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## Week 8 Quiz

After you submit your answer, you can click **Show Answer** to check the explanation of the quiz.

### Question 1

1/1 point (graded)

Consider the following:

I. Product Line design

II. Demand estimation

III. Optimal pricing

IV. Benefit Segmentation

Which of these can conjoint be used for?

☐ Only I

☐ Only II

☐ I and II

☐ I, II, and III

☒ All ✓

Submit

You have used 1 of 1 attempt

**i** Answers are displayed within the problem

### Question 2

1/1 point (graded)

In the Multinomial Logit model, how respondents are assumed to choose the alternative among the choice set presented?

- ☐ They choose the cheapest alternative
- ☐ They choose randomly with equal probability each alternative
- ☐ They choose randomly according to some probability which is function of the observed product characteristics
- ☐ They choose the brand that gives them the highest utility
- ☒ They choose the alternative that gives them the highest utility ✓

### Explanation

Respondents are assumed to choose the alternative that gives them the highest utility.

- This alternative is not necessarily the cheapest nor the brand that they prefer the most (other attributes also play a role).

- Even though the researcher/analyst cannot observe all components of utility, and therefore model choice as probabilistic, the MNL assumes that all components of utility are fully known by the respondent, and for them utility is deterministic. Thus they know which alternative provides them the highest utility, and therefore they choose that one.

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### Question 3

1/1 point (graded)

Consider a choice-based conjoint design which only 3 products are displayed to choose from (there is no "No purchase" option), similarly to the tablet example seen in the lecture; and consider the probability of choosing an alternative:

$$P(\text{choice} = 1) = \frac{\exp(V_1)}{\exp(V_1) + \exp(V_2) + \exp(V_3)}$$

Which of these is correct with respect to the identification of parameters in the MNL model?

- ☒ In the MNL model, only the difference of relative utilities between brands (up to scalar multiplication) can be recovered, so the parameter of one of the brands has to be set to zero. ✓
- ☐ The absolute utility of any brand can be estimated using MNL
- ☐ The difference of relative utility (up to scalar multiplication) between brands cannot be estimated
- ☐ All of the above

☐ None of the above

### Explanation

MNL only the difference of relative utility between brands (up to scalar multiplication) can be recovered, so the parameter of one of the brands has to be set to zero. In the lecture for each attribute, the level of one parameter is set to zero.

Absolute utility cannot be estimated from choice (You could add a constant to all brands and the choice probability will remain unchanged)

$$\frac{\exp(V_1+c)}{\exp(V_1+c)+\exp(V_2+c)+\exp(V_3+c)} = \frac{\exp(c)}{\exp(c)} \frac{\exp(V_1)}{\exp(V_1)+\exp(V_2)+\exp(V_3+c)} = \frac{\exp(V_1)}{\exp(V_1)+\exp(V_2)+\exp(V_3)} = P(\text{choice} = 1)$$

The first alternative is correct (the third actually contradicts the first).

Submit

You have used 1 of 1 attempt

**i** Answers are displayed within the problem

Consider the following confusion table for predictions on 3 brands vs actual choice of those brands for 400 respondents.

			<i>True</i>		
		<b>1</b>	<b>2</b>	<b>3</b>	Subtotal
	<b>1</b>	120	60	40	220
<b>Prediction</b>	<b>2</b>	30	60	30	120
	<b>3</b>	10	20	30	60
	Subtotal	160	140	100	

### Question 4

1/1 point (graded)

What is the hit rate of the model?

Write your answer as a percentage rounding to the closest unit, this is, if the answer is 30.7%, input 31

53

✓ Answer: 53

53

### Explanation

Hit rate is the percentage of observations with correct predictions, this is, the sum of the diagonal, divided by the number of observations.

Hit rate =  $(120 + 60 + 30) / 400 = 210 / 400 = 52.5\% \sim 53\%$

Submit

You have used 1 of 1 attempt

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## Question 5

1/1 point (graded)

How is this hit rate compared to random prediction?

☒ Better than random prediction ✓

☐ Same as random prediction

☐ Worse than random prediction

☐ Cannot be determined

### Explanation

A random prediction will assign with 33.3% chance every alternative, which means that only 33.3% will be correct.

Thus, the model (hit rate of 53%) is better than random prediction

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You have used 1 of 1 attempt

**i** Answers are displayed within the problem

Assume that after running a choice-based conjoint analysis on the tablet category (attributes, levels, and numbers are different from the lecture) you obtain the following parameters:

Attributes	Levels	Utilities
Brand	Galaxy	0.80
	iPad	1.10
	Kindle	0.10
	<u>Nexus</u>	<u>0.00</u>
Screen Size	10 inch	0.30
	9 inch	0.50
	<u>8 inch</u>	<u>0.00</u>
Hard Drive	128 GB	0.60
	64 GB	0.20

	<u>16 GB</u>	<u>0.00</u>
<b>Price</b>		-0.01

## Question 6

1/1 point (graded)

Consider the following two products:

1. An iPad, with 8 inch screen, 16 GB priced at \$150
2. A Nexus, with 9 inch screen, 64 GB priced at \$110

A respondent from the conjoint study faces those two options. Assume that only those two options are available to choose (and the respondent has to choose one).

What is the probability that a respondent will choose the iPad tablet?

Write your response in percentages rounding to the closest unit, this is, if the answer is 30.5% write 31

✓ Answer: 50 or 50%

Explanation

$$V_1 = 1.1 + 0 + 0 - 0.01 * 150 = 1.1 - 1.5 = -0.4$$

$$V_2 = 0 + 0.5 + 0.2 - 0.01 * 110 = 0.7 - 1.1 = -0.4$$

$$P_1 = \frac{\exp(V_1)}{\exp(V_1) + \exp(V_2)} = \frac{\exp(-0.4)}{\exp(-0.4) + \exp(-0.4)} = 0.5$$

Submit

You have used 1 of 1 attempt

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## Question 7

1/1 point (graded)

Consider the following two products:

1. A Kindle, with 10 inch screen, 16 GB priced at \$110
2. A Galaxy, with 9 inch screen, 64 GB priced at \$150

A respondent from the conjoint study faces those two options. Assume that only those two options are available to choose (and the respondent has to choose one).

What is the probability that a respondent will choose the Galaxy tablet?

Write your response in percentages rounding to the closest unit, this is, if the answer is 30.5% write 31

✓ Answer: 67 or 67%

67

Explanation

$$V_1 = 0.1 + 0.3 + 0 - 0.01 * 110 = 0.4 - 1.1 = -0.7$$

$$V_2 = 0.8 + 0.5 + 0.2 - 0.01 * 150 = 1.5 - 1.5 = 0$$

$$P_2 = \frac{\exp(V_2)}{\exp(V_1) + \exp(V_2)} = \frac{\exp(0)}{\exp(-0.7) + \exp(0)} = \frac{1}{\exp(-0.7) + 1} = 0.668 \approx 0.67$$

Submit

You have used 1 of 1 attempt

**i** Answers are displayed within the problem

## Question 8

1/1 point (graded)

All else equal, what is the willingness to pay for an Nexus user to switch to an iPad tablet?

Write your number in dollars rounding to the closest unit. If the answer is \$100.6, write 101

110

✓ Answer: 110

110

Submit

You have used 1 of 1 attempt

**i** Answers are displayed within the problem

## Question 9

1/1 point (graded)

Suppose a respondent is thinking purchasing a 9 inch tablet.

All else equal, how much the price of the tablet has to drop in order to be indifferent between a 9 inch tablet and a 10 inch tablet?

Write your number in dollars rounding to the closest unit. If the answer is \$100.6, write 101

20

✓ Answer: 20

20

Submit

You have used 1 of 1 attempt

**i** Answers are displayed within the problem

## Question 10

1/1 point (graded)

Consider a firm choosing which products (among a set of feasible ones) would be part of their product line.

What data would you need to find the optimal product line in order to maximize profits?

- ☐ The utilities that respondents would give to the potential products that may be part of the product line
- ☒ The margin of each one of these products potential products
- ☐ The maximum utility respondents are getting from the current products available in the market (status quo)
- ☐ The maximum number of products of the proposed product line
- ☒ All of the above ✓

Submit

You have used 1 of 1 attempt

**i** Answers are displayed within the problem

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