ONLINE ADVERTISING EXPERIMENT

RELEVANT JMP PLATFORMS AND STATISTICAL TECHNIQUES
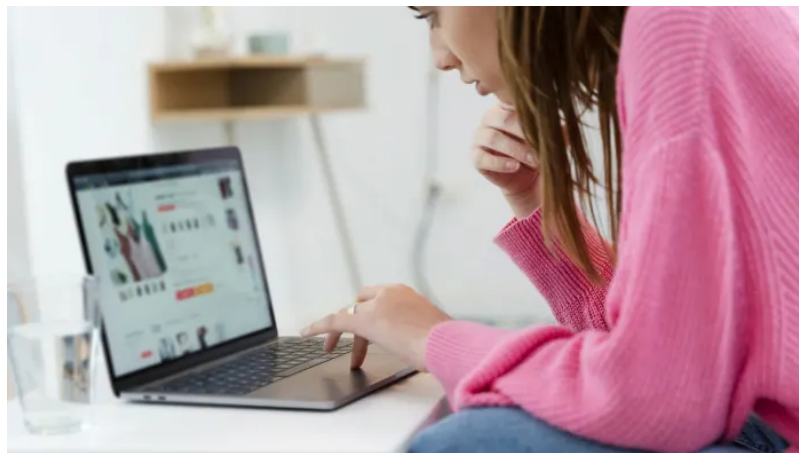
Graph Builder : Comparative Dotplots and Boxplots.

Fit Y by X : ANOVA

Fit Model : Multifactor ANOVA

PROBLEM STATEMENT

An online clothing retailer is interesed in studying the effect that different advertising styles and promotional offers have on consumers' engagement.

An experiment was designed to test the performance of 4 different styles of an advertistment for a casual wear line. These 4 advertisement styles varied design elements such as imagery, messaging, and ad copy. These will be referred to simply as Ad 1, Ad 2, Ad 3, and Ad 4. In. addition, 3 different promotional offers were varied in the expriment.

Promo 1: Receive a one time credit of $40 to use in a separate future purchase within the next 60 days when the total amount for the current purchase exceeds $150.

Promo 2: Receive a one time credit of $50 to use in a separate future purchase within the next 30 days when the total amount for the current purchase exceeds $150.

Promo 3: Receive 30% off on current purchase of $150 or more.

Each possible combination of the 4 Advertisement styles and 3 Promotional offers was studied resulting in 4 x 3 = 12 treatment combinations. The experiment was conducted by displaying one of the 12 different ad/promo combinations each day across June and July (61 days) on 20 different life style and leisure website properties. The "click-through-rate" (CTR) per thousand ad impressions for each day was observed. The table below displays how many times each of the 12 ad/promo combinations were shown for each day of the week.

Ad Style	Promotion	Day of Week							TOTAL
		Sun	Mon	Tues	Wed	Thurs	Fri	Sat	
Ad 1	Promo 1	1	1	1	0	0	2	0	5
	Promo 2	0	2	1	0	2	0	0	5
	Promo 3	1	0	0	2	1	0	2	6
Ad 2	Promo 1	3	0	0	0	0	2	0	5
	Promo 2	0	0	0	0	1	0	3	4
	Promo 3	1	1	0	2	0	0	0	4
Ad 3	Promo 1	1	2	0	1	0	0	2	6
	Promo 2	0	0	1	0	0	3	2	6
	Promo 3	0	2	2	0	0	0	0	4
Ad 4	Promo 1	0	0	1	1	2	1	0	5
	Promo 2	0	0	0	3	1	1	0	5
	Promo 3	1	0	3	0	2	0	0	6
TOTAL	All	8	8	9	9	9	9	9	61

DATA SET

Online_Advertising_Experiment.jmp

Date	Date advertisement was shown (June 1, … , July 31)
Day of Week	Day of the week advertisement was shown (Sun, … , Sat)
Ad Style	One of four different design styles of the advertisement
Promotion	One of three different promotional offers
CTR_WS1	The "click-through-rate" (per 1K impressions) on Website 1
.	
.	
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CTR_WS20	The "click-through-rate" (per 1K impressions) on Website 20

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jmp STATISTICAL DISCOVERY

EXCERCISES

1. Create some visualizations in order to compare the CTRs for the different adverstisement styles and promotional offers.
   Tip: It may be easiest to perform this and the other analyses in the excercises by first doing so with the first website variable (WS_1) and then using the Column Switcher (Redo > Column Switcher under the top red triangle) to switch that variable with all the other websites variables (WS_2 – WS_20).

   a. Which website properties have some of the highest and lowest overall CTRs?

   b. Which advertisement styles tend to perform better/worse than others across the websites?

   c. Which promotional offers tend to perform better/worse than others across the websites?

   d. Are there certain combinations of advertisement styles and promotional offers that appear to perform better/worse than others across the websites?

   e. Are there certain websites where the observed differences to the questions above stand out the most?

2. Using Analysis of Variance models (ANOVA), conduct formal inference to determine if the statistical evidence exists to support your conclusions that were based upon evaluating graphical displays of the data.

3. Are there days of the week that tend to have higher or lower CTRs across the websites and ad/promo combinations? What are some potential reasons for this?
   (hint: This may be easiest to evaluate by creating a new set of variables that are the difference between the CTRs for each day from the overall average CTR for each website).

4. What are potential reasons of why certain advertisement styles and promotional offers would perform better/worse than others for certain websites? What are some reasons of why certain websites would have higher/lower CTRs that others?

5. Provide a critique of the experimental design and how it was conducted. Do you have any recommendations for additional follow-up experiments?

COMPLIMENTARY MATERIALS

https://hbr.org/2020/10/marketers-underuse-ad-experiments-thats-a-big-mistake

https://hbr.org/2011/03/a-step-by-step-guide-to-smart-business-experiments

https://hbr.org/2017/09/the-surprising-power-of-online-experiments

https://hbr.org/2021/06/research-when-a-b-testing-doesnt-tell-you-the-whole-story

https://hbr.org/2018/11/using-experiments-to-launch-new-products

Note: These white papers published by the "Harvard Business Review" are not related to this specific problem and data. They are articles about how businesses are leveraging experimentation in marketing and advertising intiatives that may be valuable to read to provide additional context. You may be required to pay for access to these materials. Please adhere to any licensing terms and/or citation requirements for distribution and use of these white papers.