Toy Horse Conjoint Experiment

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Content

01 Assumptions and limitations

Assumptions

1. Competitors will not change their product line, which means they will not change their current product or add in new product.
2. Competitors will lower their price only when their profit is negative.
3. We can take action to change our price after competitor.
4. The result of the survey sample is representative of the market.

Limitations

1. We cannot take other important attributes into consideration, including stability, total floor footprint, quality of construction, and color/colorfulness.
2. We only analyze based on children 2~4 years old.
3. The wholesale prices can only be $111.99 and $95.99.
4. There is no more new competitors.

02 Executive summary

3 Clusters: Economic Sporty Customers; Short Rocker Lovers; Glamourous Tall Richers

2 Scenario: highest profit or highest market share

2 Outcomes: earn **$198,956** comparing to the current $75,024 or **88.40%** share comparing to the current 36.4%

Recommandation: if we choose to cluster, we should observe demo of each segment and customize packaging and channel.

Highest Profit Scenario

Product we offer:
P4: $119.99, 26”, bouncing, racing

Competitor would maintain its price.

(81.40%, $198,956)

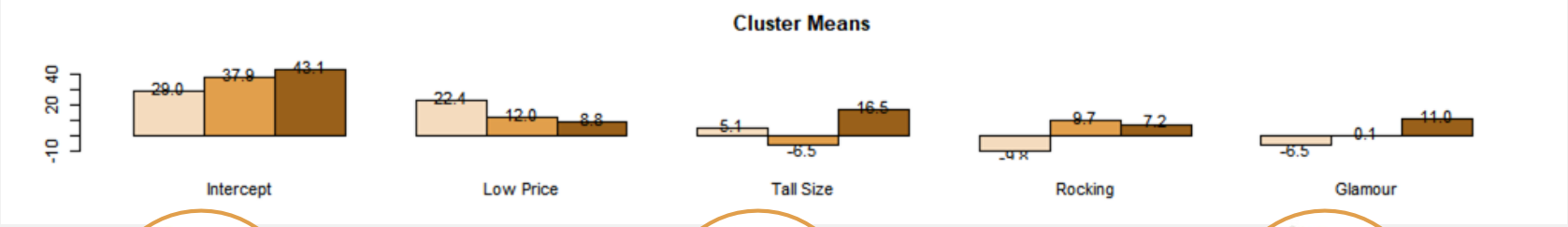
Highest Share Scenario

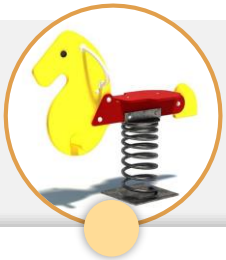
Product we offer:
P4: $119.99, 26”, bouncing, racing
P13: $139.99, 18”, rocking, glamour
P15: $139.99, 26”, rocking, glamour

If competitor lowers its price, we should then lower p13’s price to p14 and get our highest share(88.40%, $176,912).If competitor doesn’t lower,we get 96.7% market share.

03 Targeted products by 3 cluster segmentations

Economic Sporty Customers, Short Rocker Lovers, Glamourous Tall Richers

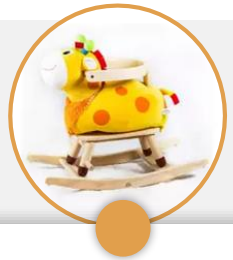




Economic Sporty Customers

- take 50% of the market
- price-sensitive, like bouncing & racing
- Like low VC products and pice-sensitive

➔ $119.99, 26'', bouncing, racing



Short Rocker Lovers

- take 20% of the market
- Less price sensitive, Like 18'' $ rocking
- Like high VC products and less price-sensitive

➔ $139.99, 18'', rocking, glamour

Glamourous Tall Richers

- take 30% of the market
- least price-sensitive, like 26''& glamour
- Like high VC products and least price-sensitive

➔ $139.99, 26'', rocking, glamour

04 Significant difference between gender, but not age

	Age	Price : Age	Height : Age	Motion : Age	Style : Age
Coefficient	-0.03	0.58	5.06	-2.63	0.90
Significance			***	***	

By Age

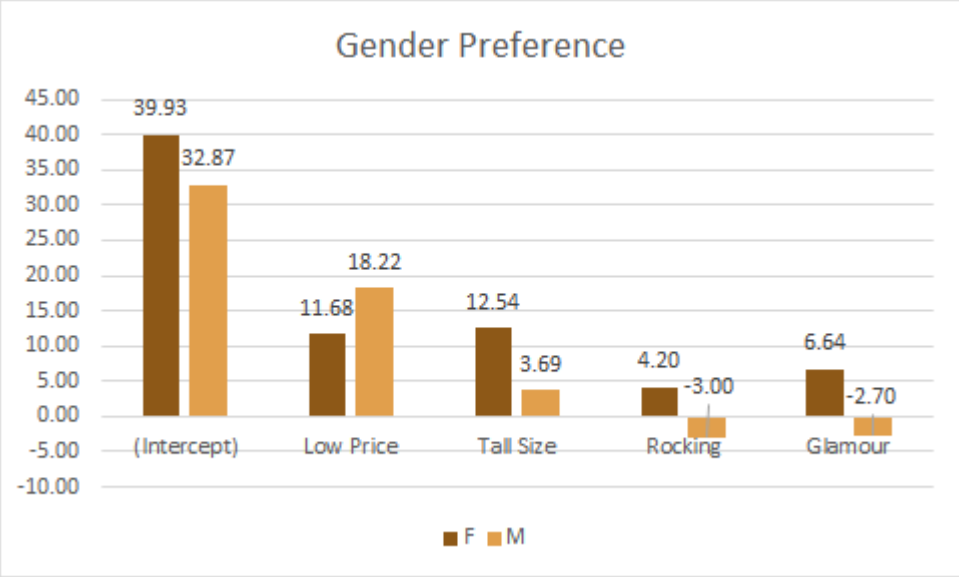
- Only the interaction of height and age, motion and age is significant
- The statistical result shows that age is not a good factor to segment consumers
- Different age periods do not show significantly different preferences on the attributes

By Gender

- Gender and all of the interactions are statistically significant
- The result shows that gender is a good factor to segment consumers
- Female and male do have significantly different preferences on the attributes

	Gender	Price:Gender	Height:Gender	Motion:Gender	Style:Gender
Coefficient	7.06	-6.54	8.86	7.20	9.34
Significance	***	***	***	***	***

04 Segmentation by gender: specific defference



segment by gender

- both female and male like low price, but male are more price sensitive
- both female and male prefer 26'', but female like large size more
- female prefer rocking toy horses while male prefer bouncing ones
- female prefer glamour toy horses while male prefer racing ones

04 Targeted products by gender

Female (product file)	Wholesale Price	Height	Motion	Style	Cost	Profit (per product)
15	$111.99	26''	Rocking	Glamour	$41	$70.99
16	$95.99	26''	Rocking	Glamour	$41	$54.99
Male (product file)	**Wholesale Price**	**Height**	**Motion**	**Style**	**Cost**	**Profit (per product)**
4	$95.99	26''	Bouncing	Racing	$29	$66.99
2	$95.99	18''	Bouncing	Racing	$21	$74.99

Via adjusting the attributes which female or male do not show specific preference, we find the two targeted products with the greatest profit.

For female, we offer product 15 ($139.99, 26'' Rocking Glamour toy horse)

For male, we offer product 2 ($119.99, 18'' Bouncing Racing toy horse)

05 Market Simulation: in current market, we have profit $75,024, with market share 36.4%

1. Status Quo :Competitor offers product 7, We offers Product 5 & Product 13 (P7,P5,P13)

Scenario	Market Share of Each Product			Expected Profit	
	Comp. P7	P5	P13	Competitor's Profit	Profit
1	63.6%	21.0%	15.4%	$160,624	$75,024

The product number is corresponding to Product profile. Two products the firm offers are Product 5 (18'' Racing Rocking Horse,$139.99) and Product 13 (18'' Glamorous Rocking Horse,$139.99).

Currently, the competitor takes the majority of market share and gains a much higher profit.

Therefore, the firm needs to adjust its marketing strategy.

05 Market Simulation: segment by gender, we can reach highest profit $185,200 offering P2, or highest share 81.4% offering P2,P16

Scenario	Market Share of Each Product					Expected Profit		Action
	Comp. P7	Comp. P8	P2	P15	P16	Profit	Competiitor's Profit	
2	31.6%		68.4%			$185,200	$69,744	Only offer P2 for male
3	2.7%		66.9%	30.4%		$247,036	-$12,332	Add P15 for female
4		35.0%	44.7%	20.3%		$151,752	$57,000	Comp. lower price
5		18.6%	42.3%		39.1%	$172,920	$20,920	we lower P15's price

When adds a new product for female segmentation, the firm gains more market share from competitor to increase profit.

But because competitor cannot earn any profit in this scenario, so we consider that competitor may lower price to retake the market, and we can also lower the price to capture market back.

The stable scenario: 2,5

05 Market Simulation: segment by cluster, we can have highest profit $198,956 offering P4, or highest share 88.4% offering P4,P14,P15

Scenario	Market Share of Each Product						Expected Profit		Action
	Comp. P7	Comp. P8	P4	P15	P13	P14	Profit	Competiitor's Profit	
6	18.3%		81.7%				$198,956	$20,260	We offer P4 for the largest segment
7	5.9%		61.3%	32.8%			$217,436	-$3,244	Add P15
8	3.3%		55.9%	29.1%	11.7%		$209,428	-$10,628	Add P13
9		27.6%	50.1%	19.8%	2.5%		$138,400	$40,720	Comp. lower price
10		11.6 %	50.0%	19.2%		19.2%	$176,912	$5,520	We lower P13' price

When offer product 4 and product 15, the firm can get a high profit, but after adding one more product, the profit declines, which shows cannibalization.

The stable scenario: 6, 10

06 Conclusion

We should do segmentation by 3 clusters.

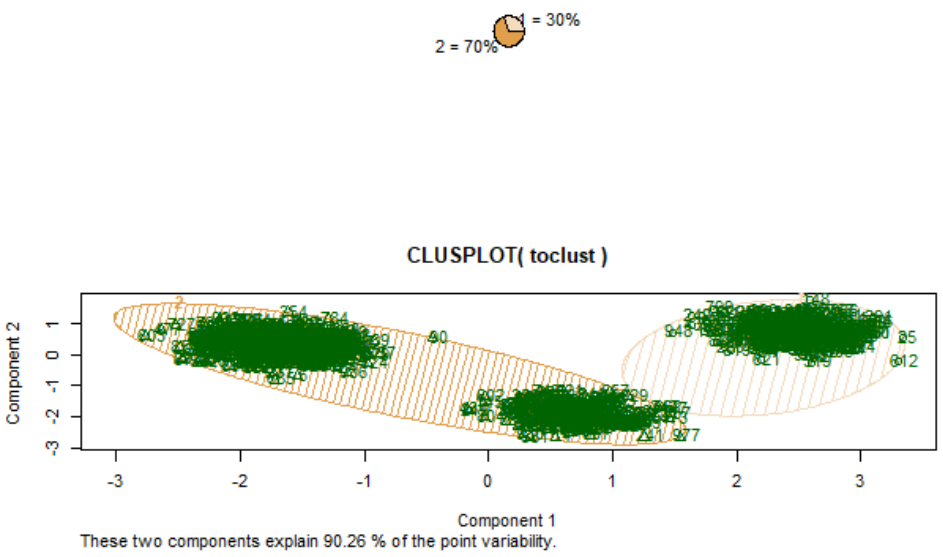
- To achieve highest profit $198,956, we suggest only offer P4
- To achieve highest market share 88.40%, we suggest offer P4, P13, P15

Segmentation	Stable Scenario	Competitor's Share	Our Share	Our Profit	Our Final Product	Comp.' product	
By gender	2	31.6%	68.4%	$185,200	P2 for male	P7	Competitor's rational reaction
	5	18.6%	81.4%	$172,920	P2, P16	P8	
By cluster	6	18.3%	81.7%	$198,956	P4 for the largest segment	P7	Highest Profit
	10	11.6%	88.4%	$176,912	P4, P14, P15	P8	Highest Share

Appendix

Product Profile

Product	Price	Height	Motion	Style	Cost	Product	Price	Height	Motion	Style	Cost
1	$139.99	18"	Bouncing	Racing	$21	**9**	$139.99	18"	Bouncing	Glamour	$21
2	$119.99	18"	Bouncing	Racing	$21	**10**	$119.99	18"	Bouncing	Glamour	$21
3	$139.99	26"	Bouncing	Racing	$29	**11**	$139.99	26"	Bouncing	Glamour	$29
4	$119.99	26"	Bouncing	Racing	$29	**12**	$119.99	26"	Bouncing	Glamour	$29
5	$139.99	18"	Rocking	Racing	$33	**13**	$139.99	18"	Rocking	Glamour	$33
6	$119.99	18"	Rocking	Racing	$33	**14**	$119.99	18"	Rocking	Glamour	$33
7	$139.99	26"	Rocking	Racing	$41	**15**	$139.99	26"	Rocking	Glamour	$41
8	$119.99	26"	Rocking	Racing	$41	**16**	$119.99	26"	Rocking	Glamour	$41



B. cluster to two groups

Divide into two segments:

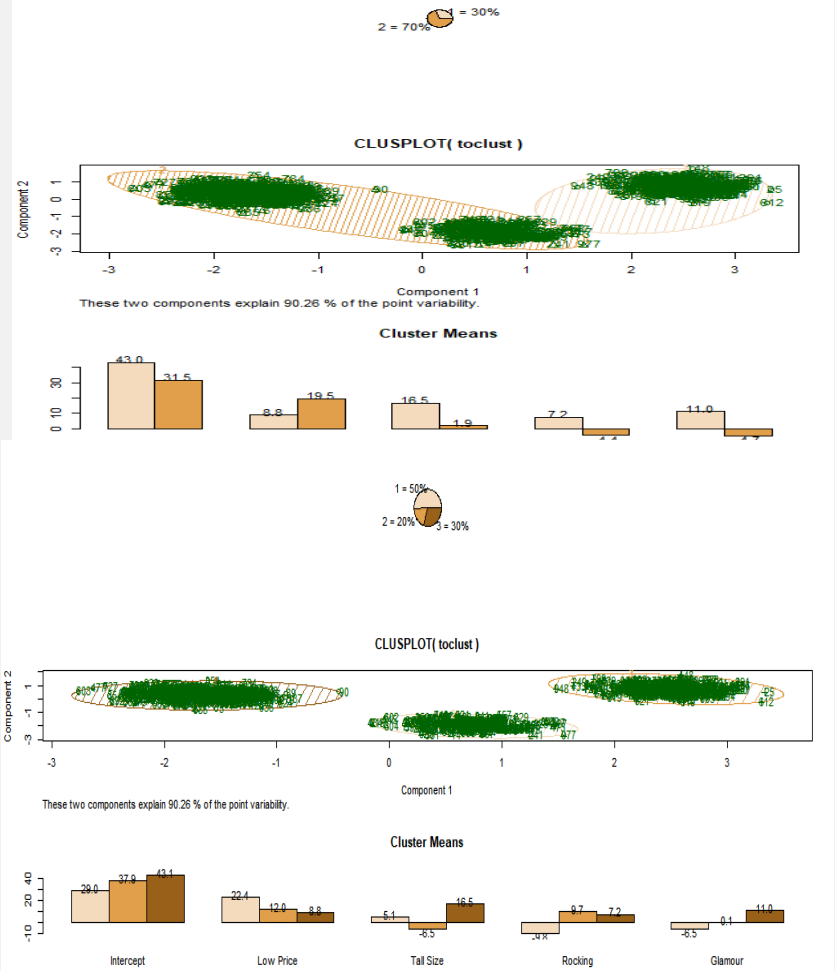
Description: less price sensitive, strongly prefer tall size, and like rocking & glamour

Product: $139.99, 26”, rocking, glamour
Market share: 30.4%

Description: price sensitive, prefer tall size, and like bouncing & racing

Product: $119.99, 18”, bouncing, racing
(Choose 18” instead of 26” for higher margin)
Market share: 66.9%

Estimated profit supposing competitor not changing price: $247,036



We choose 3 segments cluster over 2 segments cluster

Why not choose the alternative segementation:

In two groups cluster, we can see that within the larger group, there are two clusters of consumers who have significant homogeneity, which cannot fit the criteria **Homogeneity within heterogeneity between.** Therefore it is not a good segmentation.

In three groups cluster,the segmentation fits Homogeneity within heterogeneity between and customers in there three clusters show different systematic behaviors. Thus, three groups cluster is better than two groups.

Key calculation codes

```
# do cluster 2, 3
  km1 = kmeans(toclust,2,iter.max = 20, nstart=2)
  km2 = kmeans(toclust,3,iter.max = 20, nstart=2)

# check age&gender difference
  summary(lm(ratings~desmat*ageD))
  summary(lm(ratings~desmat*genderD))

# one market share&profit calculation
scen0 = c(7,15,2)   #products in the market
simDec0 = simDec(simDecInput,scen0)    #market share
simProf0 = simProfit(simDecInput,scen0,c(2,3),c(112,112,96),c(41,41,21),40000,4000)   #our profit
simProf1 = simProfit(simDecInput,scen0,1,c(112,112,96),c(41,41,21),20000,4000)   #competitor's profit
```

Regression Result by Age and Gender

```
lm(formula = ratings ~ desmat * ageD)

Residuals:
    Min      1Q  Median      3Q     Max
-36.048 -12.357  -2.576  11.314  48.483

Coefficients:
                     Estimate Std. Error t value Pr(>|t|)
(Intercept)          34.96015    0.51666  67.666  < 2e-16 ***
desmatLow Price      15.99558    0.44744  35.749  < 2e-16 ***
desmatTall Size       3.70076    0.42185   8.773  < 2e-16 ***
desmatRocking         0.46854    0.44744   1.047    0.295
desmatGlamour        -0.41684    0.42185  -0.988    0.323
ageD                 -0.03185    0.72205  -0.044    0.965
desmatLow Price:ageD  0.58172    0.62532   0.930    0.352
desmatTall Size:ageD  5.05852    0.58955   8.580  < 2e-16 ***
desmatRocking:ageD   -2.63443    0.62532  -4.213 2.54e-05 ***
desmatGlamour:ageD    0.89765    0.58955   1.523    0.128
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 16.14 on 11990 degrees of freedom
  (4000 observations deleted due to missingness)
Multiple R-squared:  0.2394,    Adjusted R-squared:  0.2388
F-statistic: 419.3 on 9 and 11990 DF,  p-value: < 2.2e-16
```

```
lm(formula = ratings ~ desmat * genderD)

Residuals:
    Min      1Q  Median      3Q     Max
-54.045  -8.760  -0.749   7.993  56.895

Coefficients:
                     Estimate Std. Error t value Pr(>|t|)
(Intercept)           32.8681     0.3687  89.138   <2e-16 ***
desmatLow Price       18.2158     0.3193  57.043   <2e-16 ***
desmatTall Size        3.6863     0.3011  12.244   <2e-16 ***
desmatRocking         -2.9975     0.3193  -9.387   <2e-16 ***
desmatGlamour         -2.7028     0.3011  -8.977   <2e-16 ***
genderD                7.0602     0.6800  10.382   <2e-16 ***
desmatLow Price:genderD -6.5387     0.5889 -11.103   <2e-16 ***
desmatTall Size:genderD  8.8586     0.5553  15.954   <2e-16 ***
desmatRocking:genderD    7.2015     0.5889  12.228   <2e-16 ***
desmatGlamour:genderD    9.3387     0.5553  16.819   <2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 13.86 on 11990 degrees of freedom
  (4000 observations deleted due to missingness)
Multiple R-squared:  0.4395,    Adjusted R-squared:  0.4391
F-statistic:  1045 on 9 and 11990 DF,  p-value: < 2.2e-16
```

Regression Result by Female and Male

```
lm(formula = ratings ~ desmat, subset = genderD == 1)

Residuals:
    Min      1Q  Median      3Q     Max
-54.045  -4.538   4.656   9.901  25.262

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    39.9283     0.6209  64.303  < 2e-16 ***
desmatLow Price  11.6771     0.5378  21.715  < 2e-16 ***
desmatTall Size  12.5449     0.5070  24.743  < 2e-16 ***
desmatRocking     4.2040     0.5378   7.818 7.05e-15 ***
desmatGlamour     6.6359     0.5070  13.089  < 2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 15.06 on 3523 degrees of freedom
  (1176 observations deleted due to missingness)
Multiple R-squared:  0.2627,    Adjusted R-squared:  0.2619
F-statistic: 313.9 on 4 and 3523 DF,  p-value: < 2.2e-16
```

```
lm(formula = ratings ~ desmat, subset = genderD == 0)

Residuals:
    Min      1Q  Median      3Q     Max
-28.092  -9.103  -2.825   5.633  56.895

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)    32.8681     0.3546  92.695   <2e-16 ***
desmatLow Price  18.2158     0.3071  59.320   <2e-16 ***
desmatTall Size   3.6863     0.2895  12.733   <2e-16 ***
desmatRocking    -2.9975     0.3071  -9.762   <2e-16 ***
desmatGlamour    -2.7028     0.2895  -9.336   <2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 13.32 on 8467 degrees of freedom
  (2824 observations deleted due to missingness)
Multiple R-squared:  0.3594,    Adjusted R-squared:  0.3591
F-statistic:  1187 on 4 and 8467 DF,  p-value: < 2.2e-16
```