

An investigation into the effects of ambiguous and unambiguous stimuli on majority influence.

Psychology A Level Coursework

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Abstract

This study aimed to explore the effect of ambiguous and unambiguous stimuli on majority influence. Using two separate questionnaires, equal numbers of male and female eleven to twelve year old students were tested in independent groups. The true nature of the study was concealed from the participants using a single blind technique in order to reduce biases. It was believed that conformity rates would be significantly higher on the ambiguous rather than the unambiguous questionnaire. The results collected were found to be statistically significant in favour of the alternative hypothesis, which was that conformity on a questionnaire would be significantly higher when an ambiguous stimulus is used, rather than an unambiguous one. This suggests that conformity is present even when reacting to previous ticks on a questionnaire, as well as proving that participants are far more likely to conform on a task which is ambiguous. The findings of this study also relate to those of Asch (1956) who conducted research into conformity with an unambiguous stimulus.

Introduction

Majority influence is a form of social influence in which a minority is pressured to adopt the same attitude or point of view as the members of a united majority. Over time, much research has been carried out to investigate this phenomenon.

In 1932, Jenness conducted a study asking students to estimate the number of beans in a jar, an ambiguous stimulus. The students were then given an opportunity to discuss their estimates as a group and were asked to give their individual guesses again. It was found that the individual's responses tended to lean towards a group norm. Jenness concluded therefore, that in an ambiguous situation people look to others for ideas about what answer is appropriate.

In 1935, Sherif also investigated group responses to an ambiguous stimulus. By making use of the *autokinetic effect* (how a point of light appears to move when in a completely dark room) Sherif asked participants to estimate how far the light had moved. Then they were asked to work in groups of four, where all members of the group had given very different answers. After group discussion, each participant repeated their individual answers. Sherif discovered that they had all become similar, acting as further proof that people tend to establish and conform to a group norm.

Asch's 1956 study investigated majority influence in unambiguous situations, where a 'correct' answer is clear. Participants were asked to match a 'standard' line to three 'comparison' lines by length. However, all but one of the participants were confederates, told to give a unanimous incorrect answer on twelve of the trials. Asch found that around one third of all responses given by true participant's conformed to the

majority, and $\frac{3}{4}$ conformed at least once. This study shows that even when a correct answer is clear, participants may still conform to majority opinion.

However, the research was criticised as being a 'child of its time'. The study was conducted during the period of McCarthyism in America, a time when American society was highly conformist. Later, in 1980, Perrin and Spencer replicated Asch's study in England and found conformity in only one out of three-hundred-and-ninety-six trials. However, this study was also criticised as it used only science students for participants, who may be more confident about being able to estimate the length of a line. Lalancette and Standing (1990) also modified Asch's experiment, making the stimuli more ambiguous and otherwise increasing the likelihood of conformity. Again a negligible level of conformity occurred, suggesting that the 'Asch effect' was a very unpredictable phenomenon. In conclusion, these studies suggest that majority influence exists when both ambiguous and unambiguous stimuli are concerned.

There are two main explanations of why people conform to majority influence:

- Normative influence: Compliance. When people merely 'follow the crowd', going along with the majority but not accepting their point of view to be correct.
- Informational influence: Acceptance. When a person changes their own point of view in alignment with that of the majority because they believe it is correct. Conforming both publicly and privately.

Aims

The studies by Jenness, Sherif and Asch all show examples of conformity in individual situations. However, this study aims to directly compare conformity levels when unambiguous and ambiguous stimuli are used. A further aim is to discover whether one type of stimulus produces significantly different conformity levels than the other. Previous research has shown the existence of conformity with both stimuli. Since Asch discovered conformity on only one third of the trials, it can be predicted that conformity would be higher with an ambiguous stimulus, when participants may look for other people's answers as a template for their own responses. This view is also upheld by the research which Jenness conducted, when a group norm was formed with an ambiguous stimulus.

Alternative hypothesis

The levels of conformity to answers on a questionnaire will be significantly higher when an ambiguous stimulus is used, as opposed to an unambiguous stimulus (directional, one-tailed hypothesis).

Null hypothesis

There will be no significant difference in levels of conformity between ambiguous and unambiguous stimuli to incorrect responses on a questionnaire.

Method

Method and design

This study utilizes a questionnaire survey which obtains interval data. Two separate questionnaires are given to two independent groups. One questionnaire entitled “Semantic Reasoning” (Appendix A) includes questions to which an answer is clear, choosing the odd word out in terms of meaning. The second questionnaire entitled “Cryptic Reasoning” (Appendix B) bears questions to which there is no definite or certain answer.

Both questionnaires were given the appearance that three students had already completed the questionnaire prior to the actual study. In all cases all three 'previous students' answered the same option (Appendix A/B shows this. In effect these are the 'blank' questionnaires). For the “Semantic Reasoning” questionnaire, *wrong* answers were selected for ten out of the fifteen questions. This was to make it harder for participants to guess the true nature of the study. It was these ten questions, spaced evenly throughout the questionnaire which were taken into account when compiling the results (question numbers 2, 4, 5, 7, 8, 10, 11, 12, 14, 15). As there is no 'incorrect' response to the ambiguous questions, the same ten questions were examined from both questionnaire types.

An independent groups design has been used to minimise order effects such as repetition and boredom. It also helps to prevent participants guessing the true nature of the experiment. Only one questionnaire is filled out by each participant. However, this design requires double the number of participants as the repeated measures design, and it is much harder to control participant variables such as individual differences.

Experimental condition (IV): The stimulus of the questionnaire. Un/ambiguous.

Dependant variable: Conformity rate. The number of times a participant conforms.

Controls

A single blind technique has been used, where the participants believe their semantic or cryptic reasoning is being assessed, it is actually whether or not they conform which is being examined. This has been used to minimise the chances to participants realising the study's true nature, which would heavily effect the results (expectancy bias). Furthermore, to help minimise investigator effects and aid with replication, standardised instructions and procedures have been used.

Since females have been shown to be more conformist than males gender bias was eliminated within the study by using random sampling to pick an equal number of male and female participants. The fact that one school year was being studied should also minimise the effects of age bias. Whilst participant variables and individual differences are nearly impossible to suppress, random sampling will help to even out their effects.

Target population and sample

Thirty-two participants (sixteen male, sixteen female) aged eleven to twelve years (year seven) were selected using the random sampling technique. Students of this age were chosen because of their proven willingness to participate in psychological studies and their likelihood not to see through the single blind.

Form lists were obtained for the entire of year seven, and each male student was assigned a number. Then, the random function on a calculator was used to select participants at random. If the same number was generated more than once, the number was discarded and a new one generated. The process was then repeated to select the female participants. Eight males and eight females were then assigned at random to complete either the ambiguous or unambiguous test.

As all the participants in the study were under the age of sixteen parental consent for their participation in the study was obtained beforehand. The student was sent home with a letter and only allowed to take part if their parents agreed.

Apparatus and materials

- “Semantic reasoning” questionnaires x 16 (Appendix A)
- “Cryptic reasoning” questionnaires x 16 (Appendix B)
- Folder for documentation and completed tests
- Pen / pencil x 8

Standardised procedures

First, a free room was commandeered for the study's use. The same room was used for all the experiments in order to prevent confounding variables of location arising. The relevant questionnaires were then placed at desks in the room and one researcher collected the participants and lead them to the room of study. Participants were told they would only need to bring a pen or pencil with them to the test.

Each study was conducted by all three researchers (sixteen and seventeen year old psychology students) who were working on the same project. Each researcher read one paragraph of the standardised instructions, found in Appendix C.

Participants were allowed to leave the room again once everyone had completed their questionnaire. Before leaving all students were thanked for their participation.

After all the studies had been completed, all participants were debriefed as to the true nature of the study, using the guidelines found in Appendix D.

Ethical issues

Deception is a key ethical issue of this study. The participants were told that their semantic and cryptic reasoning ability was being assessed, as the title of each questionnaire suggests. They were further misled by the “JAJ Foundation” logo at the

head of each test, a fictional organisation. However, this deception can be justified within the context of the conformity experiment. If the participants were told the true nature of the study, their answers would be subject to extreme expectancy bias, and the results would not be feasible.

Steps were also taken to protect participants from harm. They were only exposed to minor deception within the study and anonymity was maintained throughout, with no personal information or observations being recorded. This prevents participants from being embarrassed about any of their behaviour during the study. Furthermore, the right to withdraw was granted fully to each participant clearly in the instructions.

Informed consent could not be obtained without revealing the experiment's true nature. Instead, prior general consent was given by the participants when they agreed to leave their form room and take part in a psychological study. Furthermore, the lack of withdrawal from the experiment demonstrates their willingness to proceed. Finally, all participants were debriefed fully after the study was completed. The true nature of the study and all deceptions were completely revealed to them.

Results: Descriptive Statistics

A table of results, including measures of central tendency and dispersion, is shown below, followed by two graphical representations of the data which was collected. The raw data from the experiment can be found in Appendix F.

	Unambiguous Scores	Ambiguous Scores
Mean	0.50	4.40
Median	0.00	4.00
Mode	0.00	4.00
Standard Deviation	1.15	3.29

Overall, 18.75% of participants conformed at least once on the unambiguous questionnaire, whereas 86.67% conformed at least once on the ambiguous questionnaire. Furthermore, 8/160 (5%) of all critical answers were conformed in the unambiguous study, compared to 66/150 (44%) on the ambiguous questionnaire.

Fig. 1:

Bar chart showing total number of times conformed

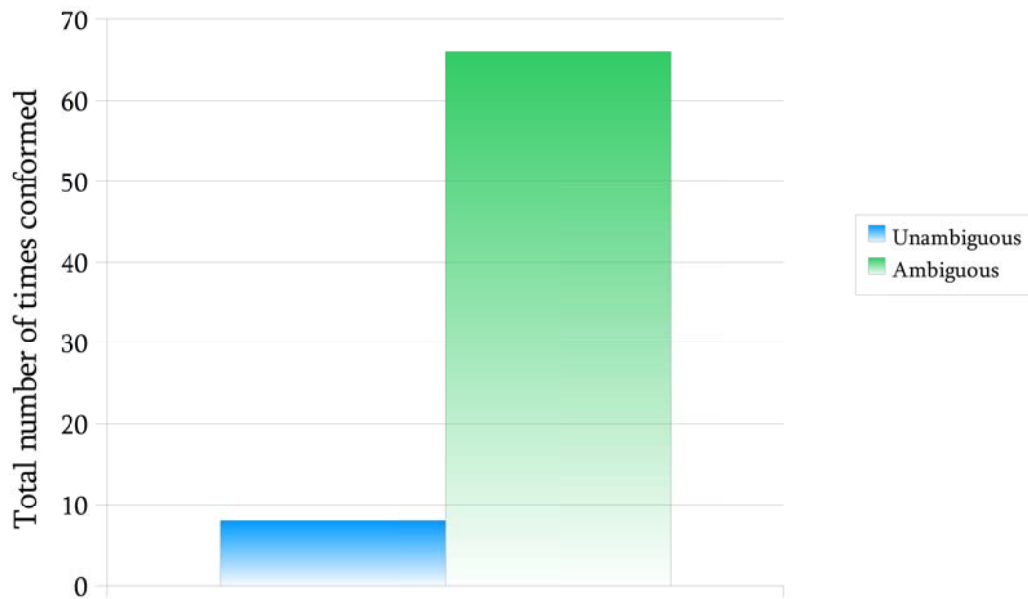
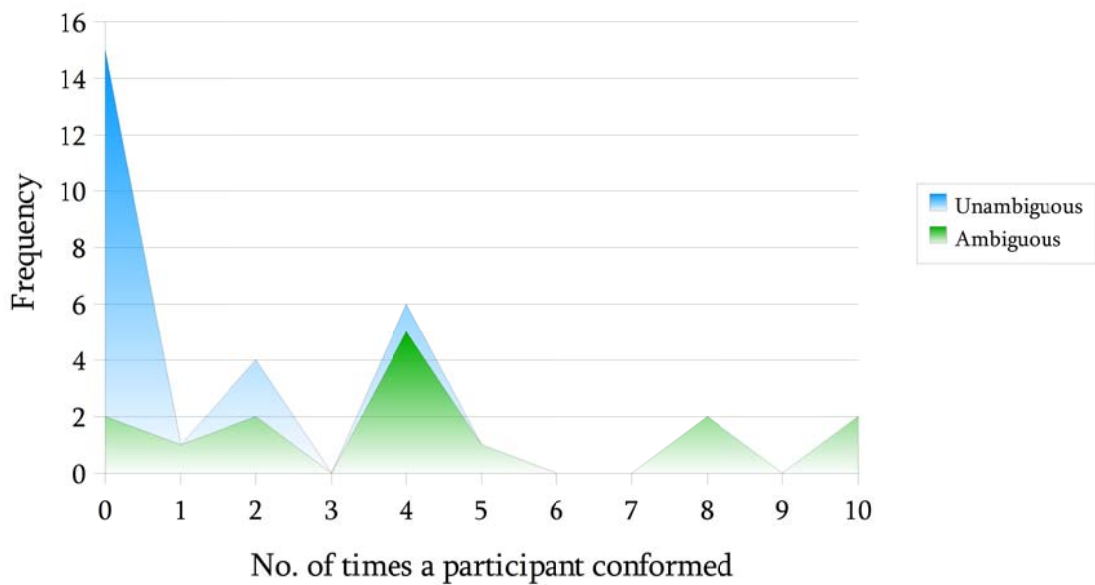


Fig. 2:

Stacked graph showing frequency of no. of times conformed



Results: Inferential Statistics

Level of significance

The level of significance selected was 5%. A Mann-Whitney U Test was chosen to assess whether the data we collected reaches this level for the following reasons:

- The hypothesis predicts a difference between two sets of data,
- An independent groups design was used,
- Interval data was collected.

The table of calculations can be found in Appendix G, however the results were as follows:

U = lowest number of points = 34.5

N_1 = number of participants in group 1 = 16

N_2 = number of participants in group 2 = 15 (due to anomalous result)

Critical value = 55

$U < \text{Critical value} \therefore$ the null hypothesis can be rejected.

Therefore the one-tailed alternative hypothesis was accepted. The levels of conformity on a questionnaire when an ambiguous stimulus is used has been found to be significantly higher than the levels of conformity from an unambiguous stimulus.

Discussion

Explanation of findings

The hypothesis predicted that conformity levels would be higher for the ambiguous rather than the unambiguous stimulus. Figure 1 showed that the total number of times conformed was indeed much higher for the ambiguous questionnaire (8.25x higher). The frequency graph in Figure 2 also shows how many more times higher conformity levels were achieved on the ambiguous questionnaire.

The mean values of the data collected (0.5 and 4.4 respectively) further prove the hypothesis correct, although the rate of standard deviation shows much more variation (backed up by Figure 2) with the ambiguous stimulus. This suggests that individual differences may play a large part in conformity, as supported by previous studies such as Asch (1956). For example, the fact that some participants conformed even on the unambiguous test suggests that either some people are far more conformist than others, or that the type of questions were unsuitable for all participants.

There were probably factors of both normative and informational influence in causing participants to conform on the questionnaire. However, since the experiment maintained anonymity it is likely that normative influence did not play as large a part, there was no reason to feel embarrassed about going against the majority. This suggests that participants conformed because they wanted to answer the questions 'correctly'. Believing the majority's opinion to be truth. However, there may also have been an element of demand characteristics and expectancy bias. The previous answers on the questionnaire being consistent may have led participants to conform because they did not wish to ruin the experiment, or because they thought this is what was expected of them. Contrastingly, this may have been the reason some participants did not conform, deliberately going against what they thought was expected of them.

Relationship to background research

Because of the quantitative data collected, the results from this study can be directly compared to the previous study into conformity by Asch (1956). In his study, as discovered that with his unambiguous stimulus, 36.8% of responses were conformed. It was also discovered that 75% of participants conformed at least once. In this study, the results from the unambiguous stimulus show that 5% of all responses were conformed and only 18.75% of people conformed at least once. These much lower results can be explained due to the lack of normative influence in this study. Participants in Asch's (1956) study felt pressured by the physical presence of a group majority, of which there was none in this study.

However, this study's results do bear more relevance to the follow-up studies conducted by Perrin and Spencer (1980) and Lalancette and Standing (1990) who

discovered little or no evidence for conformity with an unambiguous stimulus.

This study's findings for conformity with an ambiguous stimulus can not be directly compared to the qualitative data from Jenness' (1932) and Sherif's (1935) studies, however the findings are in accordance. Of great interest to the researchers was the fact that the conformity levels on the ambiguous questionnaire actually exceeded the levels of conformity found by Asch (1956). This high level of conformity could be due to setting the study in a school, where having the 'correct' answer is praised. Also, the younger age of participants could explain them being more timid and 'safe' with their answers.

Limitations and suggested modifications

One limitation of the study is presented by the anomalous result attained in the ambiguous study. The participant in question ticked all available options for every question on the test. This meant that no results could be retrieved from that test. However, due to an oversight in the design process, no part of the standardised instructions (Appendix C) specified that only one option should be chosen for each question. The participant may have noticed this omission and thought they had guessed the 'true nature' of the experiment, reinforced by the way the ambiguous questions had no absolute 'correct' answer, all options were equally correct. Therefore the following clause should be added to the instructions.

“Only one option: A, B, C or D, may be chosen for each question.”

A further limitation with this study is that the results can not be generalised to all settings and populations. The findings are only valid for the age group we researched in a school setting. Further research could be carried out to investigate other settings and populations, especially since the participants in this study were only chosen from one school. The sample is therefore biased as participants from only one area and possibly one social background were examined.

Another problem with the sample is that participant's individual differences could have played a large role in determining their conformity levels. This is shown by the large range of conformity that was discovered, especially with the ambiguous stimulus.

Since a single blind technique was used, where the experimenters knew the true nature of the study, experimenter effects could have influenced the results. The researchers could have accidentally revealed or implicated the true nature of the study.

Implications and Further research

The results of this study bear implications for the whole educational system. It has been found that clarity is important in a learning environment to prevent students simply copying from others. This also applies to group discussions, where the topic must be clear and unambiguous in order for students to come forward with their own opinions. The study has also shown that in order to reduce conformity, students should

not be given a questionnaire or test on which the answers of others have already been recorded.

Further research could be conducted to investigate the effect of an un/ambiguous stimulus on conformity in different situations. For example the experiment could be set on a public street, where participants are chosen through opportunity. Also, participants of different ages could be examined, to determine the effect of age on conformity. Research could also be conducted to examine whether girls conform more than boys to the answers on the questionnaires, as would be expected from previous research.

A study could also be designed which investigates whether the conformity of participants is merely 'compliance', accepting the answer for the sake of being correct, or 'acceptance', actually believing that the answer they are conforming to is correct.

The previously found limitation of the study, experimenter effects caused by the single blind technique, could be removed in a replication of this study using the double blind technique. If neither the experimenters nor the participants know the true nature of the study then there is a much lower risk of its true nature being revealed.

References

Asch (1956) in M. Cardwell & C. Flanagan (2003) *Psychology AS: The Complete Companion*. Nelson Thornes. Page 185.

Perrin and Spencer (1980) in M. Cardwell & C. Flanagan (2003) *Psychology AS: The Complete Companion*. Nelson Thornes. Page 185.

Lalancette and Standing (1990) in M. Cardwell & C. Flanagan (2003) *Psychology AS: The Complete Companion*. Nelson Thornes. Page 185.

Jenness (1932) in M. Cardwell & C. Flanagan (2003) *Psychology AS: The Complete Companion*. Nelson Thornes. Page 186.

Sherif (1935) in M. Cardwell & C. Flanagan (2003) *Psychology AS: The Complete Companion*. Nelson Thornes. Page 186.

Mann-Whitney U test table in J. Greene & M. D'Oliveira, *Learning to use statistical tests in psychology*. Open University Press.

Appendix A: Unambiguous Questionnaire

Semantic Reasoning Test – SRT1/1



- Mark the box next to the odd word out (in terms of meaning) in each question.
- Answer all questions and please remain silent for the duration of the test.

		Student 1	Student 2	Student 3	Student 4	Student 5		Student 1	Student 2	Student 3	Student 4	Student 5
1)	Cat Horse Duck Brick	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2)	Red Green Chair Black	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3)	Shirt Trousers Shoes Nose	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4)	Tree France Germany Spain	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5)	Pen Hair Pencil Biro	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6)	Lettuce Cake Carrot Broccoli	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7)	Nose Ear Eye Bottle	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8)	Tomato Beef Pork Chicken	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9)	Circle Fish Square Triangle	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10)	Goat Horse Sheep Watch	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11)	Rain Snow Window Hail	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12)	Roof King Queen Prince	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13)	Ring Bus Necklace Earrings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
14)	Car Bus Whiteboard Taxi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
15)	Jump Run Skip Wood	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Thank you for your participation.
Please turn over the test paper
once you have finished

Appendix B: Ambiguous Questionnaire

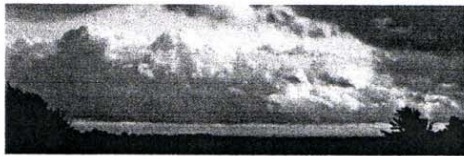
Cryptic Reasoning Test – CRT1/3



- Answer all questions as best you can using only the options provided.
- No equipment (e.g. Rulers, calculators) may be used during the test.
- You must ask no questions and remain silent for the duration of the test.

Student 1	Student 2	Student 3	Student 4	Student 5
-----------	-----------	-----------	-----------	-----------

1) How high are the clouds in the image below?



- A) 1,000 ft
- B) 2,000 ft
- C) 3,000 ft
- D) 4,000 ft

✓	✓	✓		

2) Estimate the length of the line below.



- A) 5 cm
- B) 6 cm
- C) 7 cm
- D) 8 cm

✓	✓	✓		

3) How many seconds in a moment?

- A) 2 seconds
- B) 5 seconds
- C) 8 seconds
- D) 11 seconds

✓	✓	✓		

4) How many bubbles in a bar of soap?

- A) 12,000
- B) 13,000
- C) 14,000
- D) 15,000

✓	✓	✓		

5) How many stitches in a school shirt?

- A) 1,000
- B) 1,500
- C) 2,000
- D) 2,500

✓	✓	✓		

Cryptic Reasoning Test – CRT2/3

- Answer all questions as best you can using only the options provided.
- No equipment (e.g. Rulers, calculators) may be used during the test.
- You must ask no questions and remain silent for the duration of the test.

Student 1	Student 2	Student 3	Student 4	Student 5
-----------	-----------	-----------	-----------	-----------

6) How many hairs on a human head?

- A) 110,000
- B) 120,000
- C) 130,000
- D) 140,000

✓	✓	✓		

7) How many bricks are used to build a house?

- A) 9,500
- B) 10,000
- C) 10,500
- D) 11,000

✓	✓	✓		

8) How many crisps are there in a packet?

- A) 26
- B) 28
- C) 30
- D) 32

✓	✓	✓		

9) How many books are there in a library?

- A) 2,000
- B) 4,000
- C) 6,000
- D) 8,000

✓	✓	✓		

10) Which of the lines below is longest?



- A) -----
- B) -----
- C) -----
- D) -----

✓	✓	✓		

Cryptic Reasoning Test – CRT3/3

- Answer all questions as best you can using only the options provided.
- No equipment (e.g. Rulers, calculators) may be used during the test.
- You must ask no questions and remain silent for the duration of the test.

Student 1	Student 2	Student 3	Student 4	Student 5
-----------	-----------	-----------	-----------	-----------

11) How long does a Biro pen last?

- A) 7 days
- B) 10 days
- C) 13 days
- D) 16 days

✓	✓	✓		

12) How many trees are there in a park?

- A) 50
- B) 55
- C) 60
- D) 65

✓	✓	✓		

13) How tall is the building in the image below?



- A) 72 ft
- B) 74 ft
- C) 76 ft
- D) 78 ft

✓	✓	✓		

14) How many bees are there in a swarm?

- A) 5,000
- B) 6,000
- C) 7,000
- D) 8,000

✓	✓	✓		

15) How much is that doggy in the window?



- A) £30.00
- B) £40.00
- C) £50.00
- D) £60.00

✓	✓	✓		

Thank you for your participation, please turn over the exam paper once you have finished.

Appendix C: Standardised Instructions

“Today you will be taking part in a psychological study which looks at your Semantic and Cryptic Reasoning ability. If you do not wish to continue with the test for any reason, you may leave at any time.

You are the fourth group to be taking part in the study, so please put your answers in the column labelled 'Student 4'. No communication of any kind is allowed during the test.

Please answer all questions and turn over the test paper when you have finished. No extra equipment will be required. Are there any questions?... Please turn over your papers and begin.”

Appendix D: Debrief Guidelines

- *JAJ Foundation logo seen at the top of the tests represents a fictional organisation.*
- *Results were part of 6th Form student's Psychology Coursework*
- *The study was not investigated semantic / cryptic reasoning ability, but instead whether or not participants would conform to the previous answers on the test paper.*
- *The previous answers were not made by other participants, but instead by the researchers prior to the study. Thus you were not the fourth group to be taking part in the study.*
- *No personal information or observations were recorded during the study, results remain completely anonymous.*
- *Offer limited counselling and a summary of the completed study on request.*
- *Any questions?*

Appendix E: Example Completed Questionnaires

Semantic Reasoning Test – SRT1/1

0/10

JAI
- FOUNDATION -

- Mark the box next to the odd word out (in terms of meaning) in each question.
- Answer all questions and please remain silent for the duration of the test.

	Student 1	Student 2	Student 3	Student 4	Student 5
1) Cat Horse Duck Brick	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2) Red Green Chair Black	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
3) Shirt Trousers Shoes Nose	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
4) Tree France Germany Spain	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
5) Pen Hair Pencil Biro	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
6) Lettuce Cake Carrot Broccoli	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
7) Nose Ear Eye Bottle	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
8) Tomato Beef Pork Chicken	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9) Circle Fish Square Triangle	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
10) Goat Horse Sheep Watch	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
11) Rain Snow Window Hail	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
12) Roof King Queen Prince	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
13) Ring Bus Necklace Earrings	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
14) Car Bus Whiteboard Taxi	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
15) Jump Run Skip Wood	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Thank you for your participation.
Please turn over the test paper
once you have finished

5/10

Cryptic Reasoning Test – CRT1/3

JAI
- FOUNDATION -

- Answer all questions as best you can using only the options provided.
- No equipment (e.g. Rulers, calculators) may be used during the test.
- You must ask no questions and remain silent for the duration of the test.

Student 1	Student 2	Student 3	Student 4	Student 5
-----------	-----------	-----------	-----------	-----------

1) How high are the clouds in the image below?



- A) 1,000 ft
- B) 2,000 ft
- C) 3,000 ft
- D) 4,000 ft

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2) Estimate the length of the line below.



- A) 5 cm
- B) 6 cm
- C) 7 cm
- D) 8 cm

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

3) How many seconds in a moment?

- A) 2 seconds
- B) 5 seconds
- C) 8 seconds
- D) 11 seconds

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4) How many bubbles in a bar of soap?

- A) 12,000
- B) 13,000
- C) 14,000
- D) 15,000

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5) How many stitches in a school shirt?

- A) 1,000
- B) 1,500
- C) 2,000
- D) 2,500

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Cryptic Reasoning Test – CRT2/3

- Answer all questions as best you can using only the options provided.
- No equipment (e.g. Rulers, calculators) may be used during the test.
- You must ask no questions and remain silent for the duration of the test.

Student 1	Student 2	Student 3	Student 4	Student 5
-----------	-----------	-----------	-----------	-----------

6) How many hairs on a human head?

- A) 110,000
- B) 120,000
- C) 130,000
- D) 140,000

✓	✓	✓		
			✓	

7) How many bricks are used to build a house?

- A) 9,500
- B) 10,000
- C) 10,500
- D) 11,000

✓	✓	✓	✓	



8) How many crisps are there in a packet?

- A) 26
- B) 28
- C) 30
- D) 32

✓	✓	✓		
			✓	



9) How many books are there in a library?

- A) 2,000
- B) 4,000
- C) 6,000
- D) 8,000

✓	✓	✓	✓	

10) Which of the lines below is longest?



- A) -----
- B) -----
- C) -----
- D) -----

✓	✓	✓	✓	



Cryptic Reasoning Test – CRT3/3

- Answer all questions as best you can using only the options provided.
- No equipment (e.g. Rulers, calculators) may be used during the test.
- You must ask no questions and remain silent for the duration of the test.

Student 1	Student 2	Student 3	Student 4	Student 5
-----------	-----------	-----------	-----------	-----------

11) How long does a Biro pen last?

- A) 7 days
- B) 10 days
- C) 13 days
- D) 16 days

✓	✓	✓		
			✓	



12) How many trees are there in a park?

- A) 50
- B) 55
- C) 60
- D) 65

✓	✓	✓		
			✓	



13) How tall is the building in the image below?



- A) 72 ft
- B) 74 ft
- C) 76 ft
- D) 78 ft

✓	✓	✓		
			✓	

14) How many bees are there in a swarm?

- A) 5,000
- B) 6,000
- C) 7,000
- D) 8,000

✓	✓	✓		
			✓	



15) How much is that doggy in the window?



- A) £30.00
- B) £40.00
- C) £50.00
- D) £60.00

✓	✓	✓		
			✓	



Thank you for your participation, please turn over the exam paper once you have finished.

Appendix F: Table of Results Showing Raw Data

<i>Participant</i>	<i>No. of times conformed with unambiguous stimuli</i>	<i>Participant</i>	<i>No. of times conformed with ambiguous stimuli</i>
1	0	1	5
2	2	2	8
3	0	3	4
4	0	4	2
5	0	5	4
6	0	6	10
7	4	7	0
8	0	8	8
9	2	9	4
10	0	10	4
11	0	11	Anomalous
12	0	12	0
13	0	13	1
14	0	14	2
15	0	15	4
16	0	16	10
Total	8		66

Appendix G: Mann-Whitney *U* Test

<i>Group 1</i>		<i>Group 2</i>	
<i>Unambiguous Scores</i>	<i>Points</i>	<i>Ambiguous Scores</i>	<i>Points</i>
4	7.5	Anomalous	-
2	11.0	10	0.0
2	11.0	10	0.0
0	14.0	8	0.0
0	14.0	8	0.0
0	14.0	5	0.0
0	14.0	4	0.5
0	14.0	4	0.5
0	14.0	4	0.5
0	14.0	4	0.5
0	14.0	4	0.5
0	14.0	4	0.5
0	14.0	2	2.0
0	14.0	2	2.0
0	14.0	1	3.0
0	14.0	0	12.5
0	14.0	0	12.5
211.5		34.5	

U = lowest number of points = 34.5

N_1 = number of participants in group 1 = 16

N_2 = number of participants in group 2 = 15

Critical value = 55

U < Critical value \therefore null hypothesis can be rejected