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Scientific Inquiry

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OLIPHANT SCIENCE AWARDS 2020
SCIENTIFIC INQUIRY

IS THE CENTRAL ROUTE OF PERSUASION MORE EFFECTIVE AT CHANGING AN INDIVIDUAL'S ATTITUDE TOWARDS TOBACCO THAN THE PERSUASIVE ROUTE?

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INTRODUCTION

The way that individuals react to certain questions or situations is generally as a result of their attitude towards the topic. Psychologists define attitude as "an evaluation a person makes about an object, person, group, event or issue"1. Persuasive messages such as those used in advertising campaigns have been shown to shift individual attitudes. By understanding the relationship between attitude and persuasion, positive change can occur. This is particularly evident in health advertising campaigns that can persuade smokers and the general community to change their attitudes towards smoking in order to prevent the habit or help smokers quit.

The Elaboration Likelihood Model (ELM) demonstrates how attitudes are influenced by persuasion, and the information the participants are being exposed to (Cafferata & Tybout, 1989). This information is then either processed centrally or peripherally. The central route of persuasion focuses on making the audience think and evaluate information by using credible sources, evidence and simple advertising messages. In contrast, the peripheral route does not require high level thinking, but instead relies on images or celebrity endorsement to conceal information whilst targeting vulnerable individuals2.

This report discusses the results obtained from an experimental investigation which compares the effectiveness of the two persuasive options when attempting to change attitudes. It is based around an investigation conducted in a Year 12 Psychology class, but has been expanded to include an alternate hypothesis and additional individual analysis.

Research Hypothesis

> **That the central route of persuasion is more effective at changing an individual's attitude towards tobacco than the persuasive route.**

In this investigation the independent variable, which is the peripheral (Group A) or central route of persuasion (Group B), is manipulated. This is subjective data.

The dependent variables are:

1. Participants' heart rate (quantitative data) measured after viewing each advertisement
2. Participants' thought processing responses (quantitative data)
3. Participants' assertiveness responses (quantitative data)

To address the hypothesis, an experimental investigation was carried out among a sample of 17 female Year 12 Psychology students who were randomly assigned into two groups. The independent variable was manipulated by showing the two groups advertisements from different anti-smoking campaigns and measuring their heart rates.

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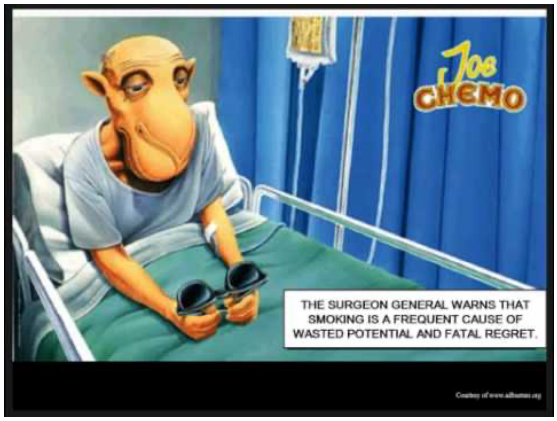
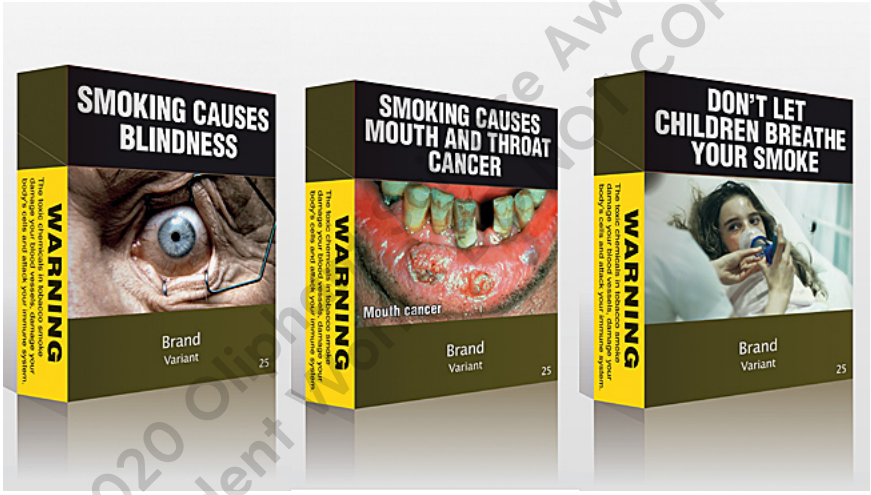
[1] Spencer, P, Hartstone, M, Carter, L & Grivas, J 2007, *Psychology Stage 2*, Bicentennial, N.a.
[2] Spencer, P, Hartstone, M, Carter, L & Grivas, J 2007, *Psychology Stage 2*, Bicentennial, N.a.

Group A viewed "Joe Chemo", a series of adverts that feature comic-style messages that utilised the peripheral route of persuasion (see example below).



Group B viewed images of the graphic warnings on cigarette packets which utilised the central route of persuasion (see example below).

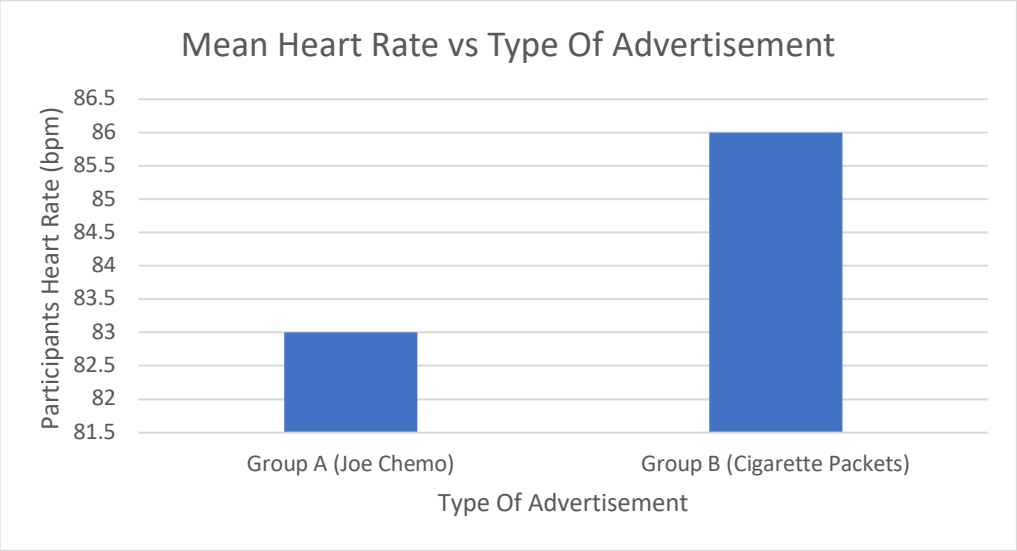


Data was calculated and entered into tables and graphs to analyse the different levels of response between Group A and Group B.

PRESENTATION OF DATA

Table 1: Heart rate response

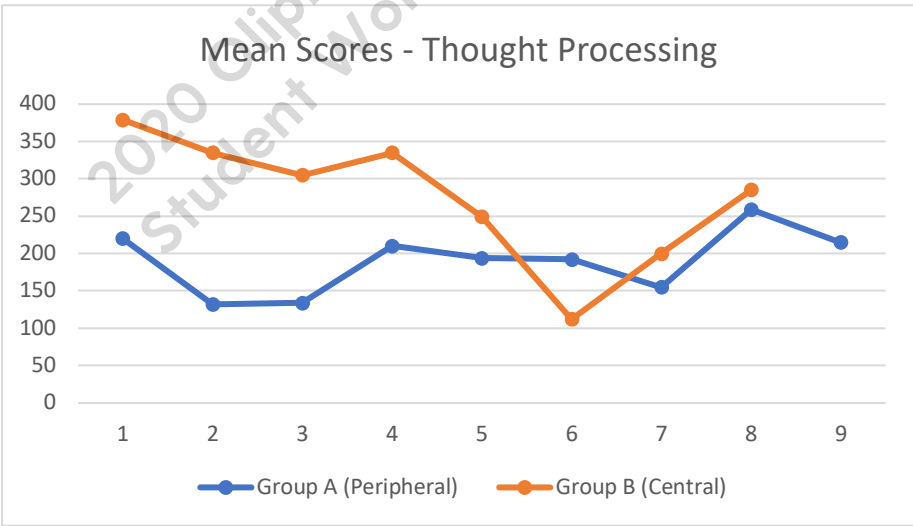
	Group A – Joe Chemo (Peripheral Route)	Group B – Cigarette packets (Central Route)	Difference between scores
Mean heart rate (beats per minute)	83.00	86.00	3.00



Graph 1: Mean heart rates produced from each advertisement

Table 1: Thought Processing Mean Scores from Questionnaire 1

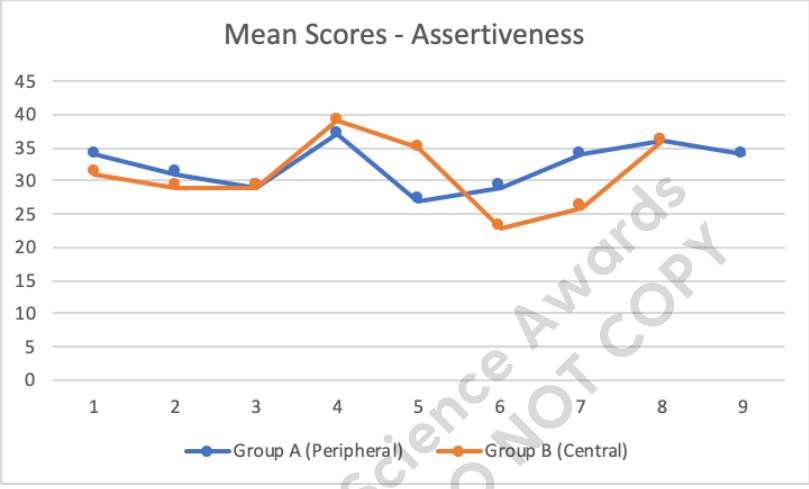
	Group A – Joe Chemo (Peripheral Route)	**Group B – Cigarette Packets (Central Route)**	**Difference between scores**
Mean of Scores	190.11	275	84.99 (C>P)



Graph 1: Mean of Scores of Thought Processing

Table 2: Assertiveness Mean Scores from Questionnaire 2

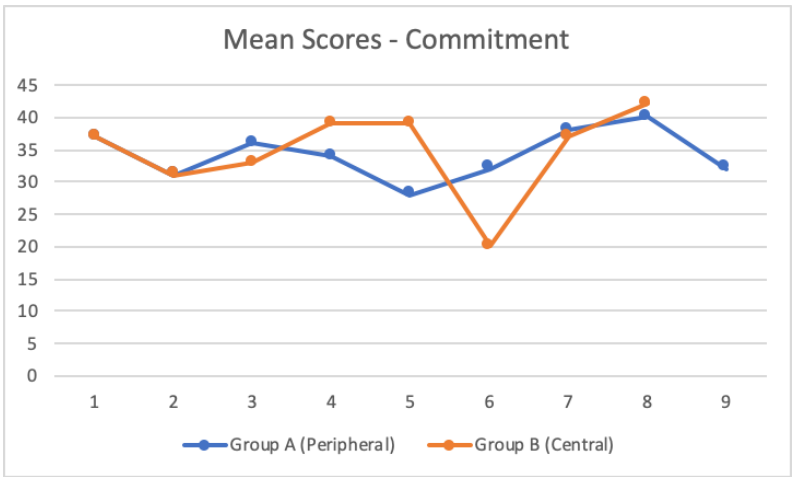
	Group 1 – Joe Chemo (Peripheral Route)	Group 2 – Cigarette Packets (Central Route)	Difference between scores
Mean of Scores	32.33	31	1.33 (P>C)



Graph 2: Mean Scores of Assertiveness Levels

Table 3: Commitment Mean Scores from Questionnaire 2

	Group A – Joe Chemo (Peripheral Route)	Group B – Cigarette packets (Central Route)	Difference between scores
Mean of Scores	34.22	33.5	0.72 (P>C)



Graph 3: Mean Scores of Commitment Levels

Data Record Summary—Peripheral Route (Group A – Joe Chemo)

ID #	Age	HR	Thoughts Processing	Attention	Understanding	Attitudes to Use of Tobacco (Self)			Attitude to Use of Tobacco (Other)	Participant Characteristics	
						Resistance Self - Efficacy	Assertiveness	Commitment		Current	Normalisation
501	17y 7m	57	220	30	85	33	34	37	29	0	1
686	16y 9m	74	132	30	26	26	31	31	24	0	1
815	16y 11m	86	134	4	90	21	29	36	20	0	2
693	17y 3m	84	210	81	95	37	37	34	14	0	1
147	17y 5m	84	194	13	14	21	27	28	12	0	1
712	17y 9m	72	192	56	83	33	29	32	24	0	1
429	-	100	155	5	40	33	34	38	30	1	2
923	17y 3m	97	259	87	94	36	36	40	37	0	0
803	17y 8m	94	215	35	43	38	34	32	32	0	1
Totals		Totals	1711	341	570	278	291	308	222		
			÷ 9 (*N*)	÷ 9 (*N*)	÷ 9 (*N*)	÷ 9 (*N*)	÷ 9 (*N*)	÷ 9 (*N*)	÷ 9 (*N*)		
			= 190.11 mean score	= 37.89 mean score	= 63.33 mean score	= 30.89 mean score	= 32.33 mean score	= 34.22 mean score	= 24.67 mean score		

Notes: *N* = total number of participants in the Peripheral-Route sub-sample, providing all relevant rows contain data (*N* is reduced in a column if data is missing in that column)

Data Record Summary—Central Route (Group B – Cigarette Packets)

ID #	Age	HR	Thoughts Processing	Attention	Understanding	Attitudes to Use of Tobacco (Self)			Attitude to Use of Tobacco (Other)	Participant Characteristics	
						Resistance Self - Efficacy	Assertiveness	Commitment		Current	Normalisation
265	17y 8m	94	379	100	92	30	31	27	39	0	1
711	16y 11m	72	335	-	-	26	29	31	22	0	1
474	16y 11m	82	305	95	95	29	29	33	22	0	0
389	17y 3m	100	335	95	70	37	39	39	38	0	0
496	17y 2m	76	249	65	77	32	35	39	33	0	0
244	17y 7m	82	112	31	100	22	23	20	19	1	1
607	16y 11m	100	200	85	100	15	26	37	11	0	1
289	16y 11m	85	285	50	95	35	36	42	33	0	1
Totals		Totals	2200	521	629	226	248	268	217		
			÷ 8 (*N*)	÷ 7 (*N*)	÷ 7 (*N*)	÷ 8 (*N*)	÷ 8 (*N*)	÷ 8 (*N*)	÷ 8 (*N*)		
			= 275 mean score	= 74.43 mean score	= 89.96 mean score	= 28.25 mean score	= 31 mean score	= 33.5 mean score	= 27.13 mean score		

Notes: *N* = total number of participants in the Central-Route sub-sample, providing all relevant rows contain data (*N* is reduced in a column if data is missing in that column)

INTERPRETATION OF RESULTS

Measures of physical response to the advertisements show that Group B had a higher mean heart rate (86.00 bpm) after viewing the graphic images on the cigarette packets compared to Group A who were shown the comics (83.00 bpm). This suggests that the central route of persuasion effectively targeted the audience's fear response and caused an increase in the heart rate responses produced.

Given the confronting nature of the cigarette packet advertising, the images may have initiated a fear response from the participants. Fear is an influential tool that advertisements use to create both an emotional and physiological response. The influence of fear also contributes to elevating the emotional response from participants by increasing heart rates. Physical reactions to fear include sweating, increased heart rate, and high adrenaline levels that make us extremely alert[3]. While fear can be an effective tool in advertising, there is a risk that the viewers may become desensitised over time if they only see the confronting images. In order to reach a level of self-efficacy, the advertisements also need to provide steps that encourage a person to change their attitudes, which in turn modifies their behaviour.

Thought processing measures the degree of thoughtful deliberation and analysis about the arguments presented on the tobacco advertisements. The data represented in Table 1 and Graph1 demonstrates a high level of difference between the mean scores of Group A (190.11) and Group B (275). This variation (84.99) is large enough to suggest that the difference was caused by the independent variable.

The results in Tables 2 and 3 and Graphs 2 and 3 demonstrate the mean scores for both groups' assertiveness and commitment levels. Assertiveness levels measure the participant's level of aggression in their behaviour towards the use of tobacco products. Commitment levels measure a participant's commitment to not using tobacco and are influenced by a participant's level of assertiveness.

Assertiveness and commitment levels were higher for Group B than those of Group A. These scores suggest that the peripheral route of persuasion was likely to result in higher levels of assertiveness and commitment to a behaviour like stopping smoking.

After reviewing the results from the investigation, the hypothesis does not appear to be clearly supported. However, given the large variance in thought processing score between

[3] Fritscher, L & Gans, S 2020, *The Psychology Behind Fear*, VeryWellMind, viewed 7 April 2020, <https://www.verywellmind.com/the-psychology-of-fear-2671696>.

the central and peripheral route compared to the other two surveys, as well as the higher average heart rate recorded for advertisements using the central route of persuasion, it seems more likely that advertisements like anti-smoking campaigns that use the central route of persuasion are more likely to change an individual's attitudes towards the particular behaviour, in this case the smoking of tobacco, because they use compelling and factual arguments from reliable sources to persuade their audience.

EVALUATION

The investigation type was experimental. This means that the investigation was conducted in a controlled environment and could be replicated.

The sample size itself was made of a group of 17 girls with 9 girls aged 16-17 in Group A and 8 girls of the same age bracket in Group B. The average age of both groups was 17 years old and the sample was made up solely of students from the same school.

Given the small sample size of both groups, it is unlikely that the results obtained are conclusive. More accurate results could be obtained with a larger group and with more variety in the people participating in the investigation. The sample size is not representative of a potential population as it using only one gender and a similar age bracket as well as students all completing their SACE studies. The data itself was potentially biased as all results were provided from girls of a similar age bracket located in the same area and coming from a similar socio-economic status. This could mean that past influences such as upbringing and social conditioning could affect the way participants view smoking based on indirect or direct experiences from their pasts.

The data obtained successfully provided results needed for the investigation, which suggests that the results appear to be valid. In this investigation, it was the measure of participants' heart rate and the thought processing scores of participants when exposed to advertisements that use central and peripheral routes of persuasion. Unfortunately, the results were not reliable as the investigation was only performed once and could not be easily replicated. If the study was repeated with new participants, it is unlikely that the same results could be achieved, and if the same participants repeated the test there could still be different results as attitudes and physical responses can change over time.

There were also extraneous variables that may have decreased the internal validity of the investigation. For example, there may have been other factors that were influencing a participants' heart rate, not associated with the advertisements. This could include an already inflated heart rate due to earlier activity, illness or stress. There was no pre-test carried out, which would have identified bias in the data, and whether the independent variable had any effect on the participants. The study also failed to identify if the participants had

any pre-existing opinion on the behaviour that may have influenced their response to the advertisements. In addition, limitations around the validity and reliability of the results, there were also strengths and weaknesses associated with the investigation. The greatest strengths were the random allocation of participants to Group A and Group B, which ensured that each participant had an equal chance of viewing the different advertisements.

One of the weaknesses was the external validity of the results, that is, the extent to which results of the investigation could be generalised. The results had a reduced level of external validity as they focussed only on a subset of the student population and were conducted under a controlled classroom setting which may have affected the way the participants physically responded. This experiment specifically focused on SACE students attending the same school, all in a similar age bracket affecting the validity of the results as participants coming from a similar background are likely to share similar views and outlooks. Participants may have felt uncomfortable being in a school setting where smoking is not socially acceptable. This may have conflicted with what they experience away from the school setting, leading to increased levels of anxiety which in turn may have increased their heart rate.

It is important research is conducted ethically. Informed consent and the right to withdraw from the investigation are important in any experimental investigation. This means that before the experiment begins, each participant must willingly consent to participate. In this investigation, participants were told to complete the tasks rather than being given the choice to take part. They must also understand that they have the right to not participate or withdraw from the investigation at any point, even if they have previously consented. This can be achieved through voluntary participation and informed consent, offering the right to withdraw, confidentiality, deception and debriefing. In this instance, the investigation was not ethically sound as participants were not given the option to withdraw from the study. Finally, it is important that no harm comes to the participants. By exposing Group B to graphically upsetting images, there was the potential for the participants to experience emotional distress over and above the fear response (heart rate) that was measured.

CONCLUSION

Results of this investigation suggest that the central route of persuasion may be more effective at increasing a person's heart rate than the peripheral route as Group B produced a higher mean heart rate than Group A. This was demonstrated by the results collected from both Groups A and B in this investigation. However, given the limited sample size and the ethical considerations that were not followed the results of this investigation should not be considered conclusive.

BIBLIOGRAPHY

1. Spencer, P, Hartstone, M, Carter, L & Grivas, J 2007, *Psychology Stage 2*, Bicentennial, N.a.

2. Spencer, P, Hartstone, M, Carter, L & Grivas, J 2007, *Psychology Stage 2*, Bicentennial, N.a.

3. Fritscher, L & Gans, S 2020, *The Psychology Behind Fear*, VeryWellMind, viewed 7 April 2020, <https://www.verywellmind.com/the-psychology-of-fear-2671696>.

Work Log:

Date	Discussion/Action
20/03/2020	- Spent the double lesson preparing the proposal - Determined that Isabelle would scribe the minutes - Student 1 elected to scribe whilst we created the proposal - Created hypothesis: Central Route of Persuasion will be more effective than the Peripheral Route - Student 1, 2 and 3 collaboratively discussed the answers and factors of the report - Got Proposal drafted twice and then submitted for approval
23/03/2020	- Students 1 & 2 collated the information and formed a table of results based on the results taken from the experiments conducted on 04/03/2020. This was then sent to Student 3 - Tables and graphs
24/04/2020	- All members of the group began working on their introduction in this lesson and exchanged ideas about what could be included in the evaluation