Week 7 Quiz

Suppose you work for an electronics' retailer that is deciding to incorporate a new streaming device product on their shelves. There are currently two products in the market already available for consumers (one Google and one Apple streaming device).

Your main goal is to decide which of other two products (Amazon or Roku) you are introducing to this market.

With this purpose in mind, you decided to conduct a conjoint analysis study to understand consumers' preferences for different prices, brands, storage and streaming capabilities, to support your decision.

Imagine the streaming device is decomposed in the following attributes and levels described in **Table 1**:

Price	Brand	Internal storage	Image quality
40	Google	0 GB	1080p only
70	Amazon	6 GB	1080p + HDR
100	Roku	16 GB	4K + HDR
	Apple	32 GB	

Table 1: Streaming device conjoint design

Q1

1/1 point (graded)

What is the total number of possible product profiles you can create from this design?

- 4
- 10

- 14
- 144 ✔
- 256

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Q2

1/1 point (graded)

Imagine you got the answers from a rating-based conjoint survey based on the design proposed in Table 1, where the underlined levels correspond to the baseline levels for each attribute.

How many coefficients (including the intercept) does your model have?

- 4
- 5
- 11 ✔
- 14
- 15

Explanation

The intercept is the first coefficient. As seen in class, each attribute takes values in one of their levels (categorical variable), and they are coded using dummy variables. For each attribute there is a number of coefficients equal to the number of levels minus one. As such, there are 2 coefficients for Price, 3 coefficients for Brand, 3 coefficients for Internal Storage, and 2 coefficients for Image Quality. In total $\mathbf{1+2+3+3+2=11}$ coefficients.

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Answers are displayed within the problem

After running your linear regression for the ratings, you get the coefficients displayed in Table 2 for three respondents. Assume that all coefficients are statistically significant at the 5% level, and those respondents are a representative sample of the consumers in the market.

	Respondent 1	**Respondent 2**	**Respondent 3**
Intercept	0.7	1.9	3.1
$70	-1.2	-0.1	-0.5
$100	-2.6	-0.4	-0.9
Amazon	1.3	0.6	0.2
Roku	-0.5	0.8	0.6
Apple	0.8	2.5	-0.8
0 GB	-0.3	-0.3	-0.6
16 GB	0.2	0.2	0.2
32 GB	0.5	0.4	0.6
1080p + HDR	0.2	0.1	0.8
4K + HDR	0.9	0.3	2.2

Table 2: Streaming device regression results

Q3

1/1 point (graded)

What is the ideal product, among all possible combinations, for respondent 1?

- An Amazon tablet, with 32GB of internal storage, 4K + HDR streaming capabilities, priced at $70
- An Apple tablet, with 16GB of internal storage, 1080p + HDR streaming capabilities, priced at $70
- A Roku tablet, without internal storage, 1080p only streaming capabilities, priced at $100

- A Google tablet, with 6GB of internal storage, 1080p only streaming capabilities, priced at $40
- An Amazon tablet, with 32GB of internal storage, 4K + HDR streaming capabilities, priced at $40 ✔

Explanation
The ideal product is the product with the level for each attribute that has the highest coefficient. That would be: $40 for Price (coef=0); Amazon for Brand (coef=1.3); 32GB of internal storage (coef=0.5); and 4K+HDR for image Quality (coef=0.9).

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Answers are displayed within the problem

Q4

1/1 point (graded)
What is the least important attribute for respondent 1?

- Price
- Brand
- Storage ✔
- Image quality

Explanation
In order to answer the question, we compute the attributes' relative importances. First, we compute the range for each attribute (which is the difference between maximum and minimum partworth of that attribute).
- Price = 0-(-2.6) = 2.6
- Brand = 1.3-(-0.5) = 1.8
- Storage = 0.5-(-0.3) = 0.8
- Image quality = 0.9-0 = 0.9

Finally, relative importances are the ranges divided by the sum of ranges:
- Price = 2.6/6.1 = 0.43
- Brand = 1.8/6.1 = 0.30
- Storage = 0.8/6.1 = 0.13
- Image quality = 0.9/6.1 = 0.15

Thus, Storage is the least important attribute for respondent 1. Note that for this question, you could answer without computing importances, just by choosing the attribute with the lowest range.

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Answers are displayed within the problem

Q5

1/1 point (graded)

What are the relative importances of each attribute for respondent 3?

- (•) 16% for Price, 25% for Brand, 21% for Storage, and 39% for Image quality ✔
- ( ) 14% for Price, 14% for Brand, 43% for Storage, and 29% for Image quality
- ( ) 0% for Price, 18% for Brand, 18% for Storage, and 65% for Image quality
- ( ) None of the above

Explanation

Analogously to the previous question, we compute the range for each attribute (which is the difference between maximum and minimum partworth of that attribute).

- Price = 0-(-0.9) = 0.9
- Brand = 0.6-(-0.8) = 1.4
- Storage = 0.6-(-0.6) = 1.2
- Image quality = 2.2-0 = 2.2

Finally, relative importances are the ranges divided by the sum of ranges:

- Price = 0.9/5.7 = 0.16
- Brand = 1.4/5.7 = 0.25
- Storage = 1.2/5.7 = 0.21
- Image quality = 2.2/5.7 = 0.39

Submit You have used 1 of 2 attempts

Answers are displayed within the problem

As mentioned before, currently there are two available products in the market :

1. Google Chromecast, without internal storage, with 1080p only capability, priced at $40; and

2. Apple TV, with 32GB of internal storage and with both 4K and HDR streaming capabilities, priced at $100.

Q6

0/1 point (graded)

Assuming that those respondents are a representative sample of the market, what is the market share of the Apple TV device?

Fill with number in percentage scale rounded to the closest unit, e.g. input the number 50 for a 50.4% market share.

50 ✖

Answer: 67 **or** 66.7 **or** 66.67 **or** 66.667 **or** 66.6667 **or** 66.66667 **or** 66 **or** 66.6 **or** 66.66 **or** 66.666 **or** 66.6666 **or** 66.66666

50

Explanation

You need to compute for each respondent the utility they will get from each product.
For example, the utility respondent 1 obtains from the Google Chromecast is:

$$U_1^{gc} = 0.7 + 0 + 0 - 0.3 + 0 = 0.4$$

Computing utilities for both products and all respondents you obtain:

$$U_1^{gc} = 0.4; U_1^{ap} = 0.3;$$
$$U_2^{gc} = 1.6; U_2^{ap} = 4.7;$$
$$U_3^{gc} = 2.5; U_3^{ap} = 4.2;$$

Now, each respondent chooses the product that gives them the highest utility: Respondent 1 chooses the Google Chromecast, whereas Respondents 2 and 3 choose the Apple TV. Therefore, the Apple TV obtains 2/3 of the market which rounding to the closest unit is 67%.

Submit You have used 1 of 1 attempt

Answers are displayed within the problem

You are deciding between one of the two following products to incorporate to the store to compete with the existing devices available on the market:

1. Amazon Fire Stick, with 6GB of internal storage, with 1080p + HDR capability, priced at $40; and
2. Roku Streaming Stick, without internal storage and with both 4K and HDR streaming capabilities, priced at $70.

For all questions remaining assume that you are ONLY CHOOSING ONE of those devices to sell in your store.

Q7

1/1 point (graded)

What is the market share you would predict for the Amazon device if you choose to sell that product in your store?

Fill with number in percentage scale rounded to the closest unit, e.g. input the number 50 for a 50.4% market share.

33 ✔ **Answer:** 33 **or** 33.3 **or** 33.33 **or** 33.333 **or** 33.3333 **or** 33.33333

33

Explanation

Now we only need to compute utilities of each respondent for the Amazon Fire Stick. For example for respondent 2

$$U_2^{am} = 1.9 + 0 + 0.6 + 0 + 0.1 = 2.6$$

Computing utilities for all three products available in the market (Google, Apple, and Amazon) and all respondents you obtain:

$$U_1^{gc} = 0.4; U_1^{ap} = 0.3; U_1^{am} = 2.2$$
$$U_2^{gc} = 1.6; U_2^{ap} = 4.7; U_2^{am} = 2.6$$
$$U_3^{gc} = 2.5; U_3^{ap} = 4.2; U_3^{am} = 4.1$$

Now, Respondent 1 chooses the Amazon device, whereas Respondents 2 and 3 choose the Apple TV. Therefore, the Amazon device obtains 1/3 of the market which rounds to 33%.

Submit You have used 1 of 1 attempt

Answers are displayed within the problem

Q8

1/1 point (graded)

What is the market share you would predict for the Roku device if you choose to sell that product in your store?

Fill with number in percentage scale rounded to the closest unit, e.g. input the number 50 for a 50.4% market share.

33 ✔ **Answer:** 33 **or** 33.3 **or** 33.33 **or** 33.333 **or** 33.3333 **or** 33.33333

33

Explanation

Similarly as the previous question we compute the utilities for the Roku Ultra. For example for respondent 3

$$U_3^{rk} = 3.1 - 0.5 + 0.6 - 0.6 + 2.2 = 4.8$$

Computing utilities for all three products available in the market (Google, Apple, and Roku) and all respondents you obtain:

$$U_1^{gc} = 0.4; U_1^{ap} = 0.3; U_1^{rk} = -0.4$$
$$U_2^{gc} = 1.6; U_2^{ap} = 4.7; U_2^{rk} = 2.6$$
$$U_3^{gc} = 2.5; U_3^{ap} = 4.2; U_3^{rk} = 4.8$$

Now, Respondent 1 chooses the Google Chromecast, Respondent 2 chooses the Apple TV, and Respondent 3 chooses the Roku Ultra. Therefore, the Roku device obtains 1/3 of the market which rounds to 33%.

Submit You have used 1 of 5 attempts

Answers are displayed within the problem

Q9

1/1 point (graded)

Assume that your retailer obtains a margin of 10% of the price for each device, and fixed costs are the same for both Amazon and Roku products.

Assume you only obtain profits for one these two products.

Which of the two products would you introduce in your store to maximize profits? Assume you only obtain profits for one these two products, and as mentioned before they are currently competing in the market with the exising ones (Chromecast and Apple TV; from other retailers).

- the Amazon streaming device
- the Roku streaming device ✔

Explanation

Different ways to approach this. You could notice that both products get the same market share, and have. Assuming the market (number of customers) stays the same size M, the profits are:

$\pi^{am} = 1/3 \cdot M \cdot margin^{am} - FC = 1/3 \cdot M \cdot 0.1 \cdot Price^{am} - FC = \$4/3 \cdot M - FC$

$\pi^{rk} = 1/3 \cdot M \cdot margin^{rk} - FC = 1/3 \cdot M \cdot 0.1 \cdot Price^{rk} - FC = \$7/3 \cdot M - FC$

$\implies \pi^{rk} - \pi^{am} = \$1 \cdot M > 0$

Therefore the Roku gives the highest profits.

Alternatively, you could identify that both products give you the same market share, incur in the same fixed costs, therefore the product with the highest margin is the one with highest profits. Given that margin for poth products is 10% of the price, the product with the highest price gives you the highest profits.

Submit You have used 1 of 1 attempt

Answers are displayed within the problem

Q10

1/1 point (graded)

Assuming in the market you can reach there are 6,000 potential customers, and using your predictions on the market share

Considering ONLY the profits from the product chosen in Q9,

What would be the profits for introducing the chosen product from Q9, assuming Chromecast and Apple TV are available in the market (from other retailers)? (Ignoring fixed costs)
Fill with number rounded to closest unit, e.g., input the number 4167 for profits of $4,166.66. DO NOT include the dollar sign $.

14000 ✔ **Answer:** 14000

14000

Explanation
If total market is $M = 6,000$ then the profits (ignoring fixed costs) for the Roku device are:
$\pi^{rk} = 1/3 \cdot M \cdot margin = 1/3 \cdot 6,000 \cdot 0.1 \cdot \$70 = \$14,000$

Submit You have used 1 of 1 attempt

Answers are displayed within the problem

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