

W204 Final Project

Effect of Political Ideology on Consumer Purchasing Behavior

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August 10, 2021

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1 Abstract

Political ideology seems to play an important role in consumer behavior. While most of the recent studies related to the intersection of political ideology and consumer behavior stems from analyzing survey and opinion data, we wanted to test the theory and see whether political attitudes translated to actual purchase and spending decisions exhibited by the consumers. The results of our experiment suggest that purchasing decisions (i.e. whether they choose to buy a product or not) is influenced by consumer’s political ideology; however we did not find any meaningful indication in the price they are willing to pay once the decision to purchase was made.

2 Background

Recent surveys¹, have demonstrated a societal shift about what is and is not acceptable for companies to endorse. It is posited that; the political identity plays a critical role in consumer decisions even when the decision may be seemingly unrelated to politics². The reasons for this likely stem from the notion that identity-congruent consumption helps an individual preserve the self by signaling to the self and to others about the importance of the identity³.

3 Research Question and Hypothesis

Is political attitude has any effect on consumer purchasing decisions? We extend on this notion of self-preserving identity, that is, if you adhere conservative ideology whether it would present itself in the consumer behavior⁴. In a recent survey conducted by Pew Research center, 83% of Republicans and those who lean to the Republican Party, say they have an unfavorable view of China. While we understand that it is difficult to isolate consumers into specific political buckets, there could be generalized that specific product like, “Trump 2024 Flags” will exclusively be bought by consumers who are right leaning or republicans

Null Hypothesis: There is no difference at number of sales and price between control and treatment groups in average.

4 Experiment Design

4.1 Experiment Overview

To test our hypothesis we set up an experiment selling Donald Trump 2024 election flags. In the experiment, the flags in control and treatment groups were identical. The item pages in control did not specify a manufacturing country and the item pages in treatment specified the flags were made in China on the item title.

We had 3 types of Trump flags (see appendix for flags images):

- Type 1: Trump Take America Back 2024 (Blue)
- Type 2: Trump Save America 2024 (Blue)
- Type 3: Trump Save America 2024 (Red)

All flags were 5ft by 3ft in dimension.

We combined type 1 and type 2 flags as blue class to setup a 2x2 multi-factorial design due to insufficient sample size:

- Blue Class: Trump Take America Back 2024 (Blue) + Trump Save America 2024 (Blue)
- Red Class: Trump Save America 2024 (Red)

Each flag then had 2 auction duration possibilities: 1 day or 3 days. All auctions had a starting price of \$2.99.

The experiment is conducted as a series of auctions on eBay. We always made sure to list two flags (of the same type) at any given time, one for control and one for treatment (made in China). After the auction ended, we launched a new set of auction pages. We measure if a flag sold, what price it sold for, and how many views the auction page received.

4.2 Project Timeline

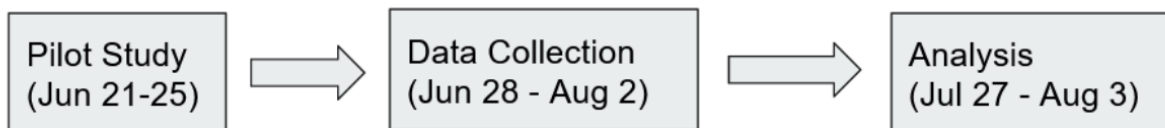


Figure 1: Time Line

The data collection process took 6 weeks to complete. Listing auction pages in sequence was a time consuming process.

4.3 Experiment Platform

For our experiment, we used eBay as the selling platform to sell our treatment and control items. We considered other platforms such as Facebook Marketplace, Etsy, and Craigslist. The reason we chose to use eBay was because eBay had a convenient auction platform. Also unlike a platform like Craigslist, eBay was not limiting listings by geography. Etsy was also a platform we spent a lot of time considering but ultimately, the cost of the flags on Etsy and its reputation as a more high-end “hippie liberal” salesplace did not align with the group of participants that would buy our flags (i.e. Trump supporters).

On eBay, there are various selling options. We can have an auction, we can simply list the item, or we can set a price at which the item will be sold immediately if someone offers to pay. We chose to hold an auction because by directly listing an item, we would not have the opportunity to see the range of prices that customers are willing to pay. And if we had chosen to set a “buy price” then we would be capping what customers are willing to spend. Therefore, auctions seemed to be the best methodology for our experiment.

As we started running our experiment, we discovered various limitations of the eBay platform we were not aware of. For example, the one day auction duration is only available to existing sellers who had already made sales on eBay. Also, one user cannot post the same item for an auction for two different durations. Similarly, one of our researchers did not have an eBay account so whenever they created an eBay account to sell Trump flags, they would be reported and the account was suspended. These were both hurdles we did not expect but we still managed to complete our experiment; albeit not as well planned as before.

4.4 Randomization

Our randomization was based on the fact we were selling on a publicly available marketplace such as eBay. However, we were limited by the eBay algorithm and cannot speak much for how that algorithm recommends items to potential buyers. We ensured that we listed both the control and treatment at the same time.

4.5 Pilot Test

The pilot test was extremely helpful to understand the roadblocks that was not anticipated. Initially, we had auction duration to be 3 days and 5 days. In our pilot test, we found out that eBay considered two item pages, which only differs in duration, to be the same item. eBay would only make one of the two to be visible to buyers, which means running 5 days auction in sequence would take too long. We also ran into a situation that eBay terminated all new accounts we created to run the experiments. We could only use two personal accounts that we had used in many years. Therefore we decided to change 5 days to 1 day auction in order to have enough sample size.

The pilot test also helped determine that an optimal price point for Trump flags was \$2.99. We did not want to price the flags too high (so they wouldn't sell) or too low (that they would always sell). Some of the pilot data was also used in our analysis.

4.6 Observations and Outcome Measures

The main observations that we measured were

- Did a flag sell? (sold indicator)
- What was the highest bid price?
- How many views did each flag listing get?

Out of the above measures, we decided to use the sold indicator as the primary outcome measurement and price as the secondary measurement. Through data exploration, we realized the 1 day auctions had a big impact on the price measurement, therefore the sold indicator was a more desirable outcome to use. Details were shown in the data exploration section.

The page views was highly influenced by the algorithm, therefore we decided to not use it for inference.

5 Data Exploration

For each item listed, we collected page views, number of bids, sale price and every bids received. In this section we want to gain some overall understanding of this experiment from the data we collected.

5.1 Items Data

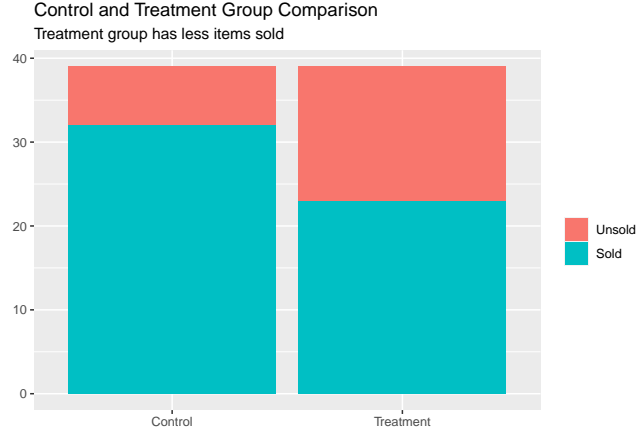
We listed total of 78 auctions, in which half is in treatment group with "Made In China" listed on the title. Total of 23 items didn't receive any bid, which accounts for 42% of total items listed. Treatment group has more unsold items than control group. Detailed numbers are summarized in the table below.

Table 1: Number of Items in Groups

Group	Number of Unsold	Number of Listed	Percent Unsold (%)
Treatment	16	39	41.02564
Control	7	39	17.94872

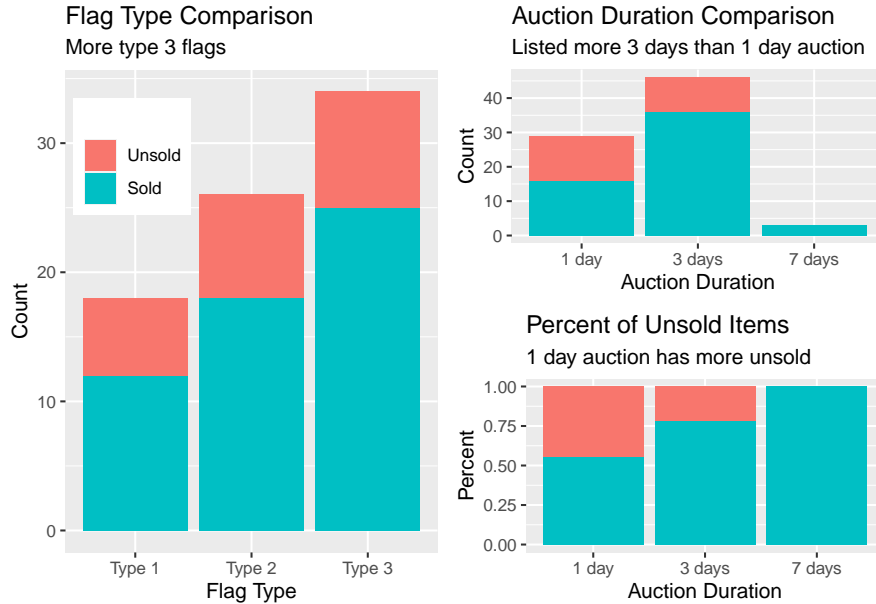
5.1.1 Sold Indicator Outcome Variable

The primary outcome variable we focused on is the sold indicator. Control group has 32 unsold items, which accounts for 20.5%, and treatment group has 23 unsold items, which accounts for 14.7%. The treatment effectively decreased sales by 5.8% when comparing the two groups.



We used 3 types of flags in this experiment. Type 1, type 2 and type 3 was listed 18, 26 and 34 times respectively. Type 1 flag didn't have enough sample size, therefore in the analysis we combine type 1 and type 2 flags together for factorial design. As illustrated below, flag types didn't seem to be a factor to affect sales.

We designed the experiment to be 1 day and 3 days auctions. During the process of the experimentation, we started to realize 1 day auction might be harder to sell compare to 3 days auctions. Therefore we intentionally launched more 3 days auction. The plot below showed that 44.8% unsold in 1 day auction and 21.7% unsold in 3 days auction.

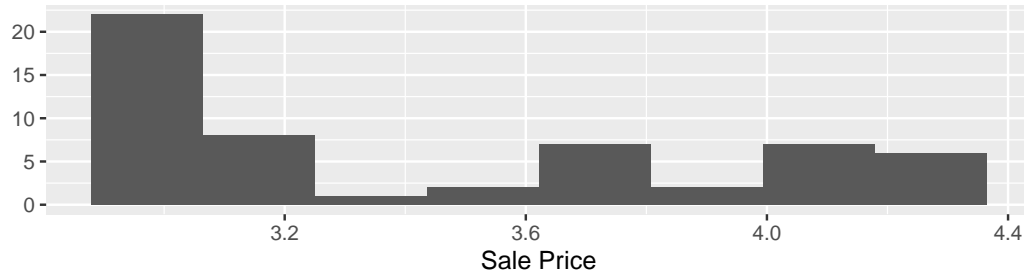


5.1.2 Sale Price

The secondary outcome variable we were interested was sale price. Among all the sold items, the mean of sale price is 3.45 dollars and the standard deviation is 0.48. The price distribution is right skewed with majority of sale price at around 3 dollars. Considering auctions started at \$2.99, it means most items were sold without much bidding competition. By looking at the plot of 1 day auction price, we observed that most of the items sold around starting price came from the 1 day auction. In fact, the price in 1 day auctions had much smaller variation when compare to 3 days auction. Therefore we concluded that the 1 day auction doesn't provide as clean measurement on price.

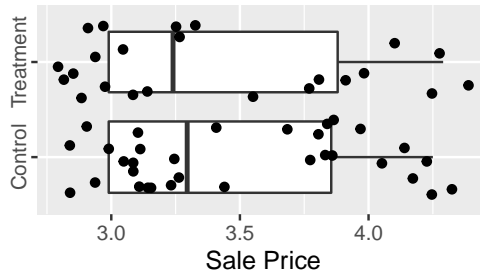
Price Distribution

Not normally distributed. Many sold at starting price.



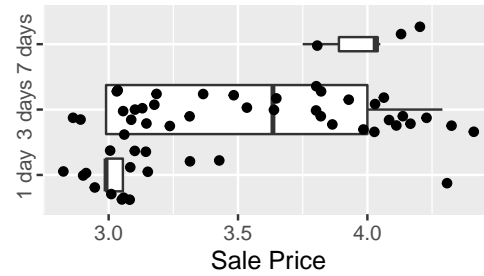
Compare Durations

Treatment group sold at lower price



Compare Treatment and Control

1 day auction price has less variation



Other measurements we collected, including number of bids and page views, were highly correlated with sale price. The covariance matrix plot of these measurements could be found in the appendix.

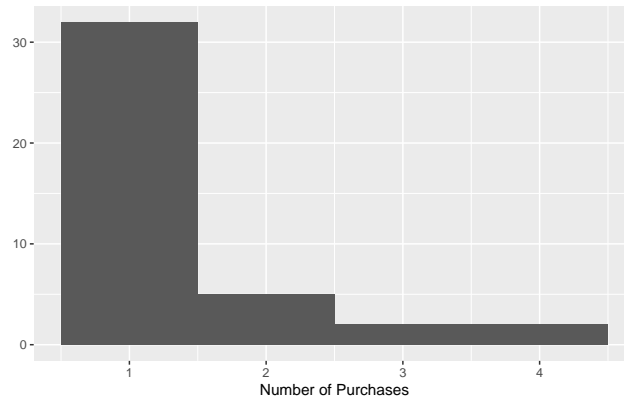
5.2 Bidders Data

In this experiment, we had received total of 119 bids from 60 bidders. There were 41 people winning 55 sold items.

As illustrated below, most of items were purchased by different people. There were 9 people who bought flags more than once and they also purchased both control and treatment. This is a desirable result, because if few people made up most of the purchases, the experiment would be highly biased to reflect the choice of those people. The 6 weeks of data collecting process helped to minimize the amount of active buyers. If we had ran the experiment in a short period time, someone who had large demand at the time might keep purchasing our product, because the price we listed was significantly lower than other sellers.

Auction Winner Distribution

Majority of items are purchased by different people



6 Analysis

6.1 Regress Sold on Treatment

We used sold indicator as outcome variable to perform three regressions as shown below. We used only treatment in first regression and duration and flag type as covariates in second regression. The third regression added interaction term of treatment and flag types.

```
##
## Regression Table 1: Regress sold on treatment
## =====
##                                     Dependent variable:
## -----
##                                     Sold
##                                     (2)
## (1)                                     (3)
## -----
## Treatment                        -0.231*      -0.246*      -0.222
##                                (0.103)      (0.101)      (0.241)
##
## Duration                        0.096**      0.096**
##                                (0.032)      (0.033)
##
## Red Flag                        0.040          0.056
##                                (0.127)      (0.163)
##
## Interaction: Treatment:Red Flag      -0.030
##                                (0.265)
##
## Intercept                       0.821***      0.566***      0.554**
##                                (0.063)      (0.159)      (0.184)
## -----
## Observations                     78          78          78
## Adjusted R2                      0.052        0.109        0.097
## Residual Std. Error      0.447 (df = 76)    0.433 (df = 74)    0.436 (df = 73)
## F Statistic              5.199* (df = 1; 76)  4.127** (df = 3; 74)  3.058* (df = 4; 73)
## =====
## Note:                                *p<0.05; **p<0.01; ***p<0.001
```

The ATE was -0.246, which means by adding the “Made in China” phrase to sale page title would decrease sales by 24.6%. The robust standard error was 0.101 and the 95% confidence interval was [-0.444, -0.048]. The ATE was statistically significant.

After adding covariates, the ATE didn’t change much. It verifies that launching control and treatment at the same time ensures apples-to-apples comparison. After adding the interaction term, the coefficient of ‘Treatment’ became the ATE of blue flags, which was statistically insignificant. We didn’t observe any significant interaction effect either. The reason might be not having large enough sample size for each subgroup. Each of the four subgroup only had less than 20 subjects in average.

The other thing to notice is that the adjusted R^2 was very low. This indicated that there were many unobserved confounders in this experiment. In fact, eBay algorithm played an important role to determine the sales of the item. Many unobserved confounders might be related to the algorithm.

6.2 Sale Price Analysis

Because the sale price was not normally distributed, we used the Wilcoxon Rank Sum test for analysis. The two sided analysis had a p-value of 0.0306225, which is statistically significant.

```
##
## Wilcoxon rank sum test with continuity correction
##
## data: highest_bid by treatment
## W = 972, p-value = 0.03062
## alternative hypothesis: true location shift is not equal to 0
```

7 Conclusions

As we observed in the analysis section, both tests were statistically significant. Therefore we rejected the null hypothesis. Considering the small sample size, the causal effect was quite strong.

The experiment we conducted provided a starting framework to pave the way for further research into the area of political ideology playing a role in the consumer decision making process. The study indicated that aggregate demand for a product was less, i.e. consumers would be buying less of the product if they have certain characteristics which are not aligned with their political ideology.

The analysis of price showed significance too, but it might be because there were simply more unsold items in the treatment group. In order to have a concrete result on the treatment effect on price, it might be more desirable to re-run the experiment with longer auction duration.

8 Limitations and Future Enhancements

There are several limitations to the study that would possibly be detrimental if we were to infer a generalized causal relationship that we are investigating.

To start with we have only looked at one side of the political spectrum and a similar effect may or may not exist on the other side of the aisle (left leaning). Khan et al. (2013) show that conservatives prefer national over generic brands due to aversion to risk and ambiguity⁵. In addition, the causal relationship of the treatment effect may only be applicable to a narrow set of the population with only very strong political conviction. This could be mitigated or improved by running experiments that measure not only both sides of the political spectrum but also with consumers who do not have any political tilt.

Given we have used only one product (albeit slight variation in the product characteristic) it might only be applicable to only certain types of product. In addition, we did not have any significant measure of the price elasticity of the product itself and conducted the experiment using a relatively cheap product which also may not be present or applicable when they are priced higher. Hence this limitation would be better conducted by using a wider range of price-product combinations.

There were also some limitations based on the platform of choice eBay. Although we listed both the control and treatment at the same time, we did not have any insight into ebay's algorithm in terms of how they assign visibility of the listing (i.e. control and treatment). While it is not a stretch to assume the algorithm is unbiased, however we do not have clarity of the process. In addition eBay allows the consumer to see 'other products listed by the 'same seller'. This might have caused unintended consequences if the buyer became aware of the similarity in the product by the same seller (us) and behaved differently based on the understanding that we are running an experiment. These constraints can be mitigated by using multiple channels (other selling platforms) and creating multiple seller accounts to account for any interference that might be inherent in the platform itself.

9 Appendix

9.1 Data

Table 2: Item Data

item_number	page_view	duration	flag_type	treatment	sold	num_bids	highest_bid
184871234654	63	3	1	1	1	3	3.76
184871243405	51	3	1	0	1	5	4.00
184896578337	14	3	2	1	0	0	0.00
184896586155	84	3	2	0	1	1	2.99
184902396418	18	1	1	1	1	1	2.99
184902398380	31	1	1	0	1	2	3.25
184904048577	64	3	3	0	1	4	4.25
184904048618	36	3	3	1	1	2	3.25
184912768657	34	1	3	0	0	0	0.00
184912768678	8	1	3	1	0	0	0.00
184914292964	87	3	3	0	1	1	2.99
184914293606	33	3	3	1	1	2	3.24
184936772463	23	1	3	0	1	3	4.25
184936772496	16	1	3	1	1	2	3.25
184939321212	12	1	3	1	0	0	0.00
184939321231	22	1	3	0	1	1	2.99
184941398273	21	1	1	1	0	0	0.00
184941399277	16	1	1	0	0	0	0.00
184943519308	66	7	1	1	1	3	4.03
184943521426	52	7	1	0	1	3	3.75
184945583877	23	1	3	0	1	1	2.99
184945583938	3	1	3	1	0	0	0.00
184953409300	12	1	2	1	1	1	2.99
184953411092	27	1	2	0	1	1	2.99
184955728815	22	1	2	0	1	1	3.25
184957582693	83	7	2	1	1	5	4.05
184962313381	32	1	1	0	1	1	2.99
184962314316	25	1	1	1	1	1	2.99
184970848406	17	1	1	0	0	0	0.00
184970848418	4	1	1	1	0	0	0.00
184970848494	16	1	3	0	1	1	2.99
184970848517	3	1	3	1	0	0	0.00
184970848538	11	1	2	0	0	0	0.00
184970848621	8	1	2	1	0	0	0.00
184970881519	43	3	1	0	1	4	3.84
184970881708	11	3	1	1	0	0	0.00
184970881884	32	3	3	0	1	3	4.25
184970881984	13	3	3	1	1	1	2.99
184970882049	35	3	2	0	1	2	3.34
184970882112	28	3	2	1	1	4	4.09
294232221758	9	3	2	1	0	0	0.00
294232222075	58	3	2	0	1	3	3.90
294232225893	5	3	2	1	0	0	0.00
294232226237	23	3	2	0	0	0	0.00
294242970874	30	3	3	1	1	1	2.99
294242970929	25	3	3	0	1	2	3.52
294250987465	42	3	3	0	1	2	3.24

item_number	page_view	duration	flag_type	treatment	sold	num_bids	highest_bid
294250987659	20	3	3	1	1	1	2.99
294252411444	63	3	3	0	1	3	3.76
294252411478	43	3	3	1	1	3	3.75
294255922008	44	3	3	0	1	4	3.78
294255923504	62	3	3	1	1	3	4.29
294266694710	60	3	3	0	1	2	3.25
294266695130	17	3	3	1	1	3	4.25
294269647104	47	3	3	0	1	3	4.13
294269647169	16	3	3	1	0	0	0.00
294275251007	21	3	2	1	1	1	2.99
294275255011	34	3	2	0	1	1	2.99
294277434818	40	3	3	0	1	3	4.00
294277434838	20	3	3	1	1	4	4.00
294283087941	16	3	2	1	1	1	2.99
294283094243	18	3	2	0	1	4	4.25
294289526403	24	3	2	1	0	0	0.00
294289528699	48	3	2	0	1	2	3.51
294297026183	38	3	2	0	1	2	3.24
294297027558	21	3	2	1	1	1	2.99
294302944825	36	3	2	1	1	4	3.75
294302945090	8	3	2	0	0	0	0.00
294302945114	8	3	3	0	1	1	2.99
294302945135	4	3	3	1	0	0	0.00
294302951523	10	3	1	1	0	0	0.00
294302951549	41	3	1	0	1	2	3.75
294302966248	23	1	1	0	1	1	2.99
294302966316	9	1	1	1	1	1	2.99
294302966389	12	1	3	0	0	0	0.00
294302966415	3	1	3	1	0	0	0.00
294302966453	15	1	2	0	1	1	2.99
294302966485	5	1	2	1	1	1	2.99

Table 3: Bidders Data

item_number	customer_id	offer
294232222075	swangin68	3.90
294232222075	afia224	3.65
294232222075	swangin68	3.00
184904048618	charaly-308	3.00
184904048618	nanticokecottageantiques	3.25
184904048577	nanticokecottageantiques	3.00
184904048577	mathis1945	3.75
184904048577	charaly-308	4.00
184904048577	mathis1945	4.25
294242970929	paulxx	3.27
294242970929	klangr	3.52
294242970874	mathis1945	2.99
294250987465	rue_hunter	2.99
294250987465	davek218	3.24
294250987659	mathis1945	2.99
184914293606	steveonlythebest	2.99

item_number	customer_id	offer
184914293606	deanntucke	3.24
184914292964	steveonlythebest	2.99
294252411478	flash44light	3.26
294252411478	mathis1945	3.50
294252411478	flash44light	3.75
294252411444	rravenn2	2.99
294252411444	flash44light	3.51
294252411444	rravenn2	3.76
294255922008	donkarosa	3.00
294255922008	22stone12	3.29
294255922008	donkarosa	3.53
294255922008	22stone12	3.78
294255923504	steveonlythebest	2.99
294255923504	fastone77	4.04
294255923504	nolffliz	4.29
294266694710	olddogscott	3.00
294266694710	hmcm2911	3.25
294266695130	towncar_lady	3.89
294266695130	meltric	4.00
294266695130	towncar_lady	4.25
184936772463	towncar_lady	3.88
184936772463	meltric	4.00
184936772463	towncar_lady	4.25
184936772496	flash44light	3.00
184936772496	towncar_lady	3.25
184939321231	confed-92	2.99
294269647104	lovemyhubba8	3.50
294269647104	pepperbellyscrapbooking	3.88
294269647104	lovemyhubba8	4.13
184945583877	mathis1945	2.99
294275251007	st5300	2.99
294275255011	st5300	2.99
294277434818	mathis1945	3.00
294277434818	talonanderson	4.00
294277434818	st5300	4.00
294277434838	st5300	3.00
294277434838	jaymatt1157	3.24
294277434838	bmn12360	3.76
294277434838	st5300	4.00
294283087941	keith harms	2.99
294283094243	jetsn-31	4.25
294297026183	buddhaboyy67	3.24
294297027558	ntaddy	2.99
294289528699	raine9dreamer	3.51
184871234654	grriata	3.20
184871234654	danelliott65	3.51
184871234654	donnihallma0	3.76
184871243405	donnihallma0	4.00
184871243405	danelliott65	3.75
184871243405	grriata	3.50
184871243405	danelliott65	3.50
184871243405	bmn12360	3.00

item_number	customer_id	offer
184902396418	afia224	2.99
184902398380	baby-pigs	3.25
184902398380	afia224	3.05
184943519308	whatcharacter	4.03
184943519308	us.cochr	4.00
184943519308	strput48	2.99
184943521426	theheadnodder1	3.75
184943521426	st5300	3.50
184943521426	normy1955	3.00
184962313381	barwillidanie	2.99
184962314316	renknight	2.99
184953409300	jeanneangerstien	2.99
184953411092	jetsn-31	2.99
184955728815	us.cochr	3.25
184957582693	cocacolachristmas	4.05
184957582693	jeanneseverything	4.00
184957582693	gracefellowship	3.50
184957582693	jeffreyh911	3.33
184957582693	gracefellowship2	2.99
294297026183	barwillidanie	2.99
294289528699	mover	3.26
294283094243	us.cochr	4.00
294283094243	jetsn-31	4.00
294283094243	jetsn-31	3.00
184970848494	makawee09	2.99
294302951549	tonygk	3.50
294302951549	markhayesinc	3.75
294302945114	tonygk	2.99
294302944825	kristnewso	3.00
294302944825	kristnewso	3.50
294302944825	nancy197111	3.50
294302944825	kristnewso	3.75
184970882112	trishz	3.09
184970882112	nancy197111	3.59
184970882112	22stone12	4.00
184970882112	nancy197111	4.09
184970882049	trishz	3.09
184970882049	22stone12	3.34
184970881984	barwillidanie	2.99
184970881884	darad-8595	3.00
184970881884	22stone12	4.00
184970881884	darad-8595	4.25
184970881519	trishz	3.09
184970881519	nancy197111	3.50
184970881519	horsepower-junkie!	3.59
184970881519	nancy197111	3.84
184896586155	jcbskb	2.99
294302966485	barwillidanie	2.99
294302966453	bmn12360	2.99
294302966316	horsepower-junkie!	2.99
294302966248	horsepower-junkie!	2.99

9.2 Flags

Type 1



Figure 2: Type 1

9.3 Other Measurements

Relationship of number of bids, price, page views.

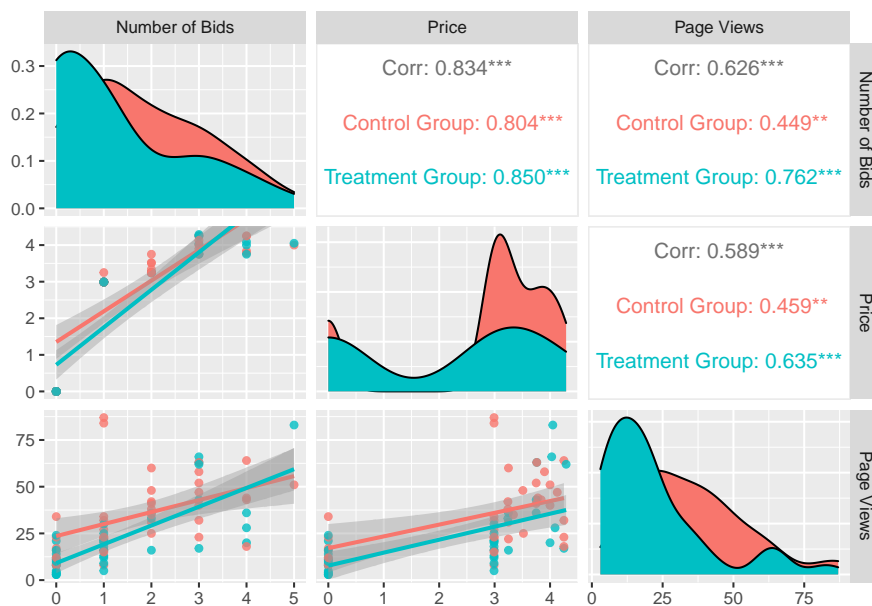




Figure 3: Type 2



Figure 4: Type 3

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5. Ideology and brand consumption. *Psychological Science* **24**, 326–333 (2013).