COURSE:

SECI2143-02 PROBABILITY & STATISTICAL DATA ANALYSIS

FACULTY:

FACULTY OF ENGINEERING

SCHOOL:

SCHOOL OF COMPUTING

TITLE:

PROJECT 1

LECTURER'S NAME:

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1.0 Introduction

1.1. Background

In recent years, millions of animals are clinically and chemically tested to evince that cosmetic products are out of harm's way to human beings. Although many beautifying or cosmetic companies are diligent in becoming cruelty-free, the awareness of the effects on animal testing remains as anonymity. Therefore, a survey to research the awareness on the effect of animal testing in cosmetic products among Malaysian University Student is conducted.

1.2. Objective

The objectives of conducting this survey and project are as follows:

1. To investigate the ownership, expenses and preferences on cosmetic products.
2. To understand the effect of animal testing in cosmetics.
3. To provide solutions and raise awareness on the effect of animal testing in cosmetics.

2.0 Data Collection

2.1. Sample

This survey aims to receive responses from Malaysian university students through Google Forms. The sample size is 135 Malaysian university students.

2.2. Parameters And Variables

The following are the nominal scale variables used in our data analysis:

i. Gender: The gender of the respondent, either Male or Female.
ii. Pet Ownership: Respondents either own a pet or not.
iii. Animal tested product: The brands that tested on animals owned by students.
iv. Awareness of the animal testing company: Respondent either knows that all of these companies test on animals.
v. Animals that undergo experimentation: The type of animal that is subjected to laboratory experiments, either Rabbit, Hamster, Fish, Guinea Pig, Monkey, Mice or Bird.

The following are the ordinal scale variables used in our data analysis:

i. The respondent choice in purchasing a cruelty-free cosmetic product: ranged from Never to Always.
ii. The respondent choice of standing: Are products tested on animals safe, The effect of animal testing on animals, and The alternatives to animal testing. (1-strongly disagree to 5-strongly agree)

The following are the ratio scale variables used in our data analysis:

i. Age: The age of respondents
ii. Overall cosmetic product ownership: How many cosmetic products do the respondents have.
iii. Cosmetic product monthly expenses: The monthly expenses on cosmetic

2.3. Method Of Data Collection

This study adopted a quantitative method through the distribution of questionnaires. The questionnaire has five sections, including respondent background, cosmetic product ownership, costs, and preferences, consumer awareness and attitude towards animal testing, the impact of animal testing in cosmetics on animals, and alternative methods for reducing the need for animal testing. A total of 135 self-administered questionnaires were distributed, with duration of one (1) week time to complete starting from 14th April to 23rd April 2021.

The collected data was then exported to Excel and imported into R studio to be analyzed, summarised, and presented. The form of bar charts, histograms, frequency distributions, pie charts, box plots, and dot plots were created by R programming language and Excel.

3.0 Data Analysis

3.1. Respondent Demographics

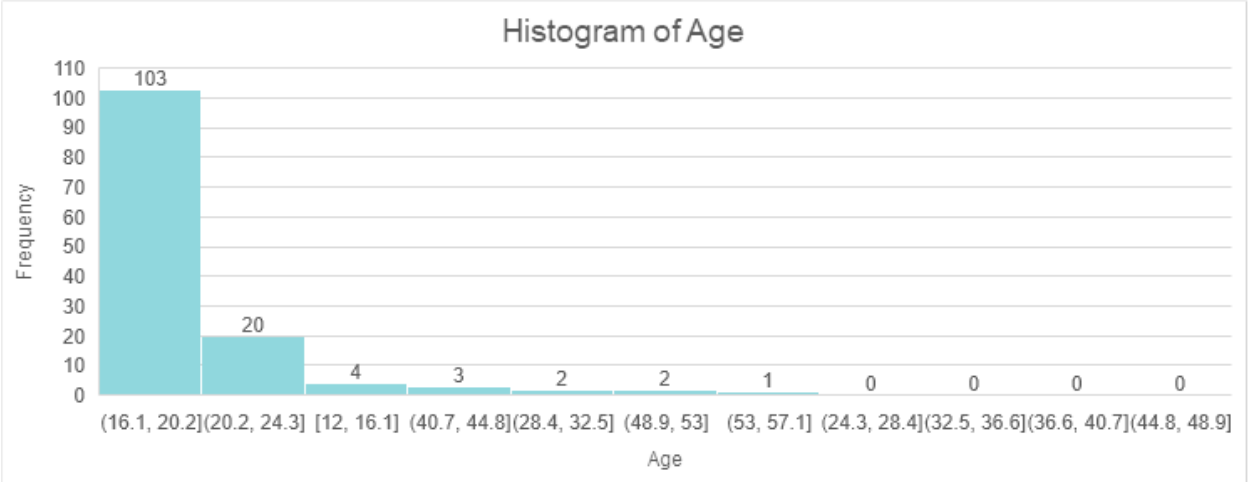


Figure 1: Histogram of Age

Mean = 21. 41

Mode = 20

Median = 20

As shown in Figure 1, the histogram indicates that distribution is positively skewed as the data is concentrated on the left with mean (20) and mode (20) fall at the same point while the median (21.41) is slightly higher. The youngest respondent is 12 years old, while the oldest is 54 years old. According to the mode, it is clear that most of our respondents are around 20 years old, with a frequency of 125 (92.6%) this is because our main target is university students. While the least is 4 (3.0%) teenagers aged between 1 to 16 years old, 5 (3.7%) middle-aged adults aged between 36 to 55 years old, 1 (0.7%) elderly aged between 46 to 60 years old which is considered as outliers in the data.

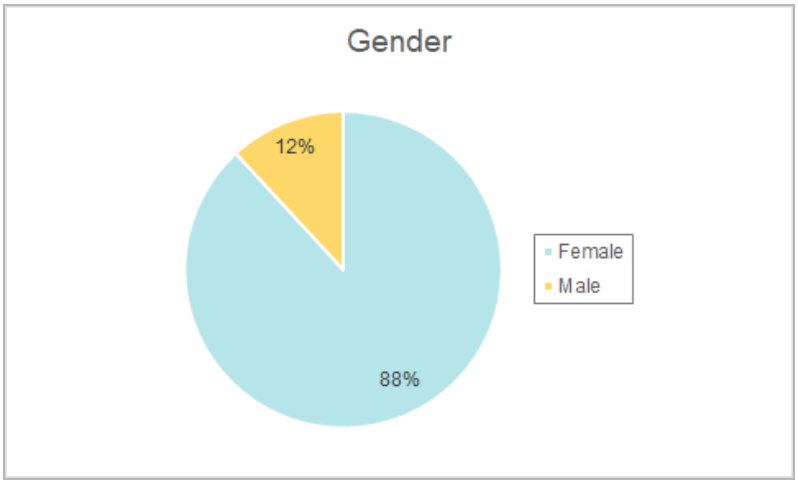


Figure 2: Pie Chart Showing Gender

Based on the pie chart shown in Figure 2, 119 female respondents (88.1%) and 16 male respondents (11.9%) took part in our research study.

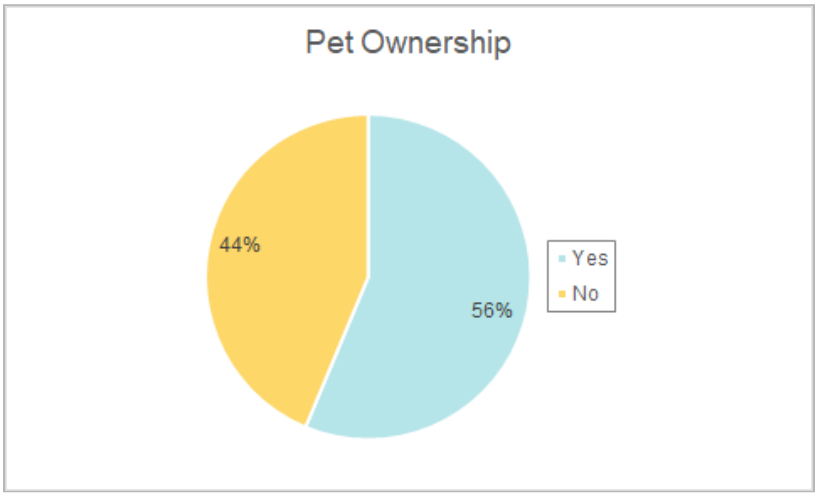


Figure 3: Pie Chart Showing Pet Ownership

Figure 3 shows that 76 (56.3%) respondents own a pet, while 59 (43.7%) did not have a pet.

3.2. Cosmetic Product Ownership, Costs, and Preferences

No. Of Cosmetic Product Owned	Frequency		Relative Frequency	
	Female	Male	Female	Male
Zero	7	5	0.059	0.313
One	13	3	0.109	0.188
Two	11	2	0.092	0.125
Three	12	4	0.101	0.250
Four	5	0	0.042	0
More Than 5	71	2	0.597	0.125
Total	**119**	**16**	**1.00**	**1.00**

Table 1: Relative Frequency Of Number Of Cosmetic Products Owned

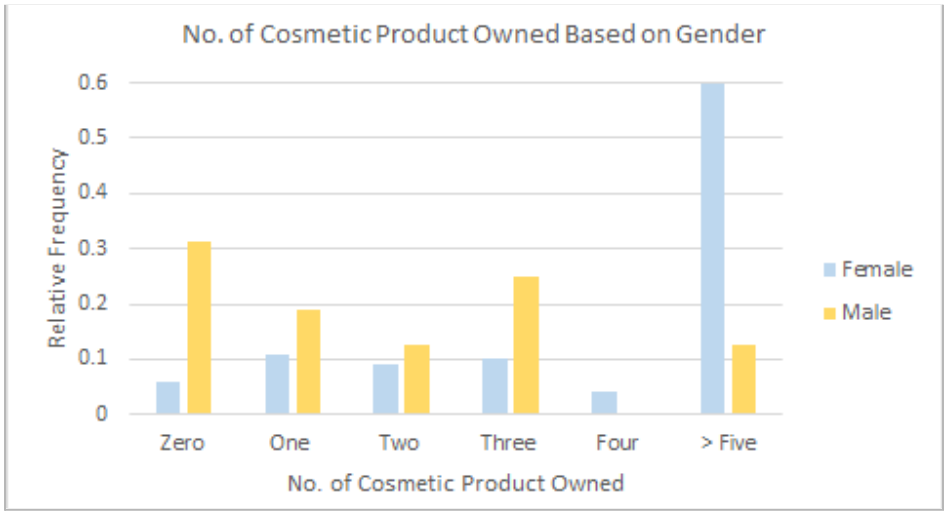


Figure 5: Comparative Bar Chart Of Cosmetic Products Owned Based On Gender

Result on Figure 5 shows the comparison of cosmetic products ownership between 16 (11.9%) male and 119 (88.1%) female university students. Female students typically own more than 5 cosmetic products (57.9%) as compared to male students that mostly do not have cosmetic products at all (31.3%). There is a decreasing trend shown from owning zero to more than five products for male students while female students show a significant increase in trend.

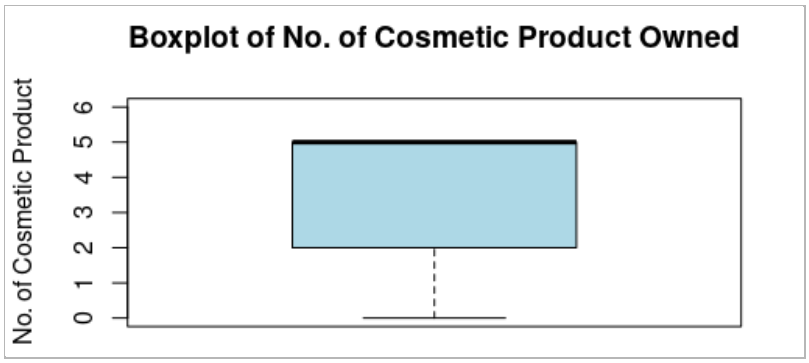


Figure 6: Boxplot Of Number Of Cosmetic Products Owned

Mean = 3.519

Mode = 5

Median = 5

First Quartile = 2

Third Quartile = 5

The boxplot in Figure 6 concludes that most of the students own approximately a minimum of 5 cosmetic products. The data distribution is negatively skewed because the mode and median is larger than the mean.

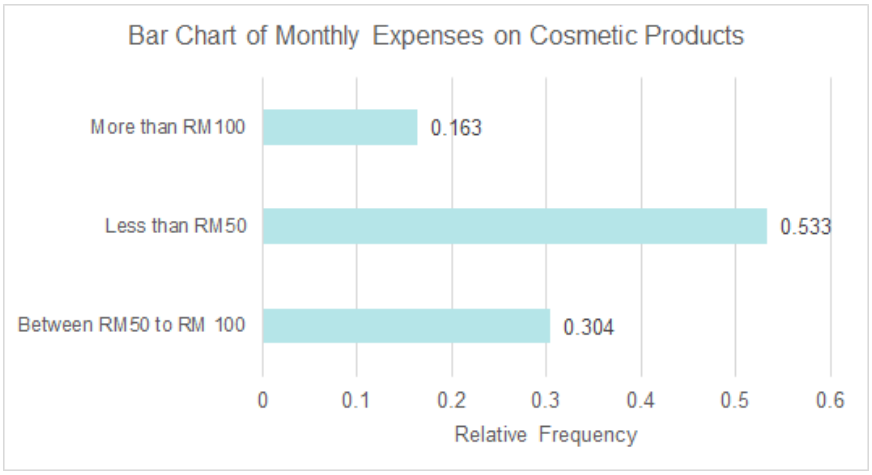


Figure 7: Bar Chart Of Monthly Expenses On Cosmetic Products

Figure 7 showed that most University students, 72 (53.3%), will spend less than RM50 on cosmetic products per month, and most of them, 41 (30.4%), also spent around RM50 to RM100. The least of them, 22 (16.3%), spend more than RM100 every month.

Option	Pet Owner	Not a Pet Owner
Always	40	30
Often	18	11
Sometimes	13	13
Rarely	1	0
Never	4	5

Table 2: Option To Choose Cruelty-free Product Based On Pet Ownership

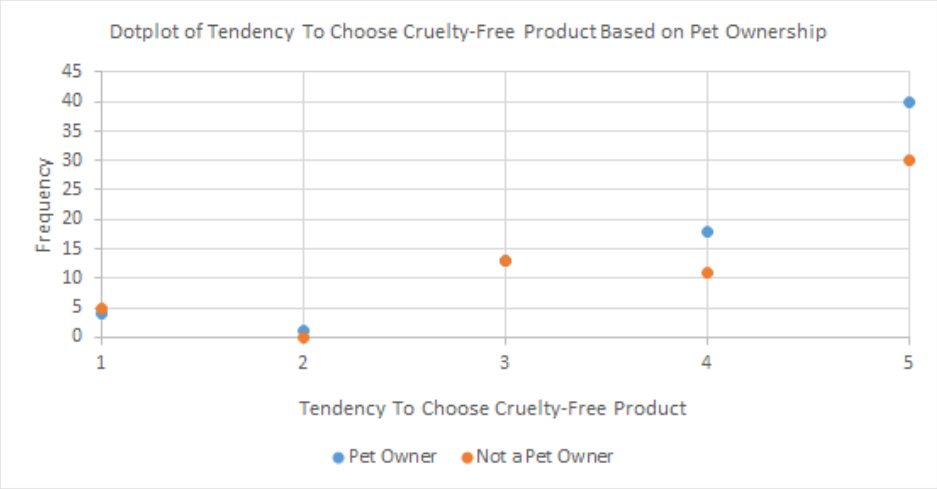


Figure 8: Dotplot Of Tendency To Choose Cruelty-free Based On Pet Ownership

Figure 8 implies, university students that own a pet tend to choose cruelty-free products in contrast to not owning a pet. The scale 1 to 5 indicates “Never”, “Rarely”, “Sometimes”, “Often”, and “Always” consecutively. Based on the dotplot, the distribution for Pet Owners is skewed to the left as the peak occurs at 5 and the "tail" extends right in which is the same as Not a Pet Owner. Both distributions are negatively skewed as most of the data are on the right and the highest data for both categories are 40 (52.6%) and 30 (50.8%) which is “Always” consider choosing cruelty-free products. In conclusion, owning a pet does make a slight difference in considering to opt for cruelty-free products.

3.3. Consumer Awareness and Attitude Towards Animal Testing

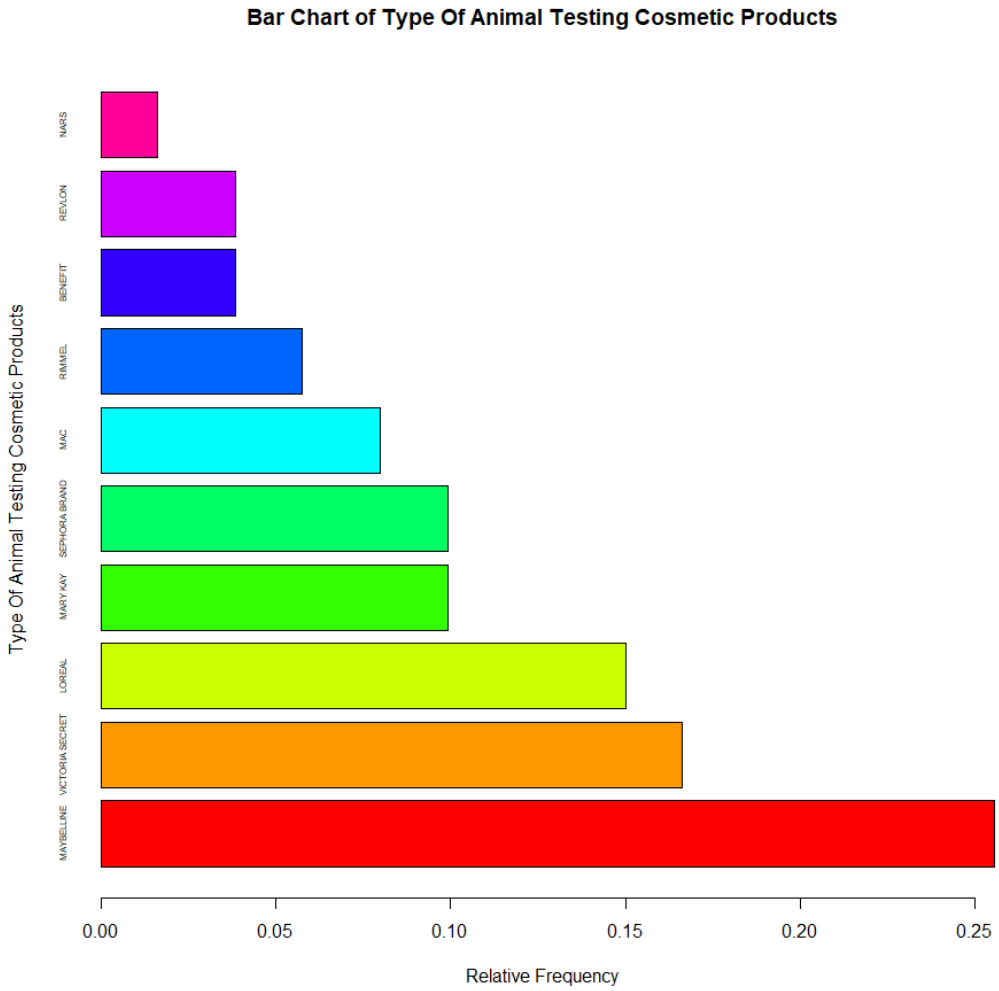


Figure 9: Bar Chart of Animal Tested Products Brands

The bar chart shows 10 brands of animal tested products used by the students. Maybelline records the highest amount of usage frequency among the student 80 (25.47%). Followed by 52 respondents (16.56%) from Victoria Secret 47 respondents (14.97%) from Loreal, 31 respondents (9.87%) from Mary Kay, and Sephora Brand respectively, 25 respondents (7.96%) from Mac, 18 respondents (5.73%) from Rimmel, 12 respondents (3.82%) from Revlon and Benefit respectively, and the least cosmetic product used by the students is Nars with a record from 6 respondents (1.91%). This bar chart depicts the most purchased animal-tested cosmetic products among Malaysian university students for students'udents top ten most purchased prmost popular cosmetic product among all the brands is Maybelline, Victoria's Secret, and Loreal.

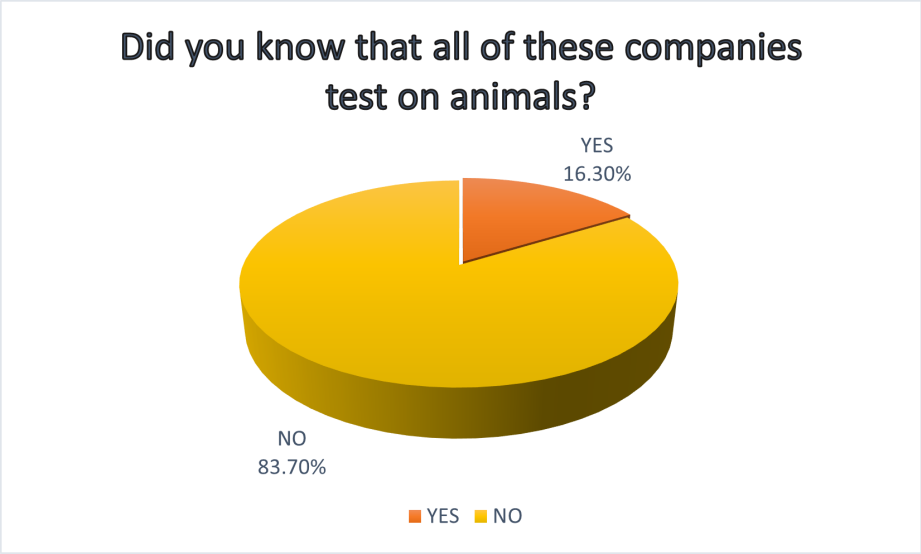


Figure 10: Pie Chart Showing Respondents Knowledge On Companies That Tests On Animal

The pie chart shows the student knowledge of the ten companies listed above that undergo animal testing for their products.The majority of 113 students (83.70% respondents) state that they were unaware that all the listed companies test on animals. Furthermore, only 22 students (16.30% respondents) were aware that those companies conduct animal testing on their products. As a result, we can conclude that the majority of students are unaware of animal-tested cosmetic products rather than being aware of them.

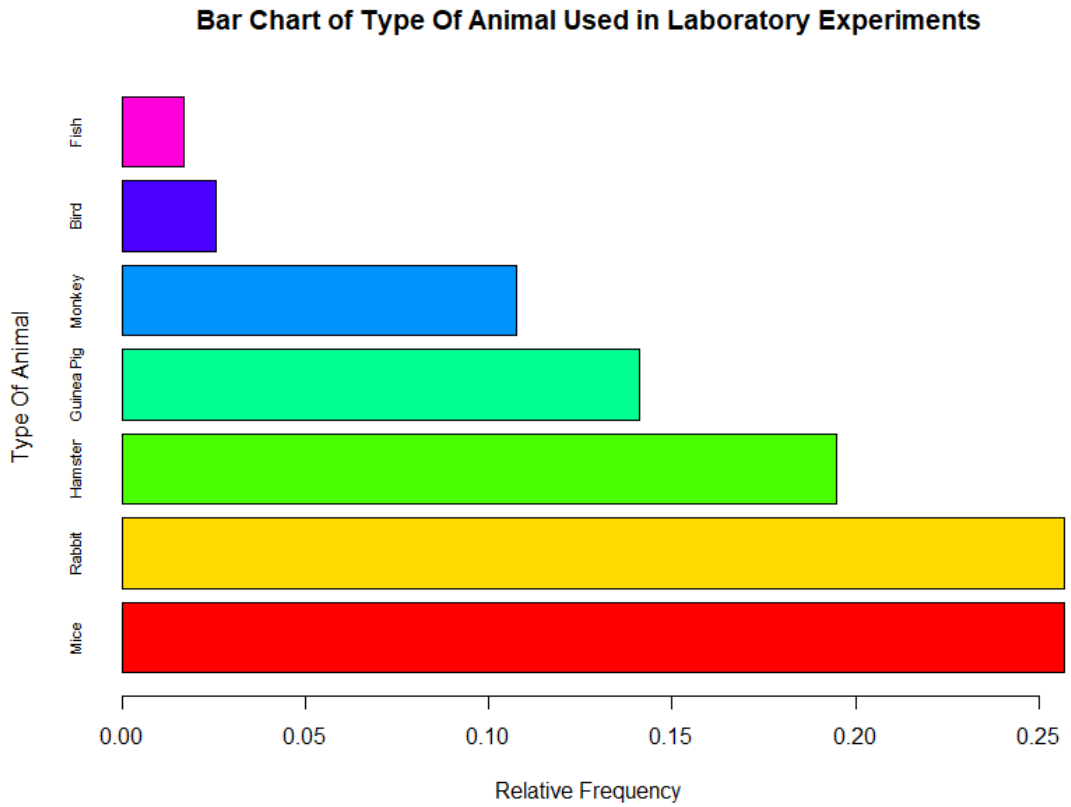


Figure 11: Bar Chart of Type of Animal Used in Laboratory Experiments

Figure 11 shows the horizontal bar chart of the type animal used in laboratory experiments based on the students knowledge. Among the 135 respondents, 25.71% (91) were aware that mice and rabbits respectively are have been used as animal testing in cosmetic products. Besides that, hamster with 19.49% (69) is the third most common type of animal known by the students followed by 14.12% (50) for guinea pig, 10.73% (38) choose the monkey and 2.54% (9) for the bird. The least chosen is the fish with only 1.69% (6) know that fish undergoes experiments in labs. Finally, rabbits and mice are the most commonly used animal subject.

Level of Agreement with Safeness of Animal-Tested Cosmetic Products	Frequency	Relative Frequency
1-Strongly Disagree	36	0.2667
2-Disagree	29	0.2148
3-Neutral	50	0.3704
4-Agree	15	0.1111
5-Strongly Agree	5	0.0370
Total	**135**	**1.00**

Table 3: Level of Agreement with Safeness of Animal-Tested Cosmetic Products

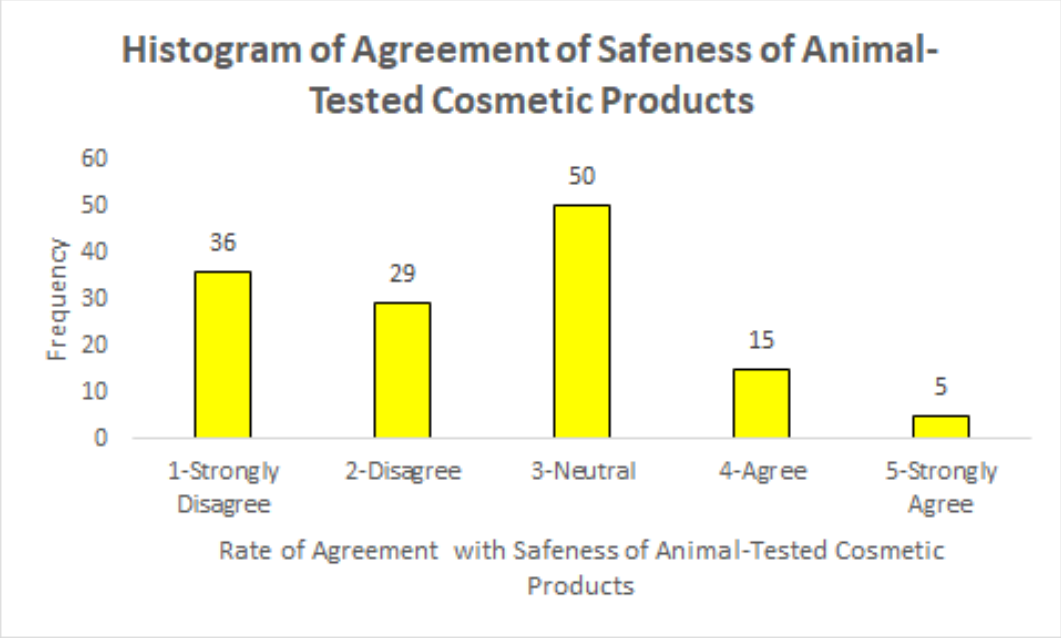


Figure 12: Histogram of Level of Agreement with Safeness of Animal-Tested Cosmetic Products

The histogram above shows the frequency of the level of agreement of safeness animal tested cosmetic products. The mode of histogram is 3 (Neutral). This shows most of the students (50 respondents) feel neither disagree nor agree with the statement "I believe products tested on animals are truly safe". 36 respondents strongly disagree while 29 respondents disagree that animal tested cosmetic products are safe because animals and humans are not identical. The main purpose of animal testing are to enter China's market due to their mandatory animal testing policies. Then, 5 students strongly agree and 15 students agree that animal tested products are truly safe because the companies need to assess the safety when developing new and untested

ingredients in their cosmetic products. Thus, the students are unable to ensure the safeness of animal tested products as it is confidential and only known by the companies.

3.4. The Effect of Animal Testing in Cosmetic

Do you agree with the following impact of animal testing?	Frequency			Relative Frequency		
	A	B	C	A	B	C
1 - Strongly Disagree	12	8	25	0.089	0.059	0.185
2 - Disagree	9	9	10	0.067	0.069	0.074
3 - Neither Disagree or Agree	16	13	25	0.118	0.096	0.185
4 - Agree	36	39	24	0.267	0.289	0.178
5 - Strongly Agree	62	66	51	0.459	0.489	0.378
Total	**135**	**135**	**135**	**1.00**	**1.00**	**1.00**

Table 4: Level of Agreement On The Impact Of Animal Testing

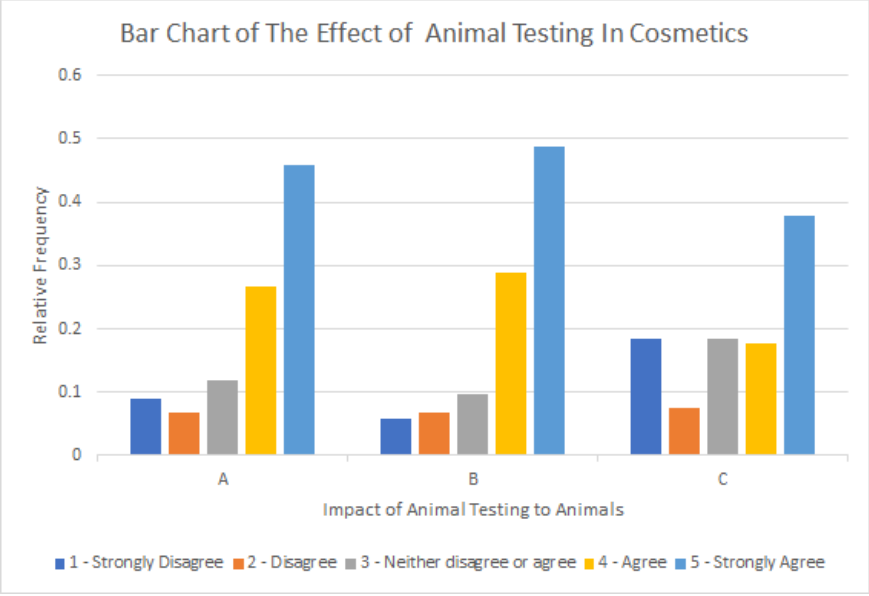


Figure 13: Bar Chart On The Effect Of Animal Testing In Cosmetics

Figure 13 depicts a grouped bar chart on the effect of animal testing in the cosmetics industry. The first impact of animal testing labelled as A is animals suffer from skin irritation, eye irritation and any kind of toxicity, whereas B indicates that the tests can result in immense pain, distress, blindness, swollen eyes, sore and bleeding skin, internal bleeding, organ damage, birth defects, convulsions and even death in the animals and lastly C represents animals who survive their use in research and testing can be killed after the study is completed. From the bar chart, we can acknowledge that most respondents strongly agree to the statements that touches on the effect of animal testing. A small number of respondents disagree to some of the impact on animal testing statements moreover in C as they might not be aware of the violent consequences concerning animal experimenting.

3.5. The Alternative to Animal Testing

Do you agree with the following alternatives to animal testing	Frequency			Relative Frequency		
	A	B	C	A	B	C
1 - Strongly Disagree	4	4	7	0.029	0.029	0.052
2 - Disagree	8	8	4	0.059	0.059	0.029
3 - Neither Disagree or Agree	22	28	21	0.163	0.207	0.156
4 - Agree	35	48	47	0.26	0.356	0.348
5 - Strongly Agree	66	47	56	0.489	0.349	0.415
Total	**135**	**135**	**135**	**1.00**	**1.00**	**1.00**

Table 5: Level Of Agreement On The Alternatives To Animal Testing

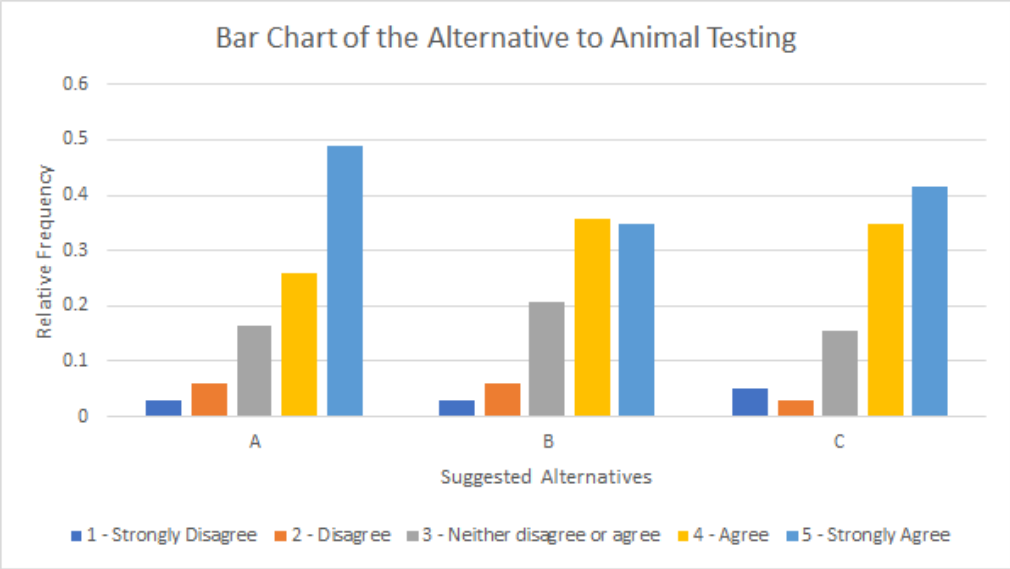


Figure 14: Bar Chart Of The Alternatives To Animal Testing

There are three suggested alternatives that were stated in our survey to curb animal testing. The first alternative (A) is to use organic material or non-biological material in cosmetic products such as honey, aloe vera, eucalyptus and many more. The next suggested alternative (B) is to utilize the usage of biochips in order to minimize the number of animals used to test the level of toxicity in a product. By implementing this alternative, researchers can keep track of the amount of livestock used for experimentation and make sure that they do not exceed a certain amount of animals used for testing. Last but not least for C, we suggest researchers to utilize Stem Cells as proper alternatives to the in vitro systems of disease testing and toxin evaluations. From Figure 14, a grouped bar chart was used to portray the respondents feedback of the suggested alternatives to curb animal testing. We can see that the majority of the respondents reacted positively to the proposed solutions by choosing the scale of 5 (Strongly agree) and the scale of 4 (Agree). On the other hand, only a small number of respondents decided to disagree with the suggested alternatives. There are many ways we can put a halt to animal experimentation as it violates their living rights and standards such as creating a massive campaign or organization that advocates for all products to be cruelty free, boycotting animal tested products and so on.

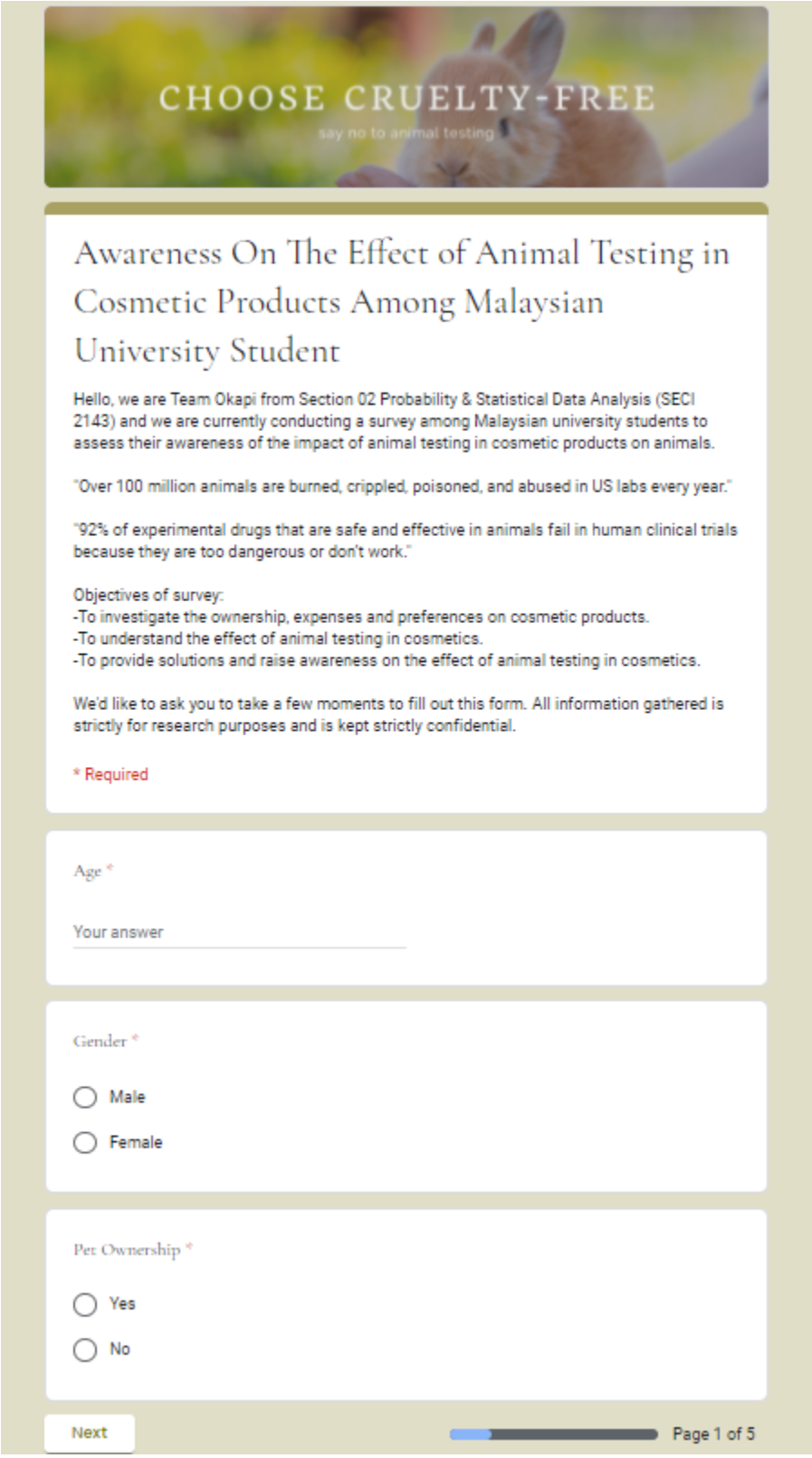
4.0 Conclusion

To conclude, in an effort to understand the effect of animal testing in cosmetics, a survey was conducted to investigate the ownership, expenses and preferences on cosmetic products in order to provide solutions and raise awareness on the issue. From the 135 sample size of Malaysian University students, most of them are female students (88.1%) aged around 20 years old, own a pet and mostly have a minimum of 5 cosmetic products compared to male students (11.9%). The students (53.3%) also tend to spend less than RM50 on cosmetic products per month due to most of them are still studying and do not have a proper income to spend more like the older respondents. It is also noticeable that students who own a pet are more likely to buy cruelty-free cosmetics.

The awareness of Malaysian university students towards animal tested cosmetics products at lowest awareness (83.80%) than students aware (16.30%) of companies that undergoes animal testing on their products. Of the ten types of animal tested cosmetic products, maybelline is the most purchased by the students (25.47%)since they can get it from the beauty drugstore. Furthermore, the students' awareness towards the type of animal that is used as an experimental animal are rabbits (25.71%) and mice(25.71%). Many of them do not know (1.69%) that fish is also one of the animals that they used. Hence, they are still not unsure (37.04%) did animal tested cosmetic products are safe enough.

From the data that has been collected and analyzed, it is safe to say that the majority of the Malaysian University students have a profound understanding and great awareness regarding the impacts of animal experimentation to animals. There are plenty of online articles that circulate the concerning issue which stated that many of the animals were abused in various ways to prove that the products are clinically safe for human consumption. Some of the animals were poisoned, burnt and killed in laboratories during cosmetic research. We hope that the awareness of animal testing will continue to spread amongst the global community and would reach out to those whom advocates for animal living rights. All living creatures deserve to live a peaceful life.

5.0 Appendix


CHOOSE CRUELTY-FREE
say no to animal testing
Awareness On The Effect of Animal Testing in Cosmetic Products Among Malaysian University Student
Hello, we are Team Okapi from Section 02 Probability & Statistical Data Analysis (SECI 2143) and we are currently conducting a survey among Malaysian university students to assess their awareness of the impact of animal testing in cosmetic products on animals.
"Over 100 million animals are burned, crippled, poisoned, and abused in US labs every year."
"92% of experimental drugs that are safe and effective in animals fail in human clinical trials because they are too dangerous or don't work."
Objectives of survey:
-To investigate the ownership, expenses and preferences on cosmetic products.
-To understand the effect of animal testing in cosmetics.
-To provide solutions and raise awareness on the effect of animal testing in cosmetics.
We'd like to ask you to take a few moments to fill out this form. All information gathered is strictly for research purposes and is kept strictly confidential.
* Required
Age *
Your answer
Gender *
Male
Female
Pet Ownership *
Yes
No
Next
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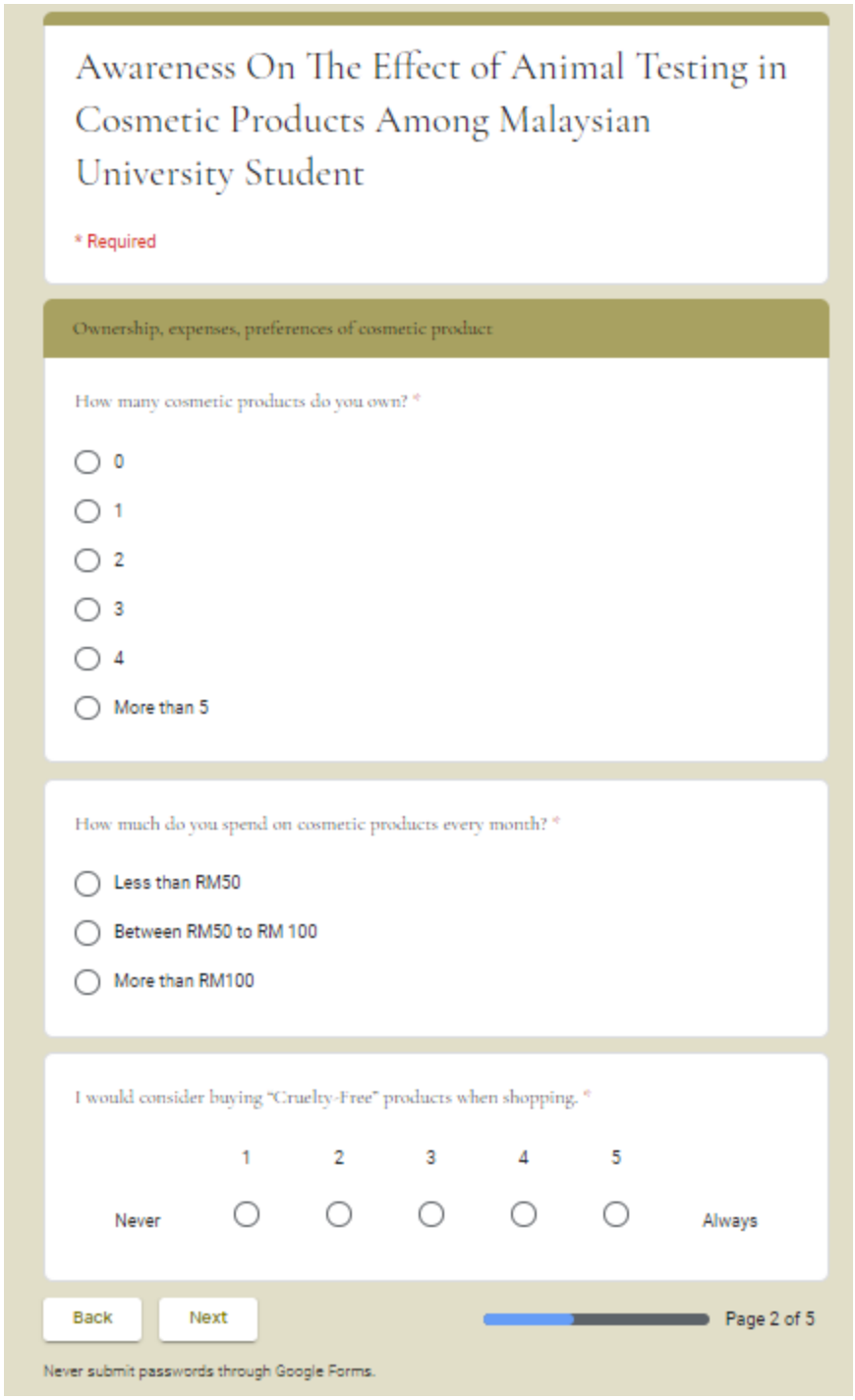

Awareness On The Effect of Animal Testing in Cosmetic Products Among Malaysian University Student

* Required

Ownership, expenses, preferences of cosmetic product

How many cosmetic products do you own? *

- 0
- 1
- 2
- 3
- 4
- More than 5

How much do you spend on cosmetic products every month? *

- Less than RM50
- Between RM50 to RM 100
- More than RM100

I would consider buying "Cruelty-Free" products when shopping. *

	1	2	3	4	5	
Never	○	○	○	○	○	Always

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Never submit passwords through Google Forms.

Awareness On The Effect of Animal Testing in Cosmetic Products Among Malaysian University Student

* Required

Consumer Awareness & Attitude Towards Animal Testing

Which of these products have you used? *

☐ NARS

☐ RIMMEL

☐ BENEFIT

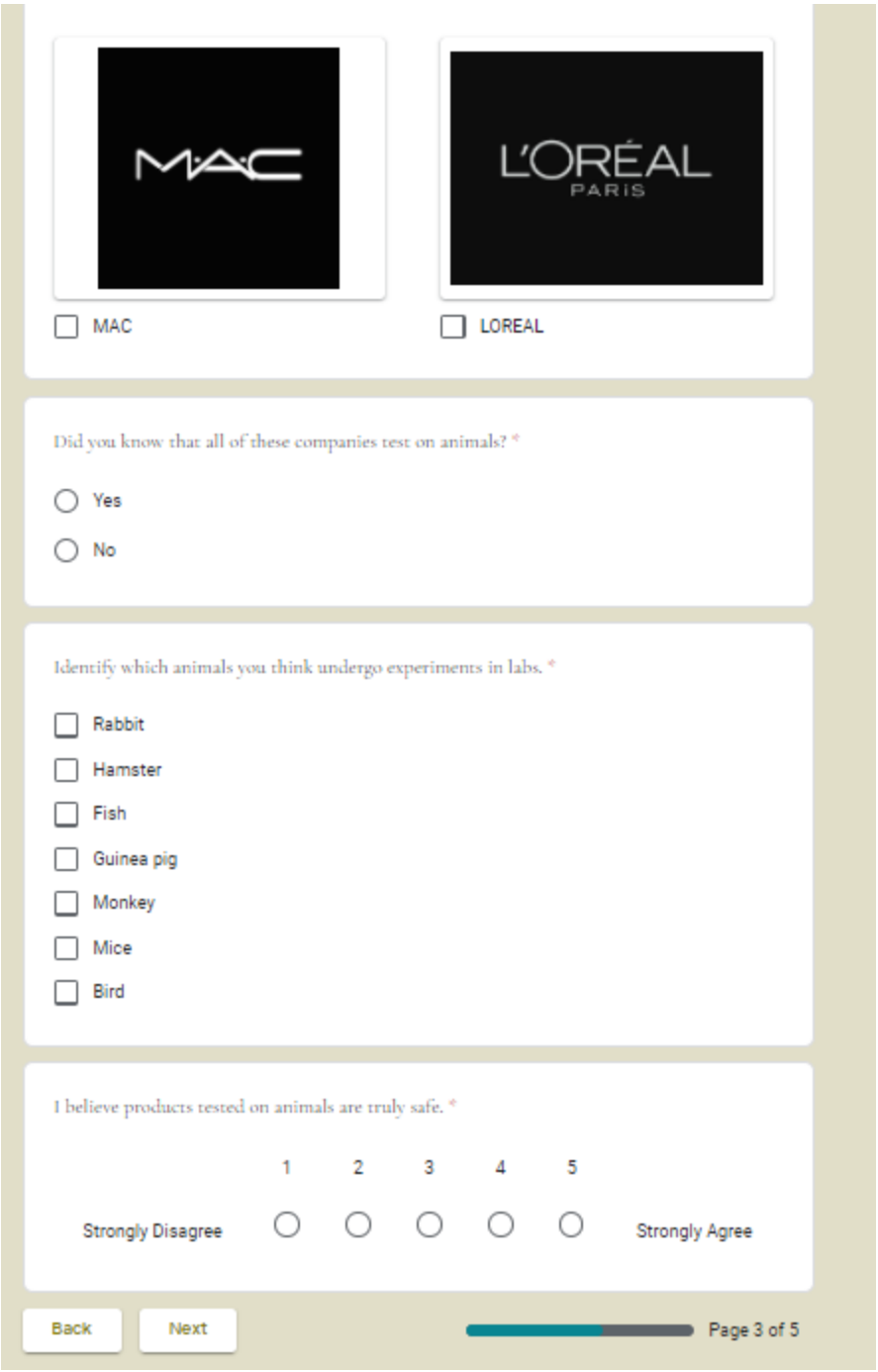
☐ VICTORIA SECRET

☐ MAYBELLINE

☐ MARY KAY

☐ SEPHORA BRAND

☐ REVLON


MAC
L'ORÉAL
PARIS
MAC
LOREAL
Did you know that all of these companies test on animals? *
Yes
No
Identify which animals you think undergo experiments in labs. *
Rabbit
Hamster
Fish
Guinea pig
Monkey
Mice
Bird
I believe products tested on animals are truly safe. *
1 2 3 4 5
Strongly Disagree
Strongly Agree
Back
Next
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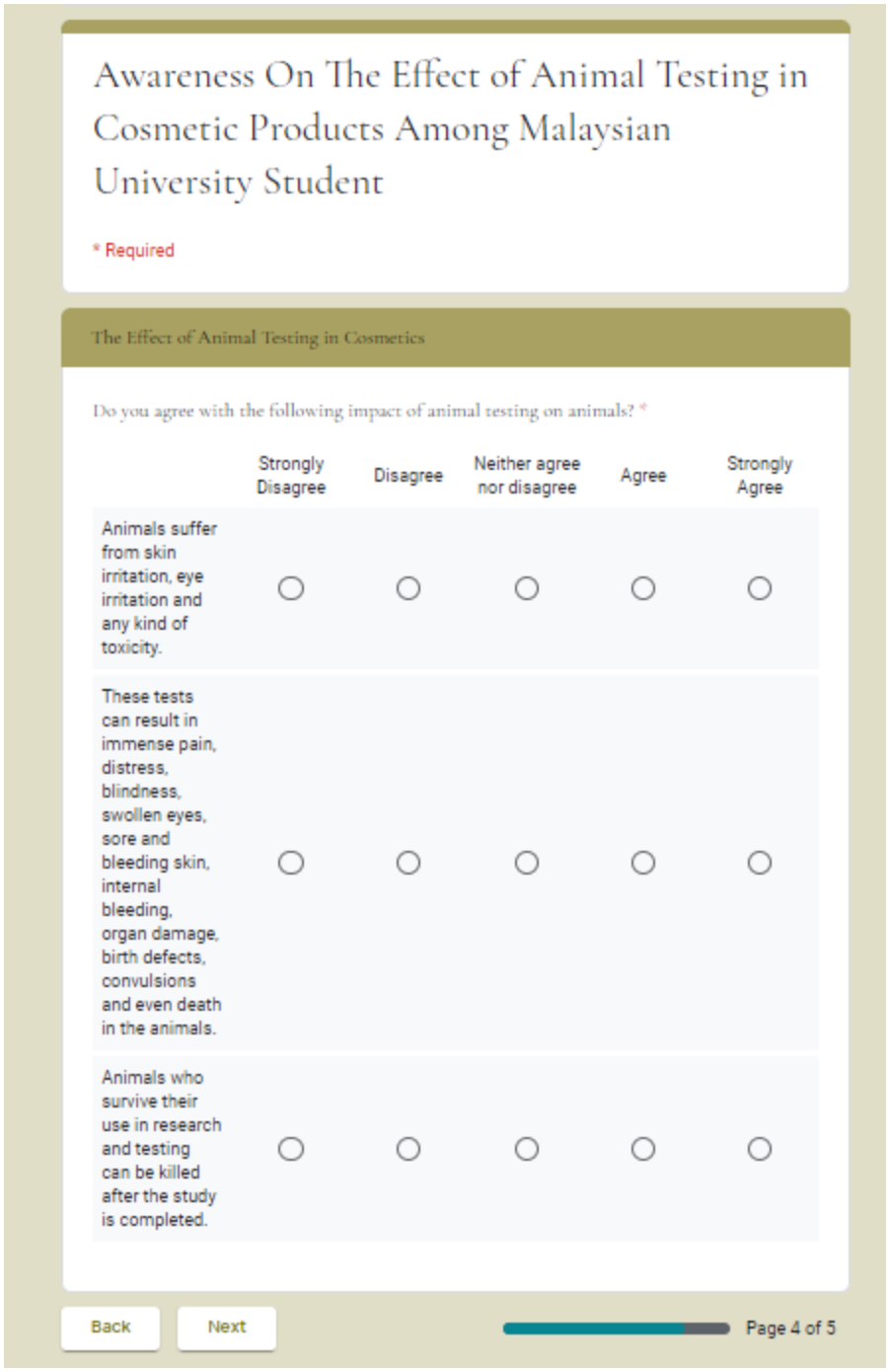

Awareness On The Effect of Animal Testing in Cosmetic Products Among Malaysian University Student

* Required

The Effect of Animal Testing in Cosmetics

Do you agree with the following impact of animal testing on animals? *

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Animals suffer from skin irritation, eye irritation and any kind of toxicity.	○	○	○	○	○
These tests can result in immense pain, distress, blindness, swollen eyes, sore and bleeding skin, internal bleeding, organ damage, birth defects, convulsions and even death in the animals.	○	○	○	○	○
Animals who survive their use in research and testing can be killed after the study is completed.	○	○	○	○	○

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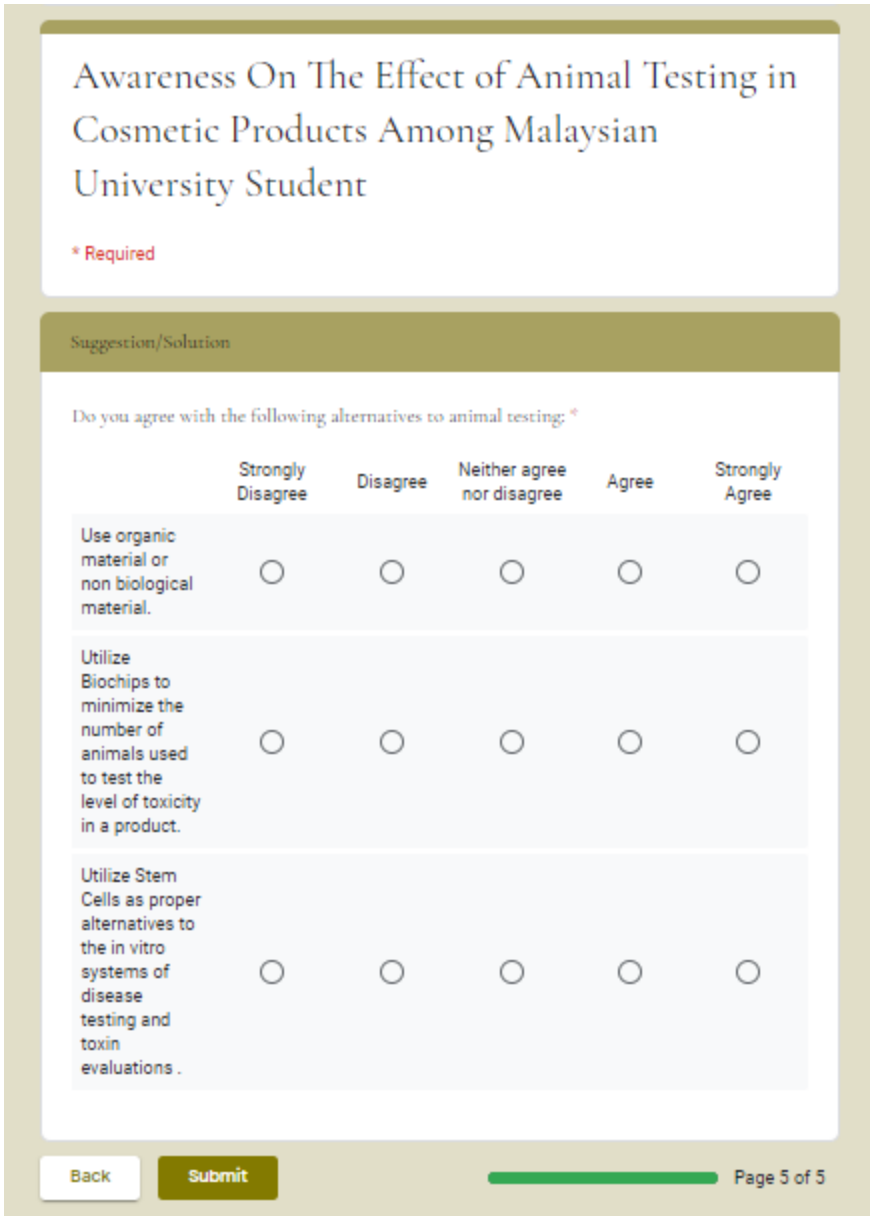

Awareness On The Effect of Animal Testing in Cosmetic Products Among Malaysian University Student

* Required

Suggestion/Solution

Do you agree with the following alternatives to animal testing: *

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
Use organic material or non biological material.	○	○	○	○	○
Utilize Biochips to minimize the number of animals used to test the level of toxicity in a product.	○	○	○	○	○
Utilize Stem Cells as proper alternatives to the in vitro systems of disease testing and toxin evaluations .	○	○	○	○	○

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