Conjoint Report Group 1 - Headphones

Team members: Madalyn, Molly, Allison, Marisol, and Michael

Description of our Product

For our conjoint analysis, we chose to study headphones. More specifically, we analyzed collected consumer data about headphones' Connectivity (Wired or Bluetooth), Sound (Noise Canceling or Non-Noise Canceling), Price ($50, $150, or $250), and Brand (Apple, Beats, or Skullcandy). We chose Connectivity as one of our attributes because that's the first thing you have to deal with when you first use your headphones. This determines if they have a wire to connect to your phone which can be impractical to many. This can affect how much or in what situations you use your headphones, for example, people who use their headphones in the gym probably prefer Bluetooth ones.

Secondly, we chose Sound because it's arguably the most important attribute of a headphone. In many cases, it drives justification (or the perception of it) of higher prices on the product. Sound importance can be affected in other notable ways, such as in design aesthetic and Connectivity options to maintain the aforementioned quality. Next, we chose Price because that is always an important attribute of a product, even if common in all products.

Lastly, we chose Brand because, with a myriad of consumers with different knowledge levels about other headphone products, Brand can sway a consumer's decision-making process in many ways. It also raises the question of which pair of headphones may be lacking in other areas that Brand can make up for, such as Beats branding as the "cool" headphones and priced as a luxury brand, even though there are various, much better quality alternatives at lower prices.

Data Analysis

We chose Peter as our respondent. His part-worths are seen in the table below. The worst possible product for Peter based on his part-worths is the Wired, Non-Noise Canceling, $50 Skullcandy headphones with a part-worth of 1.8167. On the flip side, the best possible product for Peter is Bluetooth, Noise Canceling, $250 Apple headphones with a part-worth of 7.4833. Peter's relative importance for each attribute was calculated in the table below. His most important attribute is Price, followed by Brand, then Sound and Connectivity.

Peter	*Coefficients*	WORST	BEST
Intercept	4.816666667	4.816666667	4.816667
Wired	-0.5	-0.5	0
Non-Noise Cancelling	-0.833333333	-0.833333333	0
Hundred-fifty	1.733333333	0	0
Two hundred fifty	2.666666667	0	2.666667
Beats	-0.933333333	0	0
Skull Candy	-1.666666667	-1.666666667	0
Wired, Non-Noise Canceling, $50, Skull Candy		1.816666667	
Bluetooth, Noise Canceling, $250, Apple			7.483333

While Peter's part-worths had us expecting that other respondents might have a similar expensive taste, the 5 additional plotted part-worths told us a different story. They were not consistent with what we expected, as Raul, Saba, and Chelsea showed a marked preference for the middle-priced option, and were significantly less partial to the more cheap and expensive options. Also, Justin and Mariana showed trends of decreasing likability as prices increase, completely opposite of what we expected based on Peter's part-worths (*see Figure 17*).

The product profiles we created were Product X, which was a pair of Bluetooth, Noise Canceling, $150 Skullcandy headphones, and Product Y, which was a pair of Wired, Noise Canceling, $150 Apple headphones. Product X captured 60% of the market, while Product Y held the remaining 40% (*See Figure 21)*.

A. Product A is a pair of Bluetooth, Noise Canceling, $50 Beats headphones. If launched, it would capture 60% of the market, reducing Product X from 60% to 10% market share, and Product Y being reduced from 40% to 30% market share (*See Figure 18)*.

B. Product B is a pair of Wired, Noise Canceling, $150 Skullcandy headphones. If launched, it wouldn't impact the market at all, capturing a 0% share that would result in no change to Product X and Product Y in terms of market share *(See Figure 19)*.

C. Product C is a pair of Bluetooth, Non-Noise Canceling, $250 Apple headphones. If launched, it would capture 40% of the market, reducing Product X and Y to 30% market share each *(See Figure 20)*.

Research Conclusions

In our research, we began by analyzing Peter's responses in particular, in order to give us an idea of what to expect from our 10 respondent sample. What we found however, is the more

respondent part-worths we analyzed, the more our findings shifted away from what we originally expected. Peter's part-worths led us to believe that our sample wanted to spend the most money, but we ended up uncovering different price preferences with our other samples. Through our analysis, our best suggestion to a marketing manager would be to expand the sample size, and include a more numerous pool of possible respondents. We were limited in our ability to draw overarching conclusions by the fact that we had a small population and sample size to work with, and this impacted us in more specific ways that we will delve into below.

Limitations

One of our limitations to our ability to generalize is the number of profiles we have in our sample. Since our number is relatively small compared to the population our estimates and predictions are likely to not be very precise or accurate. For example, students in a graduate program at a prestigious university are way less likely to care about Price over Sound Quality than the general population, and might also prioritize Connectivity since we're always on the go. Focusing on such a specific cross-section of the general population could give us great insight into this specific segment, but at the sacrifice of the arguably more valuable tendencies and preferences of the total population of consumers of headphones.

Appendix

Questionnaire

Figures 1-13

Below are profiles that describe headphones. Please provide your rating for each.

The attributes are as follows,

Connectivity: Wired, Bluetooth
Sound: Noise Canceling, Non-Noise Canceling
Price: $50, $150, $250
Brand: Apple. Beats, Skull Candy

Please choose how likely you are to buy this set of headphones on a scale of 1-7, with 1 being not likely and 7 being very likely.

Wired, Non-Noise Canceling, $50, Apple

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Wired, Non-Noise Canceling, $150, Beats

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Bluetooth, Non-Noise Canceling, $50, Beats

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Wired, Noise Canceling, $250, Skull Candy

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Bluetooth, Noise Canceling, $250, Beats

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Bluetooth, Noise Canceling, $150, Apple

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Bluetooth, Noise Canceling, $50, Apple

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Bluetooth, Non-Noise Canceling, $250, Skull Candy

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Wired, Noise Canceling, $150, Beats

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Wired, Noise Canceling, $50, Skull Candy

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Bluetooth, Non-Noise Canceling, $150, Skull Candy

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Wired, Non-Noise Canceling, $250, Apple

- 1
- 2
- 3
- 4
- 5
- 6
- 7

Regression Output

	A	B	C	D	E	F	G	H	I	J
1	SUMMARY OUTPUT									
2										
3	*Regression Statistics*									
4	Multiple R	0.913486								
5	R Square	0.834457								
6	Adjusted F	0.635805								
7	Standard I	0.858293								
8	Observati	12								
9										
10	ANOVA									
11		*df*	*SS*	*MS*	*F*	*gnificance F*				
12	Regressio	6	18.56667	3.094444	4.200603	0.068378				
13	Residual	5	3.683333	0.736667						
14	Total	11	22.25							
15										
16		*Coefficient*	*andard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*pper 95.0%*	
17	Intercept	4.816667	0.616937	7.80739	0.000552	3.23078	6.402553	3.23078	6.402553	
18	Wired	-0.5	0.495536	-1.00901	0.359277	-1.77381	0.773815	-1.77381	0.773815	
19	Non-Noise	-0.83333	0.495536	-1.68168	0.153458	-2.10715	0.440482	-2.10715	0.440482	
20	Hundred-f	1.733333	0.626808	2.765332	0.039584	0.122071	3.344596	0.122071	3.344596	
21	Two hund	2.666667	0.626808	4.254356	0.008058	1.055404	4.277929	1.055404	4.277929	
22	Beats	-0.93333	0.626808	-1.48902	0.196656	-2.5446	0.677929	-2.5446	0.677929	
23	Skull Cand	-1.66667	0.626808	-2.65897	0.044939	-3.27793	-0.0554	-3.27793	-0.0554	
24										
25										
26										
27	RESIDUAL OUTPUT									
28										
29	*)bservatio*	*edicted Pe*	*Residuals*							
30	1	2.65	0.35							
31	2	4.283333	-0.28333							
32	3	6.55	0.45							
33	4	5.316667	-0.31667							
34	5	3.483333	-0.48333							
35	6	3.05	-0.05							
36	7	4.983333	-0.98333							
37	8	6.55	-0.55							
38	9	4.816667	0.183333							
39	10	5.116667	-0.11667							
40	11	6.15	0.85							
41	12	4.05	0.95							
42										
43										
44										
45										

Figure 14

Excel

Figure 15

Connectivity	Sound	Price	Brand	Wired	Non-Noise Cancell	Hundred-fifty	Two hundred fifty	Beats	Skull Candy	Peter	Justin	Chelsea	Saba	Raul	Mariana	Alina	Olivia	Gracyn	Kelsey
Wired	Noise Canceling	$50	Skull Candy	1	0	0	0	0	1	3	3	5	1	3	1	1	1	1	1
Wired	Non-Noise Canceling	$150	Beats	1	1	1	0	1	0	4	2	2	4	3	1	1	2	4	1
Bluetooth	Noise Canceling	$250	Beats	0	0	0	1	1	0	7	4	5	5	5	2	7	3	3	6
Wired	Noise Canceling	$250	Skull Candy	1	0	0	1	0	1	5	1	1	2	2	1	1	2	1	1
Wired	Non-Noise Canceling	$50	Apple	1	1	0	0	0	0	3	3	1	6	2	1	1	5	4	1
Bluetooth	Non-Noise Canceling	$50	Beats	0	1	0	0	1	0	3	5	2	5	3	6	3	4	7	4
Bluetooth	Non-Noise Canceling	$250	Skull Candy	0	1	0	1	0	1	4	2	1	1	3	2	1	2	1	2
Bluetooth	Noise Canceling	$150	Apple	0	0	1	0	0	0	6	5	5	7	6	5	7	6	6	7
Bluetooth	Noise Canceling	$50	Apple	0	0	0	0	0	0	5	7	6	7	7	7	7	7	7	7
Wired	Noise Canceling	$150	Beats	1	0	1	0	1	0	5	3	4	7	3	1	1	3	5	1
Wired	Non-Noise Canceling	$250	Apple	1	1	0	1	0	0	7	2	1	5	2	1	1	2	3	1
Bluetooth	Non-Noise Canceling	$150	Skull Candy	0	1	1	0	0	1	5	3	4	1	3	2	1	4	1	3

Base Case: Bluetooth, Noise Canceling, $50, Apple

Connectivity		Profile	Connectivity	Sound	Price	Brand
Bluetooth	1		2 levels	2 levels	3 levels	3 levels
Wired	2	1	2	1	1	3
		2	2	2	2	2
Sound		3	1	1	3	2
Noise Cancelling	1	4	2	1	3	3
Non NC	2	5	2	2	1	1
		6	1	2	1	2
Price		7	1	2	3	3
$50	1	8	1	1	2	1
$150	2	9	1	1	1	1
$250	3	10	2	1	2	2
		11	2	2	3	1
Brand		12	1	2	2	3
Apple	1					
Beats	2	**Profile**	**Connectivity**	**Sound**	**Price**	**Brand**
Skull Candy	3					
		1	Wired	Noise Canceling	$50	Skull Candy
		2	Wired	Non-Noise Canceling	$150	Beats
		3	Bluetooth	Noise Canceling	$250	Beats
		4	Wired	Noise Canceling	$250	Skull Candy
		5	Wired	Non-Noise Canceling	$50	Apple
		6	Bluetooth	Non-Noise Canceling	$50	Beats
		7	Bluetooth	Non-Noise Canceling	$250	Skull Candy
		8	Bluetooth	Noise Canceling	$150	Apple
		9	Bluetooth	Noise Canceling	$50	Apple
		10	Wired	Noise Canceling	$150	Beats
		11	Wired	Non-Noise Canceling	$250	Apple
		12	Bluetooth	Non-Noise Canceling	$150	Skull Candy

Figure 16

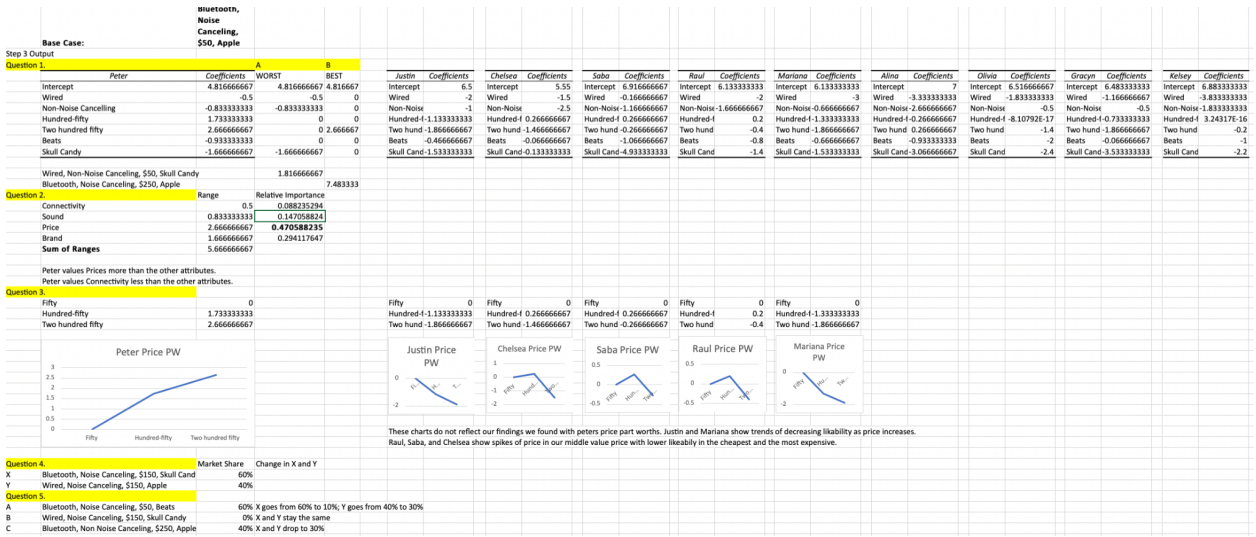


Figure 17

Figure 18

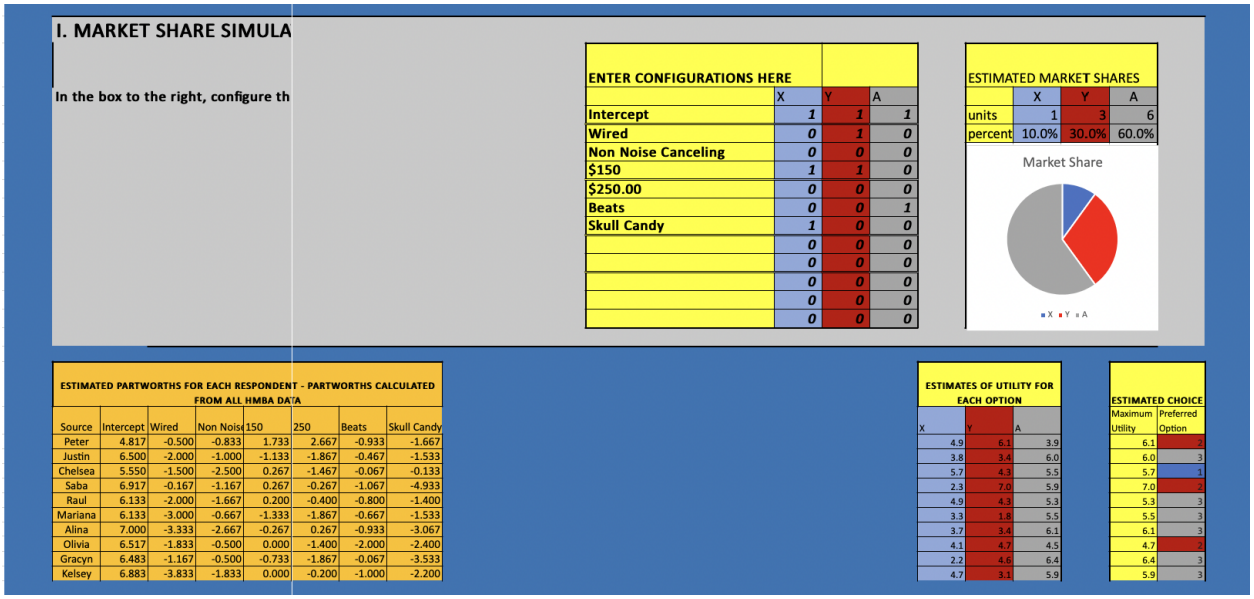


Figure 19

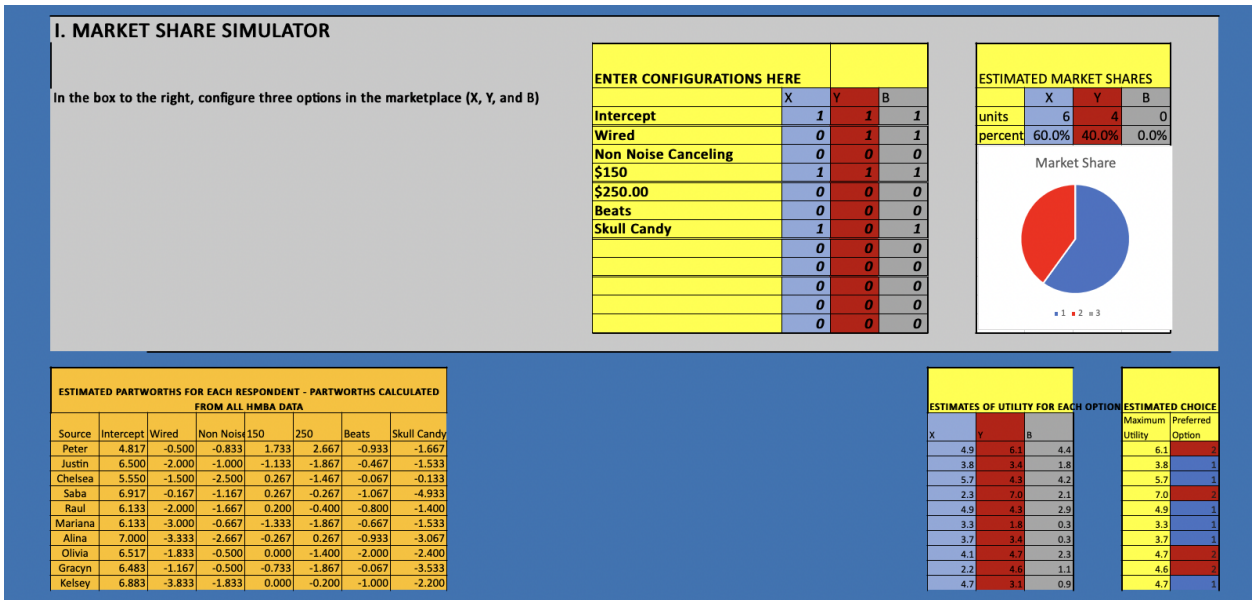
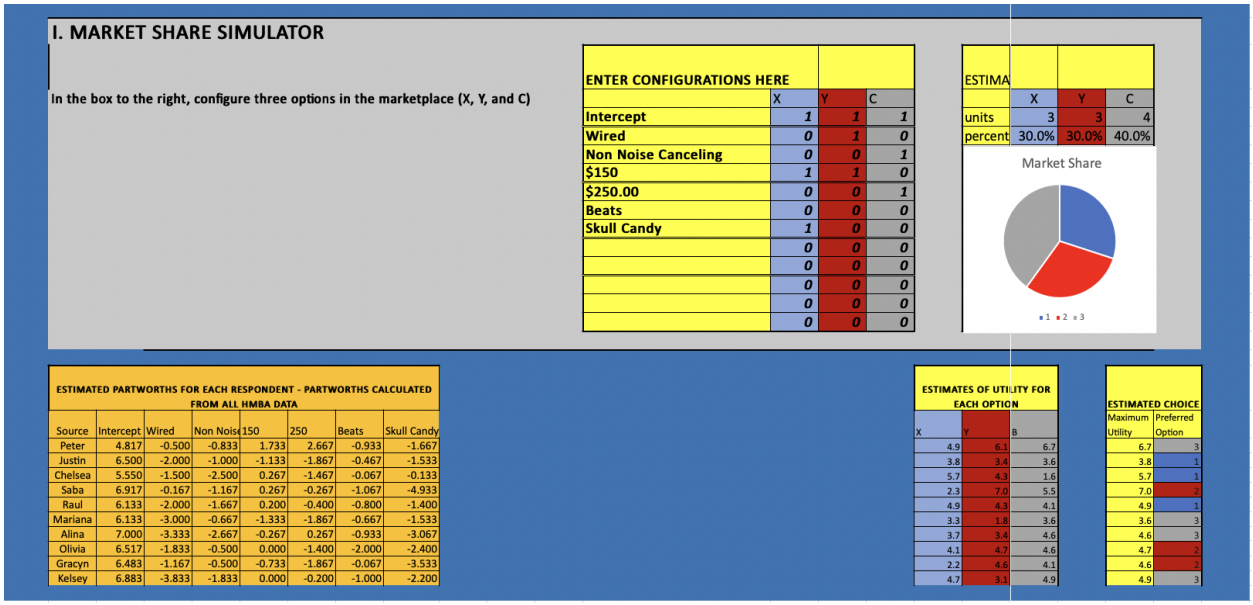


Figure 20



I. MARKET SHARE SIMULATOR

In the box to the right, configure three options in the marketplace (X, Y, and C)

ENTER CONFIGURATIONS HERE	X	Y	C
Intercept	1	1	1
Wired	0	1	0
Non Noise Canceling	0	0	1
$150	1	1	0
$250.00	0	0	1
Beats	0	0	0
Skull Candy	1	0	0
	0	0	0
	0	0	0
	0	0	0
	0	0	0
	0	0	0

ESTIMA	X	Y	C
units	3	3	4
percent	30.0%	30.0%	40.0%

Market Share

ESTIMATED PARTWORTHS FOR EACH RESPONDENT - PARTWORTHS CALCULATED FROM ALL HMBA DATA

Source	Intercept	Wired	Non Nois	150	250	Beats	Skull Candy
Peter	4.817	-0.500	-0.833	1.733	2.667	-0.933	-1.667
Justin	6.500	-2.000	-1.000	-1.133	-1.867	-0.467	-1.533
Chelsea	5.550	-1.500	-2.500	0.267	-1.467	-0.067	-0.133
Saba	6.917	-0.167	-1.167	0.267	-0.267	-1.067	-4.933
Raul	6.133	-2.000	-1.667	0.200	-0.400	-0.800	-1.400
Mariana	6.133	-3.000	-0.667	-1.333	-1.867	-0.667	-1.533
Alina	7.000	-3.333	-2.667	-0.267	0.267	-0.933	-3.067
Olivia	6.517	-1.833	-0.500	0.000	-1.400	-2.000	-2.400
Gracyn	6.483	-1.167	-0.500	-0.733	-1.867	-0.067	-3.533
Kelsey	6.883	-3.833	-1.833	0.000	-0.200	-1.000	-2.200

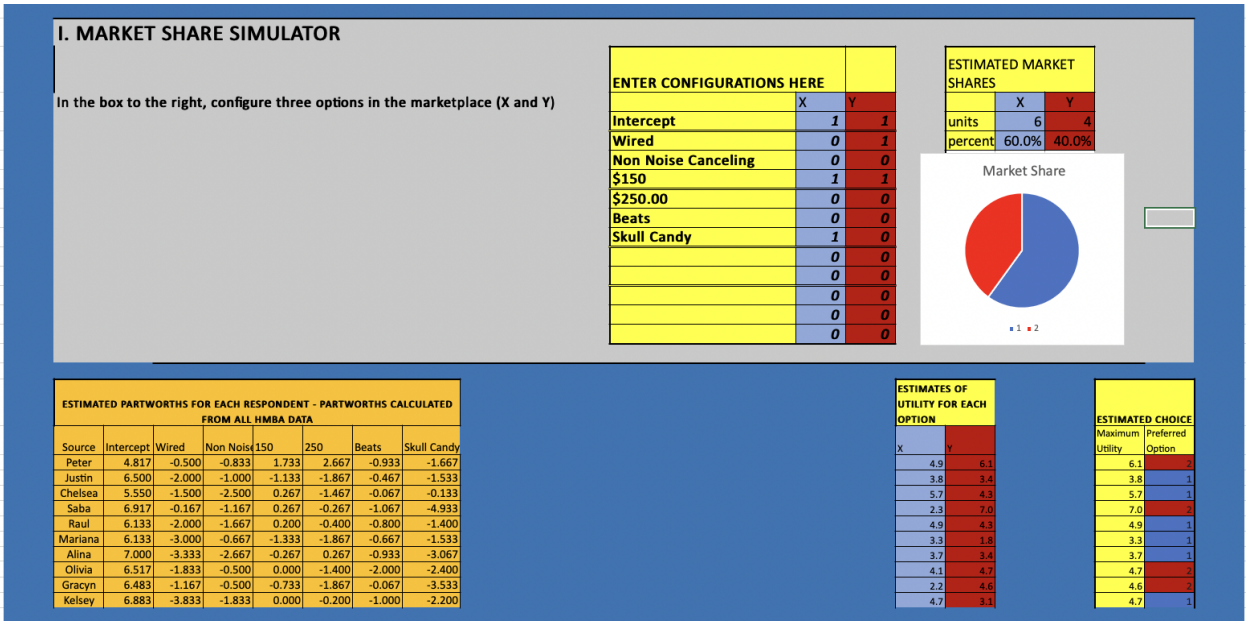
ESTIMATES OF UTILITY FOR EACH OPTION

X	Y	B
4.9	6.1	6.7
3.8	3.4	3.6
5.7	4.3	1.6
2.3	7.0	5.5
4.9	4.3	4.1
3.3	1.8	3.6
3.7	3.4	4.6
4.1	4.7	4.6
2.2	4.6	4.1
4.7	3.1	4.9

ESTIMATED CHOICE

Maximum Utility	Preferred Option
6.7	3
3.8	1
5.7	1
7.0	2
4.9	1
3.6	3
4.6	3
4.7	2
4.6	2
4.9	3

Figure 21



I. MARKET SHARE SIMULATOR

In the box to the right, configure three options in the marketplace (X and Y)

ENTER CONFIGURATIONS HERE	X	Y
Intercept	1	1
Wired	0	1
Non Noise Canceling	0	0
$150	1	1
$250.00	0	0
Beats	0	0
Skull Candy	1	0
	0	0
	0	0
	0	0
	0	0
	0	0

ESTIMATED MARKET SHARES	X	Y
units	6	4
percent	60.0%	40.0%

Market Share

ESTIMATED PARTWORTHS FOR EACH RESPONDENT - PARTWORTHS CALCULATED FROM ALL HMBA DATA

Source	Intercept	Wired	Non Nois	150	250	Beats	Skull Candy
Peter	4.817	-0.500	-0.833	1.733	2.667	-0.933	-1.667
Justin	6.500	-2.000	-1.000	-1.133	-1.867	-0.467	-1.533
Chelsea	5.550	-1.500	-2.500	0.267	-1.467	-0.067	-0.133
Saba	6.917	-0.167	-1.167	0.267	-0.267	-1.067	-4.933
Raul	6.133	-2.000	-1.667	0.200	-0.400	-0.800	-1.400
Mariana	6.133	-3.000	-0.667	-1.333	-1.867	-0.667	-1.533
Alina	7.000	-3.333	-2.667	-0.267	0.267	-0.933	-3.067
Olivia	6.517	-1.833	-0.500	0.000	-1.400	-2.000	-2.400
Gracyn	6.483	-1.167	-0.500	-0.733	-1.867	-0.067	-3.533
Kelsey	6.883	-3.833	-1.833	0.000	-0.200	-1.000	-2.200

ESTIMATES OF UTILITY FOR EACH OPTION

X	Y
4.9	6.1
3.8	3.4
5.7	4.3
2.3	7.0
4.9	4.3
3.3	1.8
3.7	3.4
4.1	4.7
2.2	4.6
4.7	3.1

ESTIMATED CHOICE

Maximum Utility	Preferred Option
6.1	2
3.8	1
5.7	1
7.0	2
4.9	1
3.3	1
3.7	1
4.7	2
4.6	2
4.7	1