



Effects of Discounting on Online Shopping

W241 Research Project

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Research Question

How will a store-wide discount affect sales for an online shop?

Primary reasons for research question:

- 1) Price elasticity of products offered on E-commerce marketplaces or online shops are rarely studied. Consumer behavior at online shops and physical shops are likely different.
- 2) Given the growing popularity of online retail shopping, the results of this analysis could prove very valuable

Hypotheses - Discounts should boost:

- Total value of sales
- Total quantity sold
- Sales per order
- Sales per unique item per order
- Order value per buyer
- Order quantity per buyer
- Conversion rate



Our Partner

Etsy

Sell on Etsy



Home



Favorites



You ▾



Cart

Clothing & Accessories

Jewelry

Craft Supplies & Tools

Weddings

Entertainment

Home & Living

Kids & Baby

Vintage

Whoever you are, find
whatever you're into

What are you shopping for?

Search



- Etsy is an online marketplace that allows entrepreneurs to sell unique products to customers all over the world
- Etsy specializes in unique items, such as craft, vintage and handmade goods, and cultural items that may be difficult to locate otherwise based on location
- Relatively attractive for sellers - \$0.20 USD listing fee for each item listed and a 3.5% fee for sales
- The network is large with 1.7 million active sellers and 28.6 million active buyers
- For our experiment we partnered with a direct seller associated with Etsy



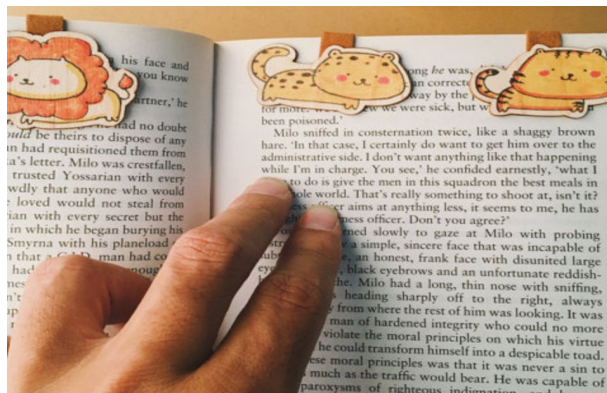
3XUdesign

Truly unique & fun handmade products

📍 Ho Chi Minh City, Vietnam | 2373 Sales | On Etsy since 2016

★★★★★ (346)

♡ Favorite shop (2773)



Experimental Design

20% OFF all items (except bundled items
already on discount)

Control Group 1

All visitors
March 13-19

All visitors
March 20-26

Treatment Group

All visitors
March 27-April 2

Control Group 2

Treatment Setup

Ensured that Sales Event was Conspicuous for Shop Visitors

Third-party website, “etsyonsale.com,” was used to create sales event and enabled us to:

- Advertise the sale on the shop’s website banner
- Place line through the original item price and display final price
- Clearly display “ON SALE” on product page
- Calculate and display final price based on discounted rate (20%)
- Set duration of sales event



Control and Treatment Groups

Control 1

Sample Size: 1161
Age 25-34 (Share): 32.6
Female (Share): 82.1
U.S.-English (Share): 36.1
U.S. (Share): 20.5

Treatment

Sample Size: 1239
Age 25-34 (Share): 37.7
Female (Share): 85.4
U.S.-English (Share): 40.2
U.S. (Share): 24.0

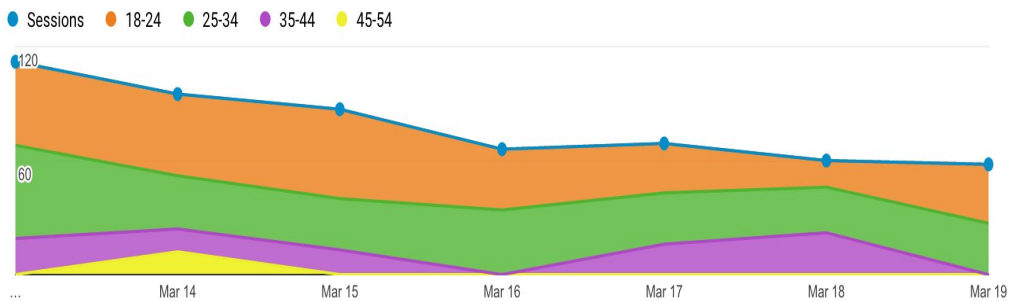
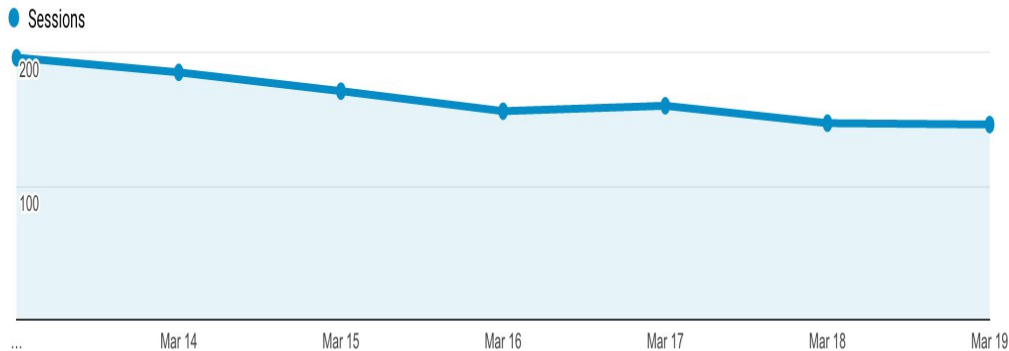
Control 2

Sample Size: 1129
Age 25-34 (Share): 35.5
Female (Share): 84.8
English (Share): 39.4
U.S. (Share): 22.1



Data Collection

Google Analytics: Number of Visits, Demographic Data



Etsy: Quantity, Prices, Sales

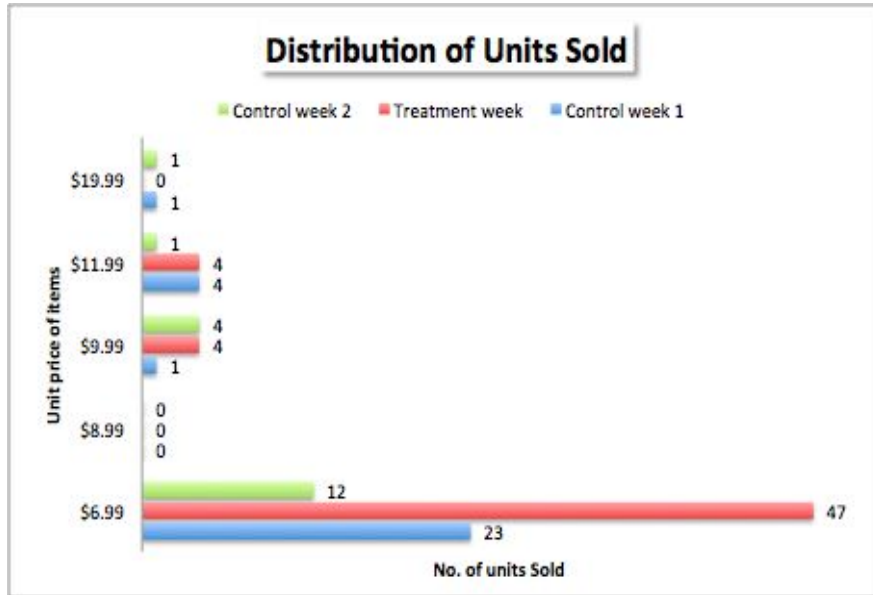
Sale Date	Number of Items	Date Shipped	Ship Country	Order Value
3/31/17	1	4/4/17	United State:	9.99
3/31/17	1	4/4/17	United State:	6.99
3/30/17	1	4/4/17	Australia	6.99
3/29/17	1	3/30/17	Germany	11.99
3/29/17	3	3/30/17	United State:	20.97

Outcome Measures

Measures	Definition
Total Sales Value	Sum of sales in each of the treatment and the control weeks
Total Quantity Sold	Sum of items sold in each of the treatment and control weeks
Sales per Order	Sales value of each order
Sales per Unique Item per Order	Sales of unique item per order
Sales per Buyer	Total sales per unique buyer
Quantity Sold per Buyer	Total items purchased per unique buyer
Conversion Rate	Percentage of web sessions that resulted in purchases



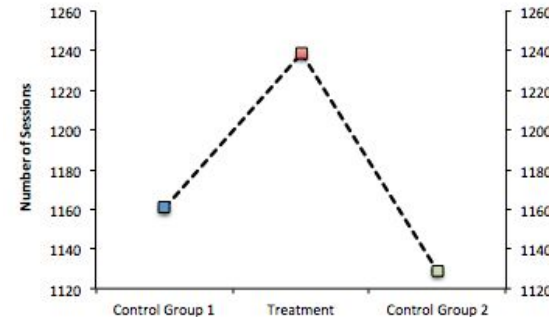
Results - Overview



Note: Prices during treatment week are \$5.59, \$6.99, \$7.99, \$9.59 and \$15.99, respectively. Source: Etsy

Measure	C1	T	C2
Total Sales	325.71	452.95	162.81
Total Quantity	32	67	19

Number of Sessions



Source: Etsy and Google Analytics

Results - Outcome Table

Measure	Pre-treatment Week (Control 1)	Treatment Week (Treatment)	Post-treatment Week (Control 2)	T-C1 pvalue	T-C2 pvalue
Sales per Order	14.81	23.84	11.63	0.28	0.27
Sales per Unique Item per Order	10.18	7.31	9.06	0.018	0.17
Sales per Buyer	15.51	25.16	11.63	0.42	0.32
Quantity Sold per Buyer	1.52	3.72	1.36	0.24	0.36
Conversion Rate	0.019	0.015	0.012	0.4964	0.5411

Source: Etsy and Google Analytics

Challenges

- Unable to randomize item prices for each visitor on Etsy platform
- Limits on length of time we were able to conduct the sales event and total discounts that we could apply
- Difficulties in obtaining demographics and other characteristics of all site visitors
- Summarized data available through GA as opposed to individual level data required for more clarity in data analysis



Conclusion and Future Work

- Discounts boost quantity of items sold and total value of sales
- Although the order value per buyer and order quantity per buyer increase, the change is not statistically significant
- Replicate experiment on other online retail stores with a more diversified range of products offered
- Randomly vary prices for each session
- Estimate the effect of altering the length of time for which treatment is applied



Appendix



Covariate Balance Check

Covariate	Total No. of Sessions			Wilcoxon Test Statistics	
	Control Group 1	Treatment	Control Group 2	Control Group 1 vs Treatment	Control Group 2 vs Treatment
Age (18-24)	237	210	209	0.565(0.489)	1(0.969)
Age (25-34)	216	254	217	0.105(0.217)	0.249(0.178)
Age (35-44)	82	98	43	0.949(0.527)	0.08(0.04)
Age (45-54)	12	40	39	0.263(0.243)	1(0.971)
Age (all groups)	547	602	508	0.318(0.426)	0.277(0.193)
Females	574	608	559	0.405(0.555)	0.535(0.430)
Males	125	94	81	0.247(0.201)	1(0.662)
Language	1136	1215,1214*	1099	0.924(0.371)	0.05(0.09)
Country	1133	1215,1207*	1096	0.907(0.281)	0.261(0.134)

Note: * signifies that out of two values mentioned in the cell, the first value represents the value used while comparing C1 and TR weeks and the second value represents the value used while comparing C2 and TR weeks. Source: Etsy and Google Analytics