Toy Horse Conjoint Analysis

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Executive Summary

Key Insights:

Customers can be divided into **3** segments to conduct better targeting based on their preference towards price, size, motion and style

Running market simulation under different scenarios leads to the result that **profile 4 & 16** would generate the highest profit

Recommendation:

Switch the current products into **profile 4** and **profile 16**:

- $119, 26-inch, bouncing, racing toy horse
- $119, 26-inch, rocking, glamour toy horse

Current Situation

Goal: To find the most profitable product line for EarlyRider

EarlyRider's local retail channel product:

1) 18-inch Rocking & Glamour Horse Ride

   $139.99 for Retail Price (Profile 13)

2) 18-inch Rocking & Racing Horse Ride

   $139.99 for Retail Price (Profile 5)

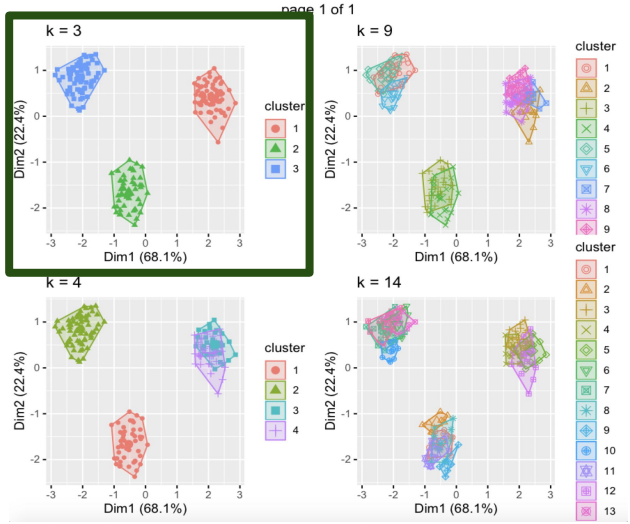
Competitors local retail channel product:

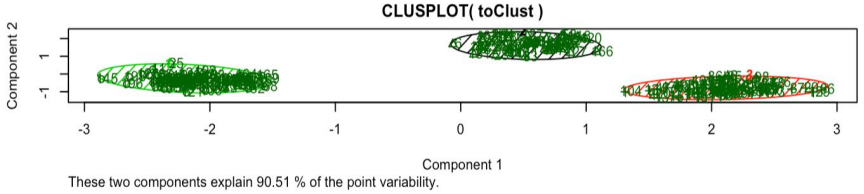
1) 26-inch Rocking & Racing Horse Ride

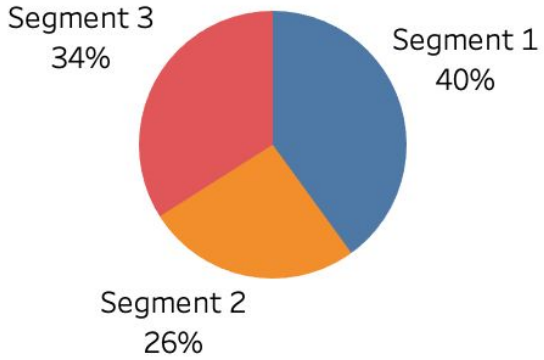
   $139.99 for Retail Price (Profile 7)

*Also much less expensive toy horse competitors online, but are unlikely to make much headway in the local market

Post-hoc Segmentation Interpretation



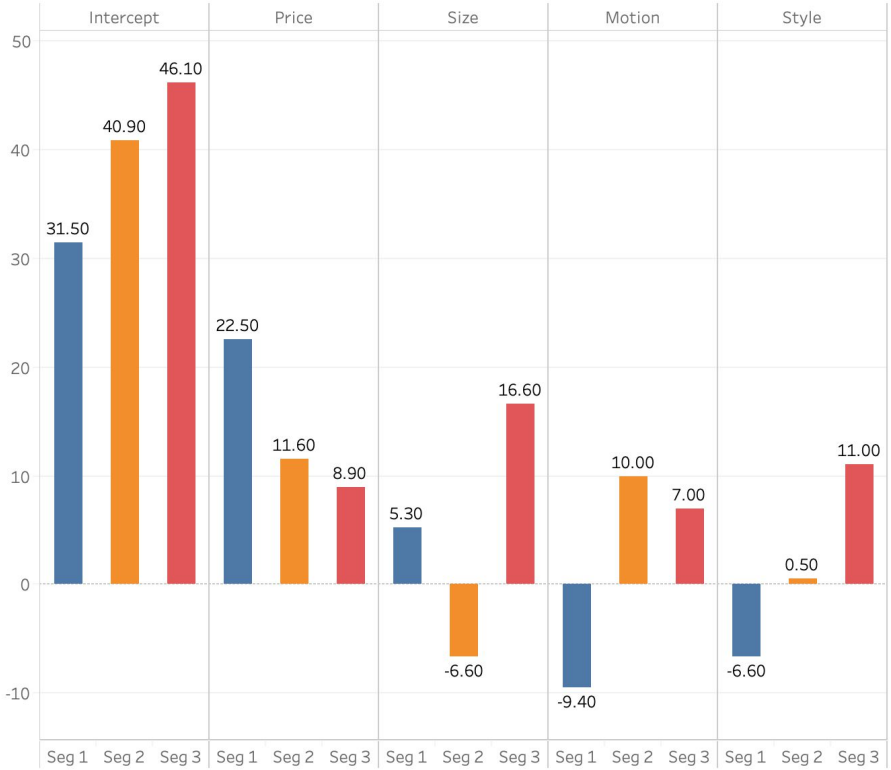




Market for study: 200 individuals
Method: K-means cluster

Obviously, **3 market segments** is the best choice.
There will be too many overlapped markets if we set more than 4 markets.

Cluster Means Interpretation



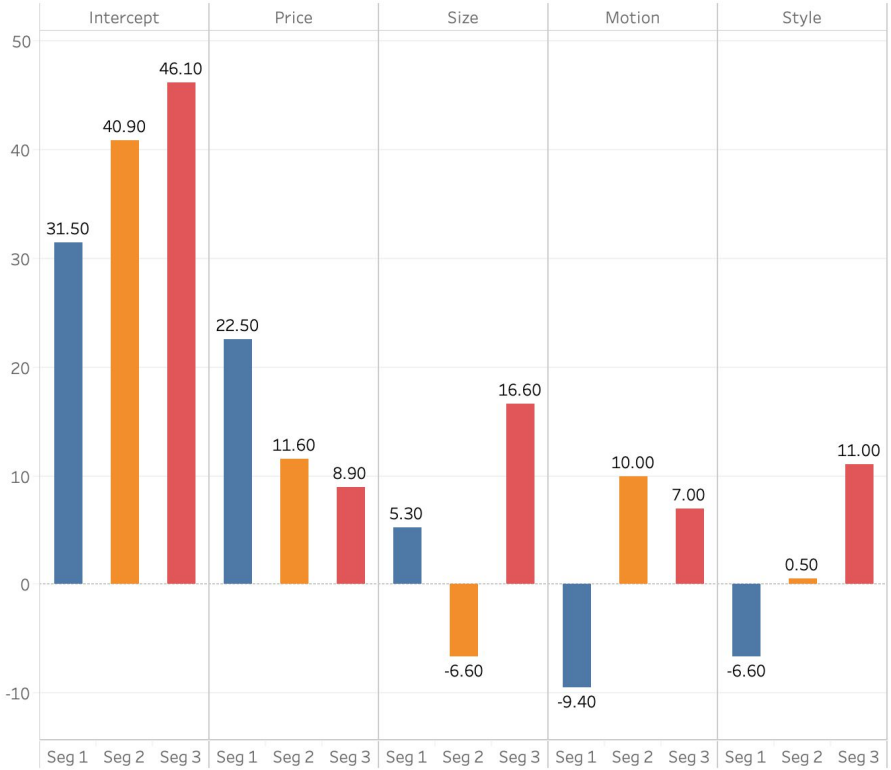
Price: All three segments like cheaper horse, and Segment 1 like it most.

Size: Segment 3 prefers larger size horse, while Segment 2 prefers smaller size horse.

Motion: Segment 1 likes bouncing horse, while other two segments like rocking horse.

Style: Segment 1 prefers racing horse, while segment 3 prefer glamour horse. However, segment 2 doesn't show much preference.

Cluster Means Interpretation



Segment 1: $119.99, 26-inch, bouncing, racing (profile 4)

Segment 2: $119.99, 26-inch, rocking, glamour (profile 16)

Segment 3: $119.99, 18-inch, rocking, glamour (profile 14)

Market Simulation

1 <dbl>	2 <dbl>	3 <dbl>	4 <dbl>	5 <dbl>	6 <dbl>	7 <dbl>	8 <dbl>	9 <dbl>	10 <dbl>	11 <dbl>	12 <dbl>	13 <dbl>	14 <dbl>	15 <dbl>	16 <dbl>
Original market share			NA	0.220	NA	0.57	NA	NA	NA	NA	NA	0.210	NA	NA	NA
keep all current products + new products			0.355	0.020	NA	NA	0.170	NA	NA	NA	NA	0.025	NA	NA	0.430
			0.355	0.005	NA	NA	0.085	NA	NA	NA	NA	NA	0.215	NA	0.340
Only new products			0.355	NA	NA	NA	0.085	NA	NA	NA	NA	NA	0.220	NA	0.340
			0.400	NA	NA	NA	0.335	NA	NA	NA	NA	NA	0.265	NA	NA
			0.355	NA	NA	NA	0.180	NA	NA	NA	NA	NA	NA	NA	0.465
			NA	NA	NA	NA	0.405	NA	NA	NA	NA	NA	0.230	NA	0.365
Only one current product + new products			0.415	NA	NA	NA	0.520	NA	NA	NA	NA	0.065	NA	NA	NA
			NA	NA	NA	NA	0.495	NA	NA	NA	NA	0.035	NA	NA	0.470
			NA	NA	NA	NA	0.700	NA	NA	NA	NA	0.005	0.295	NA	NA
			NA	0.005	NA	NA	0.700	NA	NA	NA	NA	NA	0.295	NA	NA
			0.415	0.040	NA	NA	0.545	NA	NA	NA	NA	NA	NA	NA	NA
			NA	0.020	NA	NA	0.500	NA	NA	NA	NA	NA	NA	NA	0.480

The scenarios can be separated into four main types:

1) Original market share
2) Keep the current products, and add new products (This will exceed the maximum capacity for the retailer. We assume we can sell the additional products on Amazon marketplace)
3) Switch all current products to two new products
4) Keep only one current product, and add one new product

Most Profitable Scenario

1 <dbl>	2 <dbl>	3 <dbl>	4 <dbl>	5 <dbl>	6 <dbl>	7 <dbl>	8 <dbl>	9 <dbl>	10 <dbl>	11 <dbl>	12 <dbl>	13 <dbl>	14 <dbl>	15 <dbl>	16 <dbl>
NA	NA	NA	NA	0.220	NA	0.57	NA	NA	NA	NA	NA	0.210	NA	NA	NA
NA	NA	NA	0.355	0.020	NA	NA	0.170	NA	NA	NA	NA	0.025	NA	NA	0.430
				0.005	NA	NA	0.085	NA	NA	NA	NA	NA	0.215	NA	0.340
				NA	NA	NA	0.085	NA	NA	NA	NA	NA	0.220	NA	0.340
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NA	NA	NA	0.355	NA	NA	NA	0.180	NA	NA	NA	NA	NA	NA	NA	0.465
NA	NA	NA	NA	NA	NA	NA	0.405	NA	NA	NA	NA	NA	0.230	NA	0.365
NA	NA	NA	0.415	NA	NA	NA	0.520	NA	NA	NA	NA	0.065	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	0.495	NA	NA	NA	NA	0.035	NA	NA	0.470
NA	NA	NA	NA	NA	NA	NA	0.700	NA	NA	NA	NA	0.005	0.295	NA	NA
NA	NA	NA	NA	0.005	NA	NA	0.700	NA	NA	NA	NA	NA	0.295	NA	NA
NA	NA	NA	0.415	0.040	NA	NA	0.545	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	0.020	NA	NA	0.500	NA	NA	NA	NA	NA	NA	NA	0.480

Most profitable: scenario 4

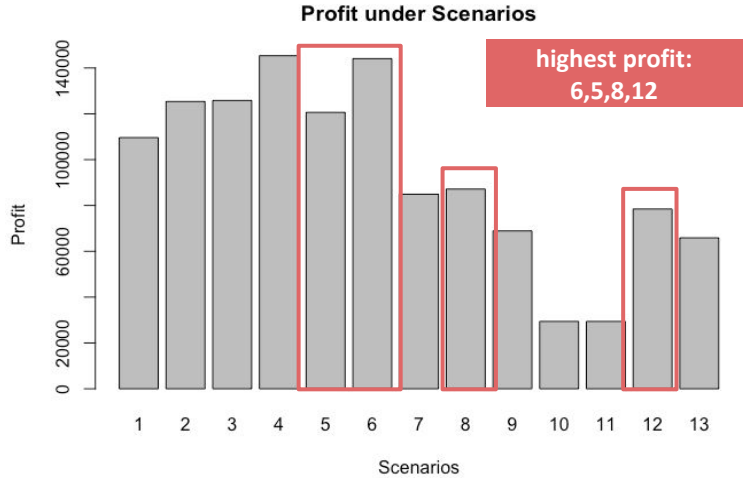
Original market share
profile 5: 22%
profile 13: 21%
profile 7: 57% (competitor)
Profit: **$109,623**
Profitability: **53.16%**

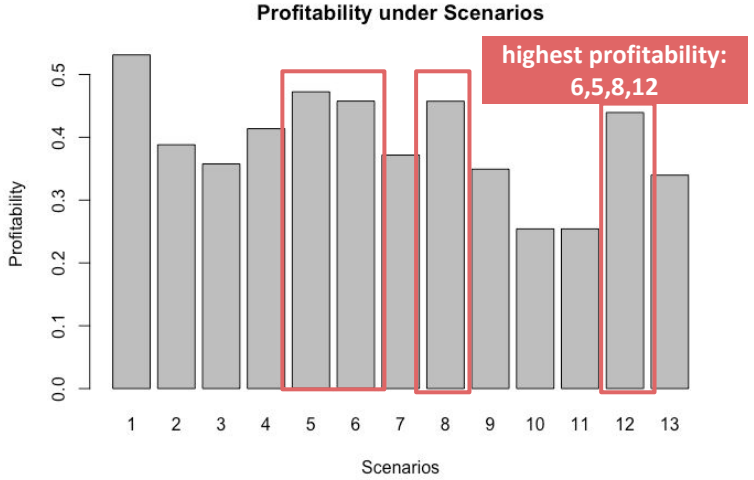
Most profitable scenario
profile 4: 35.5%
profile 16: 46.5%
profile 8: 18% (competitor)
Profit: **$144,073.9**
Profitability: **45.8%**

For the most profitable scenario,

1. we assume competitor will lower its price, because we lower our price.
2. We switch the current product to two new products that will generate **81% market share**, with profit almost **31%** higher than previous product line

Other Profitable Scenarios





scenario	Profile Selected	Profit	Profitability
5	4, 8, 14	$120620.1	47.2%
6	4, 8, 16	$144073.9	45.8%
8	4, 8, 13	$87154.13	45.74%
12	4, 5, 8	$78455.13	43.94%

- Scenario 4 generates the highest profit, but it exceeds the maximum capacity for the retailer (scenario 4 carries 8,4,14,16)
- Scenario 5 has the highest profitability, but profit is lower than scenario 6.
  - Hence we still consider scenario 6 as the best option
- Scenario 8 and 12 also generate relatively higher profitability.

Key Insights

- EarlyRiders can divide their customers into three segments and charge them at a low price ($119.99 retail price).

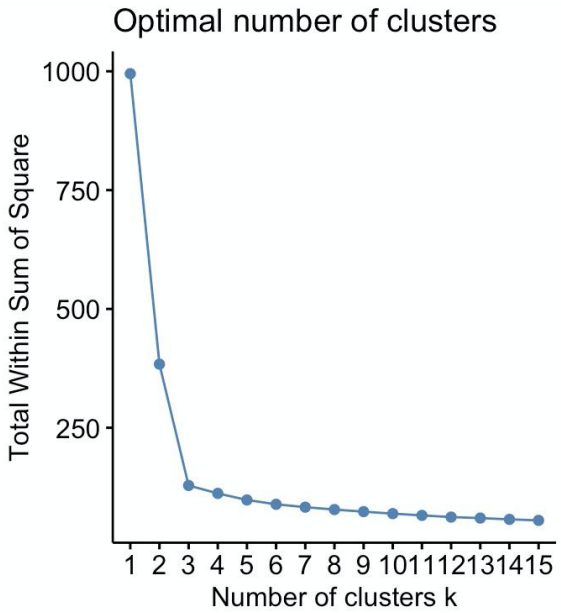
	Price	Size	Motion	Style
Segment 1	$119.99	26-inch	Bouncing	Racing
Segment 2	$119.99	26-inch	Rocking	Glamour
Segment 3	$119.99	18-inch	Rocking	Glamour

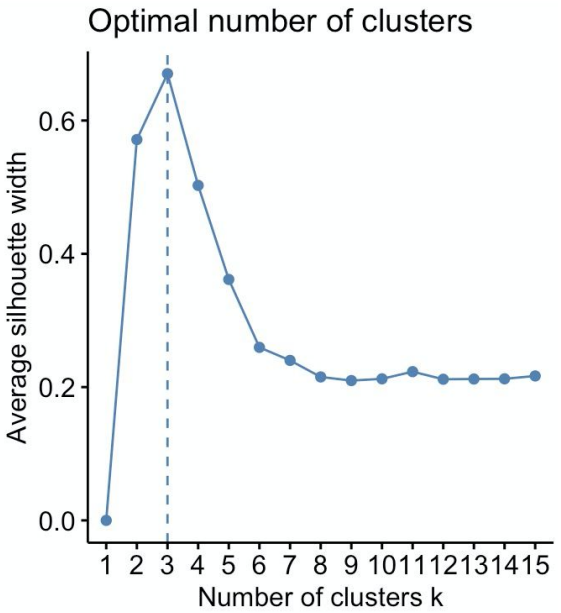
Recommendations

- EarlyRiders can maximize their profit when selling profile 4 and 16 through retail channel, without selling their current products.
- **Profit: $ 144,073.9; Profitability: 45.8%; Market share: 81%**

	Price	Size	Motion	Style
Profile 4	$119.99	26-inch	Bouncing	Racing
Profile 16	$119.99	18-inch	Rocking	Glamour
Profile 8 (Competitor)	$119.99	26-inch	Rocking	Racing

Appendix - Post hoc Analysis





After running the functions, we conclude that cluster of 3 is the most optimal number.

In our analysis, we still tried 3, 4, 9, 12 to see how the cluster performed. Still, cluster of 3 is the most optimal number.

Appendix - A Priori Analysis

- We first run regression between ratings and attributes, interacting with age. Then we run regression between ratings and attributes, interacting with gender.
  - The result shows that the latter one is more significant.
- Hence, in our a priori analysis, we separate consumers into two types based on gender: boys and girls

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	38.8906	0.6274	61.990	< 2e-16	***
price	14.6755	0.7562	19.407	< 2e-16	***
size	4.1154	0.7562	5.442	5.66e-08	***
motion	3.0573	0.7562	4.043	5.41e-05	***
style	1.4489	0.7562	1.916	0.055452	.
price:age	0.7396	1.0038	0.737	0.461340	
size:age	3.6515	1.0038	3.638	0.000280	***
motion:age	-3.6381	1.0038	-3.624	0.000294	***
style:age	-0.6050	1.0038	-0.603	0.546772	

Interation with age

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	38.8906	0.5980	65.029	< 2e-16	***
price	15.9278	0.7449	21.383	< 2e-16	***
size	2.9214	0.7449	3.922	8.97e-05	***
motion	-1.6896	0.7449	-2.268	0.023376	*
style	-2.8190	0.7449	-3.785	0.000157	***
price:gender	-1.6273	0.9600	-1.695	0.090100	.
size:gender	5.6258	0.9600	5.861	5.08e-09	***
motion:gender	5.3882	0.9600	5.613	2.16e-08	***
style:gender	7.3378	0.9600	7.644	2.77e-14	***

Interaction with gender: more significant

Appendix - A Priori Segmentation Interpretation

intercept	price	size	motion	style	segment
40.87007	13.50856	7.755489	2.9067692	3.726996	Girls
36.56684	16.85734	3.850932	-0.7601191	-1.889529	Boys

Based on the segmentations, we conclude that:

- Both girls and boys prefer **lower price** and **larger size product**
- Girls prefer 119'', 26-inch, rocking, glamour toy horse **(profile 16)**
- Boys prefer 119'', 26-inch, bouncing, racing toy horse **(profile 4)**

Appendix

Table for 13 Scenarios' Profit & Profitability

Scenario	Profile	Profit	Profitability
1	5,13,7	$ 109,623	53.11%
2	5,13,8,4,16	$ 125,367	38.81%
3	5,8,4,14,16	$ 125,823	35.77%
4	8,4,14,16	$ 145,343	41.37%
5	8,4,14	$ 120,620	47.24%
6	8,4,16	$ 144,074	45.76%
7	8,14,16	$ 84,903	37.16%
8	13,8,4	$ 87,154	45.74%
9	13,8,16	$ 68,893	34.93%
10	13,8,14	$ 29,401	25.42%
11	5,8,14	$ 29,401	24.42%
12	5,8,4	$ 78,455	43.94%
13	5,8,16	$ 65,873	33.97%

Table for Each Product's Profitability in Each Scenario

Scenario	Product	Profitability
1	13	52.70%
	5	53.60%
2	13	-761%
	4	55%
	5	-761%
	14	40.80%
	16	42%
3	5	-761%
	4	50.20%
	14	41.41%
	16	42%
4	4	50.20%
	14	34.10%
	16	42%
5	4	52.40%
	14	39.40%
6	4	50.20%
	16	42.30%
7	14	35.40%
	16	38.30%
8	13	-8.28%
	4	53.40%
9	13	-46.60%
	16	42.50%
10	13	-781.00%
	14	5.00%
11	5	-761.00%
	14	42.10%
12	5	-136.00%
	4	53.10%
13	5	-136.00%
	16	46.40%