organisation

Does this organisation have its own ethics approval system?	YES	☐	NO	☐
If Yes, please attach a copy of any final approval (or interim approval) from the organisation				

SECTION E: Details of Research Activity

Indicative title:	The effects of levels of processing on memory recall
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Proposed start date:	16.10.18	Proposed end date:	9.11.18
Purpose of research activity (including aims and objectives) Outline the purpose, aims and objectives of the research activity, including key research questions. Show briefly how existing research has informed the proposed activity and explain what the research activity will add and how it addresses an area of importance. (Maximum 300 words)			
The basic prediction of the LOP approach is that the amount of information participants will recall/recognise will depend on how deeply the experimental stimuli were processed. Craik and Tulving (1975) investigated the effects of different types of processing on the recall of words. They argued that deeper levels of processing result in more long lasting and more retrievable memories, whereas shallow levels of processing result in memories that are less long-lasting and less likely to be retrieved. It is predicted (from the above theory), that words which are processed for meaning (deep processing) will be remembered better than words processed for sound (intermediate processing) which in turn will be recalled better than words which are processed for superficial characteristics such as shape, size or colour (shallow processing). This explanation of memory is useful in everyday life because it highlights the way in which elaboration, which requires deeper processing of information, can aid memory. This has educational implications. Students can use semantic processing to revise which should result in deeper processing through using elaborative rehearsal. Consequently, more information will be remembered (and recalled) and better exam results should be achieved. This research will help to confirm previous findings and the importance of elaborative rehearsal. (this box should expand as you type)			
Proposed methods Provide a brief summary of all the methods that may be used in the research activity, making it clear what specific techniques may be used. If methods other than those listed in this section are deemed appropriate later, additional ethical approval for those methods will be needed. (Maximum 600 words)			
In-class experiment using presumptive consent. Students will be presented with a powerpoint slide that includes 45 trials (plus four practice trials). 15 structural/shallow words (Is this word in capital letters?) 15			

phonological/intermediate words (Does this word rhyme with _?), and 15 semantic meaning/deep words (Does the word fit in the sentence? Cat's meow, dogs_). While going through each slide students will be asked to place a cross in a yes or no box (e.g., Q3. Is this word in capital letters? – TRAIN – put a cross in the no box).

Students believe that this is the real test, but once they have completed the task above, the real task involves them recognising words from the powerpoint slides. The 45 words from the slides are placed amongst 105 words. Their task is to recognise as many of the 45 words presented to them, again putting a cross against as many of the 45 words as they can remember.

All data will be collated and analysed using SPSS.

(this box should expand as you type)

Location of research activity

Identify all locations where research activity will take place.

D003 – computer lab. Carmarthen campus.

(this box should expand as you type)

Research activity outside of the UK

If research activity will take place overseas, you are responsible for ensuring that local ethical considerations are complied with and that the relevant permissions are sought. Specify any local guidelines (e.g. from local professional associations/learned societies/universities) that exist and whether these involve any ethical stipulations beyond those usual in the UK (provide details of any licenses or permissions required). Also specify whether there are any specific ethical issues raised by the local context in which the research activity is taking place, for example, particular cultural sensitivities or vulnerabilities of participants.

N/A

(this box should expand as you type)

SECTION F: Scope of Research Activity

Will the research activity include:	YES	NO
Use of a questionnaire or similar research instrument?	☒	☐
Use of interviews?	☐	☒
Use of diaries?	☐	☒
Participant observation with their knowledge?	☐	☒
Participant observation without their knowledge?	☐	☒
Use of video or audio recording?	☐	☒
Access to personal or confidential information without the participants' specific consent?	☐	☒
Administration of any questions, test stimuli, presentation that may be experienced as physically, mentally or emotionally harmful / offensive?	☐	☒
Performance of any acts which may cause embarrassment or affect self-esteem?	☐	☒
Investigation of participants involved in illegal activities?	☐	☒
Use of procedures that involve deception?	☐	☒
Administration of any substance, agent or placebo?	☐	☒
Working with live vertebrate animals?	☐	☒
Other primary data collection methods, please explain in this box Experiment (see above)	☒	☐

If NO to every question, then the research activity is (ethically) low risk and **may** be exempt from **some** of the following sections (please refer to Guidance Notes).

If YES to any question, then no research activity should be undertaken until full ethical approval has been obtained.

SECTION G: Intended Participants

Who are the intended participants:	YES	NO
Students or staff at the University?	☒	☐
Adults (over the age of 18 and competent to give consent)?	☒	☐
Vulnerable adults?	☐	☒
Children under 18?	☐	☒
Prisoners?	☐	☒
Young offenders?	☐	☒

Those who could be considered to have a particularly dependent relationship with the investigator or a gatekeeper?	☐	☒
People engaged in illegal activities?	☐	☒
Others (please identify):	☐	☒

Participant numbers and source

Provide an estimate of the expected number of participants. How will you identify participants and how will they be recruited?

They will part of the level 5 research methods cohort. Approx 24 students

(this box should expand as you type)

Information for participants:	YES	NO	N/A
Will you describe the main research procedures to participants in advance, so that they are informed about what to expect?	☒	☐	☐
Will you tell participants that their participation is voluntary?	☐	☐	☒
Will you obtain written consent for participation?	☐	☐	☒
Will you explain to participants that refusal to participate in the research will not affect their treatment or education (if relevant)?	☐	☐	☒
If the research is observational, will you ask participants for their consent to being observed?	☐	☐	☒
Will you tell participants that they may withdraw from the research at any time and for any reason?	☐	☐	☒
With questionnaires, will you give participants the option of omitting questions they do not want to answer?	☐	☐	☒
Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☒	☐	☐
Will you debrief participants at the end of their participation, in a way appropriate to the type of research undertaken?	☒	☐	☐
If NO to any of above questions, please give an explanation			
This is an in-class experiment and is part of their first assessed report. If they do not take part – they will not understand how to complete their assignment.			
(this box should expand as you type)			

Information for participants:	YES	NO	N/A
Will participants be paid?	☐	☒	☐
Is specialist electrical or other equipment to be used with participants?	☐	☒	☐
Are there any financial or other interests to the investigator or University arising from this study?	☐	☒	☐
Will the research activity involve deliberately misleading participants in any way, or the partial or full concealment of the specific study aims?	☐	☒	☐

If YES to any question, please provide full details

(this box should expand as you type)

SECTION H: Anticipated Risks

Outline any anticipated risks that may adversely affect any of the participants, the researchers and/or the University, and the steps that will be taken to address them.

If you have completed a full risk assessment (for example as required by a laboratory, or external research collaborator) you may append that to this form.

Full risk assessment completed and appended?

Yes ☐

No ☒

Risks to participants

For example: emotional distress, financial disclosure, physical harm, transfer of personal data, sensitive organisational information

Emotional distress. Students may be upset if their recall scores are low. In the debriefing I will reiterate what they have previously learned in relation to memory tests, and reassure them that this is no way linked to intelligence.

(this box should expand as you type)

If research activity may include sensitive, embarrassing or upsetting topics (e.g. sexual activity, drug use) or issues likely to disclose information requiring further action (e.g. criminal activity), give details of the procedures to deal with these issues, including any support/advice (e.g. helpline numbers) to be offered to participants. Note that where applicable, consent procedures should make it clear that if something potentially or actually illegal is discovered in the course of a project, it may need to be disclosed to the proper authorities

N/A (this box should expand as you type)
Risks to investigator For example: personal safety, physical harm, emotional distress, risk of accusation of harm/impropriety, conflict of interest The risks to the investigator are minimal as this is an in-class experiment with students that the researcher already knows. The only risk may be researcher bias, but as the students will be writing up their own lab reports, this should not be an issue in the interpretation of results. (this box should expand as you type)
University/institutional risks For example: adverse publicity, financial loss, data protection Minimal as I will follow BPS and University guidelines. (this box should expand as you type)
Adverse outcomes List measures put in place to limit any adverse effects or outcomes of research activity where appropriate. Include any emergency protocols. I will follow the University's emergency protocols if need be (as the experiment will take place on the premises). (this box should expand as you type)

Disclosure and Barring Service			
If the research activity involves children or vulnerable adults, a Disclosure and Barring Service (DBS) certificate must be obtained before any contact with such participants.			
	YES	NO	N/A
Has a DBS certificate been obtained?	☐	☐	☒

SECTION I: Feedback, Consent and Confidentiality

Feedback

What feedback will be provided to participants, how will this be done and when?
Debriefing – verbal following the experiment (this box should expand as you type)
Informed consent Describe the arrangements to inform potential participants, before providing consent, of what is involved in participating. Describe the arrangements for participants to provide full consent before data collection begins. If gaining consent in this way is inappropriate, explain how consent will be obtained and recorded.
Presumptive – in-class experiment (this box should expand as you type)
Confidentiality / Anonymity Set out how anonymity of participants and confidentiality will be ensured in any outputs. If anonymity is not being offered, explain why this is the case.
No names/personal information will be attached to the individual scores. (this box should expand as you type)

SECTION J: Data Protection and Storage

In completing this section refer to the University's Research Data Management Policy and the extensive resources on the University's Research Data Management web pages (<http://uwtsd.ac.uk/library/research-data-management/>).

	YES	NO
Does the research activity involve personal data (as defined by the Data Protection Act)? <i>“personal data” means data which relate to a living individual who can be identified—</i> <i>(a) from those data, or</i> <i>(b) from those data and other information which is in the possession of, or is likely to come into the possession of, the data controller, and includes any expression of opinion about the individual and any indication of the intentions of the data controller or any other person in respect of the individual.</i>	☐	☒
If YES, provide a description of the data and explain why this data needs to be collected: (this box should expand as you type)		

Does it involve sensitive personal data (as defined by the Data Protection Act)? “Sensitive personal data” means personal data consisting of information as to – (a) the racial or ethnic origin of the data subject, (b) his political opinions, (c) his religious beliefs or other beliefs of a similar nature, (d) whether he is a member of a trade union (within the meaning of the Trade Union and Labour Relations (Consolidation) Act 1992), (e) his physical or mental health or condition, (f) his sexual life, (g) the commission or alleged commission by him of any offence, or (h) any proceedings for any offence committed or alleged to have been committed by him, the disposal of such proceedings or the sentence of any court in such proceedings.	☐	☒
If YES, provide a description of the data and explain why this data needs to be collected:		
(this box should expand as you type)		

Will the research activity involve storing personal data on one of the following:	YES	NO
Manual files (i.e. in paper form)?	☒	☐
University computers?	☒	☐
Private company computers?	☐	☒
Home or other personal computers?	☐	☒
Laptop computers/ CDs/ Portable disk-drives/ memory sticks?	☐	☒
“Cloud” storage or websites?	☐	☒
Other – specify:	☐	☒
For all stored data, explain the measures in place to ensure data confidentiality, including details of password protection, encryption and anonymisation:		
There is no personal data – just scores (raw data). (this box should expand as you type)		
Will the research activity involve any of the following activities:	YES	NO
Electronic transfer of data in any form?	☐	☒
Sharing of data with others at the University?	☐	☒
Sharing of data with other organisations?	☐	☒
Export of data outside the European Union or importing of data from outside the UK?	☐	☒
Use of personal addresses, postcodes, faxes, emails or telephone numbers?	☐	☒
Publication of data that might allow identification of individuals?	☐	☒
Use of data management system?	☐	☒

Data archiving?	☐	☒
If YES to any question, please provide full details, explaining how this will be conducted in accordance with the Data Protection Act (and/or any international equivalent):		
 (this box should expand as you type)		

List all who will have access to the data generated by the research activity:
The principal researcher (this box should expand as you type)
List who will have control of, and act as custodian(s) for, data generated by the research activity:
The principal researcher (this box should expand as you type)
Give details of data storage arrangements, including where data will be stored, how long for, and in what form. Will data be archived – if so how and if not why not.
N/A as data will not be stored. Raw data will be analysed in SPSS in class. (this box should expand as you type)

SECTION K: Declaration

The information which I have provided is correct and complete to the best of my knowledge. I have attempted to identify any risks and issues related to the research activity and acknowledge my obligations and the rights of the participants. In submitting this application I hereby confirm that I undertake to ensure that the above named research activity will meet the University's Research Ethics and Integrity Code of Practice
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Signature of applicant:	Date:
--------------------------------	--------------

For students:

Director of Studies/Supervisor:	Dr Charlotte Greenway
Signature:	
Date:	15.10.18

For staff:

Head of School/Assistant Dean:	
Signature:	
Date:	

Checklist: Please complete the checklist below to ensure that you have completed the form according to the guidelines and attached any required documentation:

☒	I have read the guidance notes supplied before completing the form.
☒	I have completed ALL RELEVANT sections of the form in full.
☒	I confirm that the research activity has received approval in principle
☒	I have attached a copy of final/interim approval from external organisation (where appropriate)
☐	I have attached a full risk assessment (and have NOT completed Section H of this form) (where appropriate)
☒	I understand that it is my responsibility to ensure that the above named research activity will meet the University's Research Ethics and Integrity Code of Practice.
☒	I understand that before commencing data collection all documents aimed at respondents (including information sheets, consent forms, questionnaires, interview schedules etc.) must be confirmed by the DoS/Supervisor, module tutor or Head of School.

RESEARCH STUDENTS AND STAFF ONLY

All communications relating to this application during its processing must be in writing and emailed to pgresearch@uwtsd.ac.uk , with the title 'Ethical Approval' followed by your name.

You will be informed of the outcome of your claim by email; therefore **it is important that you check your University and personal email accounts regularly.**

STUDENTS ON UNDERGRADUATE OR TAUGHT MASTERS PROGRAMMES should submit this form (and receive the outcome) via systems explained to you by the supervisor/module leader.

This form is available electronically from the Academic Office web pages:
<http://www.uwtsd.ac.uk/academic-office/>

Application Process

All staff research projects and all research students must submit the Ethical Approval Form to the **University Ethics Committee** via the Academic Office (pgresearch@uwtsd.ac.uk). Staff research directly in relation to personal study for taught undergraduate or Masters programmes should be submitted via the Faculty procedures explained below.

Taught masters and taught undergraduate research Ethical Approval Forms are considered **within Faculties**. Faculties will provide details of the specific processes for this. Where the Ethical issues within any single ethical application are of particular concern the Faculty will refer these to the University Ethics Committee. Any student activity that involves the collection of primary data needs to undergo Ethical approval, this includes assignment work as well as dissertations.

Notes for guidance in completion of this form

Section A: About You

Please complete all relevant sections

Section B: Approval for research activity

Research proposals must be approved in principle before applying for Ethical Approval. The proposal approval only becomes final when the ethical approval is received.

The process for proposal approval varies according the individual and programme of study:

- Research students, by application on form PG1 to the Research Degrees Committee

- Taught students by review of research proposal within Faculties (Faculties provide specific details of these processes)
- Staff, by agreement by the Head of School/Assistant Dean

Section C: External Ethical Guidance materials

Many discipline areas are required to operate with the discipline specific codes of research ethics (for example health, psychology, education etc.), any such codes must be listed and you must tick to confirm that you have consulted with these.

Section D: External Collaborative Research Activity

Provide details of the external collaborative partners, where appropriate you might want to submit a copy of the external collaboration agreement with the Ethical Approval Form. If the partner requires the research to be subject to its own internal Ethical approval process then please provide details of that process and a copy of any final (or interim) approvals received from the organisation.

Section E: Details of Research Activity

Remember that the individuals reviewing this Ethical Approval Form may not have seen your research proposal, and also may not be experts in the specific area of your research. The information provided should therefore be jargon free and clearly stated.

Indicative Title: please use the same title as used on the research proposal.

Purpose: the Ethical approval process will want to ensure that the methods you propose are adequate and appropriate to address the research aims and objectives. Excessive additional data collection can be seen as unethical.

Proposed Methods: the Ethical approval process seeks to ensure that you understand the methods that are intended, and that the implementation of those methods will be appropriate and without unnecessary impact on respondents. Please be specific.

Location: this needs to mention geographical location and also local situation (for example, within Local Authority Offices in Cardiff, using a private room but close to other individuals). If you are collecting data within an organisational setting then you need to explain the permissions that you have obtained to do this.

Research Activity outside of the UK: please complete this section in detail, and note any guidance you have received. Also describe your own familiarity (or not) with the location that you will be utilising.

Section F: Scope of Research Activity

Please tick ALL of the research activities that might be undertaken. If any additional types of activity are intended then please add an extra box and describe these.

If you have answered no to all questions in F then sections G and J do not need to be completed. Section H should be considered, and may be completed. Signatures are still required in section K.

Section G: Intended Participants

Please tick all categories that might apply.

Numbers & Source: if you are using a series of different methods or research activities please list numbers for each stage/phase. Be clear about how you will find respondents. Will you use intermediaries, and if so how? How will you ensure compliance with your sampling strategy?

Information for participants: all participants should be appropriately informed about the research, what is expected of them and what will happen to the information that they provide. The Ethical review process does not ask to see this documentation, but requires this to be reviewed and approved by the Director of Studies in the case of research students, the supervisor/module tutor in relation to students on taught programmes and the Head of School/Assistant Dean in relation to staff research.

Section H: Anticipate Risks

All research carries some level of risk. The answers you provide to questions in this section will be reviewed to ensure that you have an appropriate understanding of the type of risks involved and how you can mitigate against these risks. If you have completed a full risk assessment, as required for example for laboratory work, field work, clinical tests, diving operations, or by a collaborative partner, you may append that to this form. In that case, please tick the box indicating this has been provided. You will not then be required to complete Section H.

Risk to participants Think very carefully about how your actions/questions/discussions might affect the people you are involving as participants. You might identify the risk as small but it would still be a risk. Many types of question have the potential to make respondents less content with their life / job; you need to recognise and try to ameliorate any such effects. If these are business owners, time with you may reduce profit.

In some locations physical risk is very real to both participants and yourself, please consider this.

Risk to you, the researcher Think about where you will meet people, if there are any dangers involved in the location. If you are meeting people as individuals think about using a public place. In general do not visit people in their own homes or remote locations. If you are talking to individuals about certain issues think about how their responses might affect you emotionally. What about the risk of collecting insufficient data?

Risk to the University When undertaking your research, you are acting as a member of the University (student or staff). Professionalism is important, so it is important to be well organised and well prepared. Punctuality, clarity etc. are all part of this. What will you do to ensure this? You must ensure you do not harm the good name of the University in any way and do nothing to undermine the reputation of the research it conducts and sponsors.

Upholding high standards of conduct and integrity are vital in this regard. You must also conduct the research in such a way to minimise the potential for claims of negligence made against the University, its researchers and any collaborating individual or organisation. In this respect you should always comply with ethical, legal and professional frameworks, obligations and standards as required by statutory and regulatory authorities, as well as the university's Research Integrity and Ethics Code of Practice. Research misconduct in this respect can take many forms, including:

- fabrication: making up results or other outputs (eg, artefacts) and presenting them as if they were real
- falsification: manipulating research processes or changing or omitting data without good cause
- plagiarism: using other people's material without giving proper credit
- failure to meet ethical, legal and professional obligations: for example failure to declare competing interests; misrepresentation of involvement or authorship; misrepresentation of interests; breach of confidentiality; lack of informed consent; misuse of personal data; and abuse of research subjects or material
- improper dealing with allegations of misconduct: failing to address possible infringements such as attempts to cover up misconduct and reprisals against whistle-blowers

Adverse Outcomes. Think carefully about the possibilities, and cover here

Section I: Feedback, Consent and Confidentiality

Feedback to participants: outline your approach. Will interview transcripts be shared with respondents to check accuracy? Will summaries of questionnaire analysis be made available to respondents in some way? Will an overview report be provided? How and when?

Informed consent: Draft letter / e-mail / or heading (or footer) section of questionnaire must be approved by DoS/supervisor (if research student), supervisor/module tutor if taught student, or Head of School / Assistant Dean if a member of staff.

Confidentiality/Anonymity. Explain clearly how you will ensure confidentiality and anonymity.

Section J: Data Protection and Storage

Before completing this section it is necessary to read the University's Research Data Management information. The questions that follow are designed to ensure compliance with the Data Protection Act as well as established research protocols.

Many research activities will involve electronic transfer of data and use of data management systems in the summarisation and analysis of data. You will need to explain these in relation to compliance with the Data Protection Act.

Think carefully about who will have access to your data, this will include supervisors and examiners. Also that a thesis will be made available via the University library and the British Library system. If you are seeking an access bar for a period after completion, then mention it here. If you will provide a copy of your findings, or intend to give a presentation, to a facilitating/ supporting/accessing organisation then explain that in this section. But also think about the general principle of data sharing, as explained in the Research Data Management information.

In terms of storage of data please ensure security, and also mitigate against loss of data.

Section K: Declaration

Ensure the appropriate countersignatures have been provided

Look carefully at the checklist and ensure that you comply with and tick all that are relevant to your research.

Appendix 7

Consent form



PRIFYSGOL CYMRU
Y Drindod Dewi Sant
UNIVERSITY OF WALES
Trinity Saint David

School of Psychology
Carmarthen Campus

Study Consent Form

I understand that this research study is being carried out by a 2nd year Psychology Student for their dissertation, and that taking part in this study will involve [brief description]

This task will take approximately XX minutes to complete.

I understand that participation in this study is entirely voluntary and I am free to withdraw participation at any time without giving a reason. I am aware that if I have concerns about the study I can discuss these concerns with the researcher or academic supervisor at any time during or after the study.

I understand that the information provided by me will be held confidentially, with a code assigned in place of my name. These data will be stored indefinitely in accordance with the Data Protection Act.

I also understand that at the end of the study I will be provided with a debrief form and the opportunity to discuss any issues with the researchers.

I, _____ (NAME) consent to participate in the study conducted by [student], School of Psychology, University of Wales Trinity Saint David, Swansea under the supervision of [supervisor]

Participant Signature: _____

Date: _____

Name and signature of researcher taking consent

Appendix 5

Debrief form



PRIFYSGOL CYMRU
Y Drindod Dewi Sant
UNIVERSITY OF WALES
Trinity Saint David

School of Psychology
Carmarthen Campus

Study Debrief Sheet

(words underlined and in italics should be changed to fit your specific study)

Study Title

Thank you for taking part in the study.

The aim of this study was to explore We specifically wanted to find out whether to explore the effects of levels of processing looking at structure processing (shallow), phonemic processing (intermediate) and semantic processing (deep).

If you wish to withdraw your data from the study you must tell the researcher now. After this point, all of your data will remain confidential/anonymous and we will not trace it back to you.

If taking part in this study has raised any questions please speak to the researchers on [name and email] or contact the academic supervisor [insert supervisor contact here, name and email]

Thank you once again for taking time to participate in this study.

Student name

BSc Honours Applied Psychology

University of Wales Trinity Saint David, Carmarthen