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MEASURING THE VALUE OF WEB DESIGN ELEMENTS WITH THE CONJOINT
METHOD

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April 2024

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Abstract

This study serves as a publicly available, data-backed guide for selecting the best aesthetics when designing an e-commerce website. The conjoint method was used to evaluate seven different web design elements, each with two levels, to establish some understanding of how to please online shoppers. Conjoint studies use an orthogonal array to significantly reduce the number of variable level combinations for participants to evaluate through equal weighting. Participants were asked to complete a survey in which they ranked eight websites with identical content based on aesthetic qualities. Simultaneously, a database collected the number of times users visited each page and the amount of time spent per page in the background. A linear regression model calculated the individual effects of each variable design element on participant rankings of the websites in order to identify the optimal combination of design elements. The study revealed that the design elements tested did have significant effects on website utility, and that higher utility websites induced longer browsing times. The study also revealed differences in design element utility between men and women. The results will help businesses of all sizes understand some specific steps to take that will improve their websites in the eyes of consumers and encourage business.

Introduction

Background

Businesses of all sizes in the digital age rely on the internet as an essential point of contact with customers. Websites now play an arguably more important role in attracting business than physical locations, so why are so few businesses investing in improving their online presence? Considering that the average user forms an opinion of a website in 0.05 seconds, business owners must prioritize their digital aesthetic to ensure continued success in e-commerce. In 2023, 71% of businesses had websites, 21% of business websites experienced low traffic, and sites from all industries averaged less than 5% click-through rate. A significant portion of small businesses specifically plan on improving website performance, so how can they execute (Haan, 2023)? Years ago, only people well-versed in HTML and CSS could create acceptable sites for the public, and usually for larger companies. Now, advanced online tools allow even lone entrepreneurs with no coding experience to build effective online commerce platforms, but a lack of knowledge of aesthetically pleasing design standards blocks these individuals from realizing greater potential from their online presence.

Study

While creating a subjectively beautiful website requires artistic skill, there must be simple design choices that a site owner of any experience level can make to improve their digital marketplace in the eyes of consumers. This topic has received previous attention from researchers looking at concepts as high-level as “quality” and “flow” (Hasley & Gregg, 2019). Other studies get more specific by looking at elements like “organization,” “navigation,” and “simple,” providing context for these terms using actual design choices like color, font, and

image size (Garett et al., 2016). No matter the tools used, making a website memorable aesthetically and organizationally encourages greater use (Chang et al., 2014). Due to a general lack of granularity used in finding actual drivers of positive ecommerce impressions and engagement, this study pinpoints certain aesthetic choices for website design elements that entrepreneurs or other inexperienced web designers can follow to create an online experience with the greatest value. The study also analyzes the impact of web design elements on user engagement and retention through background data collection, and whether male and female ecommerce shoppers have different utility levels for web design elements.

To define simple aesthetic rules of thumb in terms of specific website elements, seven design choices were selected based on several previous studies on the topic, and personal experience with website design and coding. Each design element had two levels, with each level representing a different aesthetic. The study used a conjoint analysis to calculate the respective part-worths of design elements, determining the effect of each on total utility of a website. Using an orthogonal array, which is a mathematical matrix, eight combinations of design elements were created to represent all possible configurations of the element levels. A website was created for each combination of elements with identical content imitating a simple online apparel store. Participants in the study completed a survey in which they ranked the eight combinations from best to worst based on opinion along with other control and demographic questions. While participants browsed sample websites, PHP code logged the number of times an individual clicked to another page on each site, and how long an individual spent on each page in seconds.

The study revealed that different levels of website design elements do have relatively generalizable effects on site utility. For engagement, the number of clicks had no clear relationship with the overall utility of a website. For retention, the amount of time spent on a

website did relate to the overall utility of the website, with one outlier. Results from calculating utility by gender showed several small differences in design element utility for men and women. While this could be explained by small sample size, some differences found have been noted in previous works.

Purpose

This thesis provides an opportunity to help others and addresses a void in website design literature. First, the results of the proposed study will assist people and organizations, especially small businesses, with creating successful websites. While these results will not give the same level of tailored feedback that a paid website analyst would, they will supply a generally applicable, publicly available, and data-backed baseline of design rules to foster improved user interaction. Considering small businesses specifically, many entrepreneurs are the sole employees of their venture and cannot support a web designer for their business (Main, 2024). Second, while searching for related works to guide the proposal process, I found a lack of specificity in the literature regarding the value of website components, design, and themes. Several papers discuss more abstract concepts that improve the user experience, while this study examines the utility of specific differences in code.

Literature Review

The first major guiding text for this thesis, “Using conjoint analysis to assess website information utility,” provided ideas that shaped the design of the survey and motivated deeper investigation into web design. Hasley’s discussion of part-worth information utility inspired the use of the conjoint method to better measure utilities of website elements. While Hasley’s approach relies on somewhat intangible and qualitative definitions of elements, this study uses two-level variables analyzed conjointly to provide a purely quantitative measurement. The concepts of “website quality” and “flow” that Hasley defines helped generate specific website design elements that affect the user experience in a meaningful way. While the text does highlight important areas that require exploration, the study overall gives very little specific actionable information (Hasley & Gregg, 2019).

The second major work, “The Influence of Culture in Website Design and Users’ Perceptions: Three Systematic Reviews,” served as a comprehensive wealth of knowledge relating to internationalization, localization, gender, and more as factors in the perception of web design. The authors provided a multitude of their own references that helped build context throughout the study (Tigre Moura et al., 2016).

The third major work, “A Literature Review: Website Design and User Engagement,” further inspired the choice of design elements by picking up where Hasley’s work left off. Garrett et al. identify tangible parts of websites to evaluate including navigation, graphical representation, and more. Each element has a definition that uses more granular web features as examples which helped the most when selecting the list of elements used in this study. While the definitions used by Garrett et al. include parts of the user experience, the seven elements in this

study relate to specific deliberate design choices in the CSS code of the website (Garett et al., 2016).

By exploring the landscape of visual and organizational website traits and their relation to user experience and fulfilment, these first three works inspired the central research hypothesis.

H1: Website design elements affecting visuals and organization have an impact on the utility a user receives when browsing a site.

The authors also imply that implementing positive changes to their respective versions of general website and design utility can help improve user retention and engagement, both vital components of success for ecommerce stores. This merits examination in conjunction with design element utility.

H2: The level of utility provided by a website affects user engagement and retention.

One of the articles previously mentioned compiled their list of design elements by analyzing the top 100 papers on website design and user engagement since 2000 (Garett et al., 2016). In addition, previous research has already shown a connection between website design fitting customer shopping needs and an enhancement in customer engagement. To be specific, the study connected how customers achieve goals (in the context of regulatory focus theory) to decisions made in the purchase intention-adoption stage (Ashraf et al., 2016). Another somewhat related work showed how a well-designed augmented reality application could inspire consumers by providing positive brand experiences through interaction (regulatory engagement theory). In turn, inspired consumers more often led to positive brand outcomes (Arghashi & Yuksel, 2022). Considering this, the study should verify whether web design affects forms of engagement in the context of aesthetic part-worth utilities.

In addition to the major guiding works, other papers helped incorporate a gender-based hypothesis into the study. In “Gender and Website Design in e-Business,” Cyr and Bonanni explore several hypotheses regarding differences between men and women in the online shopping experience. Among other things, they found that female participants appreciated use of color whereas male participants appreciated website features such as animations. Female participants also had more complaints about the organization and layout of the site than their male counterparts. This suggests some difference in the utility of design elements between genders in 2005, and although online shopper perceptions may have shifted since then, this study will consider the possibility of differences in utility by gender.

Although Cyr and Bonanni’s work best relates to the methodology of this study, researchers have also explored a connection between gender and website use with a variety of experimental methods, and concluding to varying degrees that women and men exhibit some differences in their interactions with sites and the internet in general. Garbarino and Strahilevitz demonstrate a difference between male and female online shoppers when measuring perception of negative outcomes, concern for loss of privacy, and effects of recommendations from friends (Garbarino & Strahilevitz 2004). In another paper, Cyr and Head reveal differences in website utility across both gender and cultural values simultaneously (Cyr & Head, 2013). Due to the findings of these studies, it seems acceptable to investigate the following supplementary hypothesis.

H3: The gender of participants will affect the utility of website design elements.

Methodology

To explore best practices for styling websites, the study measures user utility of the following design elements: color theme, navigation bar, font, images, spacing, buttons, and tailored mobile design. The following two-level variables represent each element: light vs dark theme, horizontal vs vertical navigation, serif vs sans serif font, small vs large images, less vs more spacing, static vs dynamic buttons, and absence vs presence of mobile design.

Variable	Level 1	Level 2
Color Theme	Light	Dark
Navigation Bar	Horizontal	Vertical
Font	Serif	Sans-Serif
Images	Small	Large
Spacing	Less	More
Buttons	Static	Dynamic
Mobile CSS	No	Yes

These elements were thought to have a significant impact on the user experience for their roles in the overall usability of websites. Synthesizing worthwhile elements began with reviewing past CSS code from UVM web design course projects and creating a list of candidate design choices for further analysis in the experiment. After drawing on past experience, candidates were then compared to aesthetic concepts used in all works referenced in this study. The paper by Garrett et al. provided the most comprehensive collection of possible design choices in their definitions of the Key Design Elements examined, which significantly helped with

picking the most relevant and granular design elements as variables (Garett et al., 2016). The article by Feldman also provided specific suggestions and greatly aided in the overall construction of the method for the study (Feldman, 2010).

To best determine the importance of each element, this study employs the conjoint method, a type of analysis that quantitatively measures the individual utility of several multi-level variables using a minimal number of combinations for participants to rank. First, variables go through an orthogonal array to determine the structures of the combinations of variables that users will rank. An orthogonal array is a table of values (in this case, ones and twos) with mathematically determined combinations of variable levels that equally weigh the occurrence of each level of each variable. This significantly reduces the number of variable combinations that participants must rank for the results to accurately reflect the relative utility of each variable level for any combination. In the case of this study, there are seven variables with two levels each, which generates eight different combinations of variable levels according to the related orthogonal array. Seven two-level variables imply 128 possible combinations ($2^7 = 2 * 2 * 2 * 2 * 2 * 2 * 2 = 128$), however the eight combinations produce the same result using equal weights, and participants save time and energy ranking far fewer combinations. The final step involves creating a statistical model that can calculate the part-worths of each variable based on respondent rankings of the eight combinations. If the model can accurately measure the effect of each variable level based on the sample of eight combinations, it can calculate rankings for the other 120 combinations and identify the optimal configuration of website elements.

Combination	Color Theme	Navigation Bar	Font	Images	Spacing	Buttons	Mobile CSS
Site 1	Light	Horizontal	Serif	Small	Less	Static	No
Site 2	Light	Horizontal	Serif	Large	More	Dynamic	Yes
Site 3	Light	Vertical	Sans Serif	Small	Less	Dynamic	Yes
Site 4	Light	Vertical	Sans Serif	Large	More	Static	No
Site 5	Dark	Horizontal	Sans Serif	Small	More	Static	Yes
Site 6	Dark	Horizontal	Sans Serif	Large	Less	Dynamic	No
Site 7	Dark	Vertical	Serif	Small	More	Dynamic	No
Site 8	Dark	Vertical	Serif	Large	Less	Static	Yes

After generating eight combinations of web element variables, respective sample websites were created. Data analysis focused on the site aesthetic rather than the actual purpose of the site, so all content must match between sites while providing both a familiar and common experience. Because of prevalence in e-commerce by purchasing frequency and market revenue, the websites contain content for a mock online apparel marketplace (Mailchimp, 2022). The structure of each site is the same: a home page, men's clothing, women's clothing, and a newsletter signup. The eight sample sites were accessible through a central page that contained only labelled links with no styling to avoid skewing results.

The study used an online survey hosted on Qualtrics through UVM. The survey began by asking the participant to examine each of the eight websites via a provided link on their computer and phone, and then rank the sites from best to worst based on personal preference. This question generates data for calculating utility of variable levels using the conjoint method. After this, participants had an opportunity to openly write anything they liked or did not like about the websites. These responses may give some valuable individual context to analyze for each participant. Next, participants answered multiple choice questions about each design element, stating which level of the variable they preferred. These questions provide checks to measure how closely participant responses matched their actual opinions when ranking the sites in the first question. Finally, participants responded to a series of demographic questions, including age, gender, academic college at UVM, and favorite color. These questions provide characteristics that could affect responses to previous questions, and it should be measured to what degree this occurs.

The study also gathered background usage data. While participants viewed the series of sites as they filled out the survey, data was collected on their interactions with each site and page. The websites were hosted on the UVM internal network and used PHP code to record the number of times a participant clicked to different pages on each site, and the time spent on each page on each site in seconds. The study captured these metrics to cross-reference the most successful websites with participant interaction as a way of evaluating the second hypothesis, H2. The code stored metrics in an SQL database on the UVM WebDB platform.

Any UVM student could participate in the study by receiving the link to the survey. Participants primarily received the link through printed flyers with QR codes, campus newsletters, and word of mouth.

Rankings from survey responses were compiled in SPSS statistical software to run an aggregate linear regression and measure the part-worths of different design elements. Dummy variables used a 1 or 0 to represent whether the combination contained the variable level. SPSS also required a reference bundle, or test case, to calculate part-worths based on. The regression used the Site 1 combination of variable levels as a reference bundle, which assumes the part-worths of the variable levels in that combination equal zero. The regression took in the reversed ranks for each site as the dependent variable, with the dummy variables not found in the reference bundle as the independent variables. SPSS then calculated the part-worths of the independent variables, or the numeric effect on site rank caused by each variable level not found in the reference bundle. The results of the regression directly answer the first hypothesis, H1. After establishing design element utilities based on the entire data set, two more regressions in SPSS divided by gender output the design element utilities for men and women separately to test the third hypothesis, H3.

To summarize, participants responded to survey questions asking them to rank sample websites and provide other information. While viewing sample websites, usage data was collected in the background. The study implemented a linear regression of website rankings to test H1 and linear regressions of rankings separated by gender to test H3. H2 was tested by aggregating background data and comparing to utilities from the first linear regression.

Results

Evaluating H1

Results of the linear regression of rankings revealed the actual effects of variable levels on the rank of any site. Values in the graph of part-worths correspond to the variable levels not found in the reference bundle, Site 1. Out of all design elements, respondents had the strongest preference for horizontal navigation over vertical. Respondents also preferred serif font, large images, less blank space, and adjustments for mobile users. Respondents slightly preferred a light theme, and the responsiveness of buttons had virtually no effect on rank. These values reveal the optimal website and help predict its average rank. The optimal website has a light theme, horizontal navigation, serif font, large images, less blank space, dynamic buttons, and custom mobile design. The results for design element utility support H1.

Evaluating the Model and Participants

The box plot of site rankings shows the entire distribution of ranks for each site, while the bar chart of average ranks aggregates the same data. The box plot of all rankings shows relatively clear preferences for Site 1 and Site 2 as well as overall distaste for Site 4 and Site 7 due to combined effects of favorable and unfavorable variable levels, respectively. The model has done a very good job of measuring the effects of variable levels as shown by the bar chart of predicted average ranks. Note that the second bar chart used a constant of roughly 5.68, which is also the average rank of the reference bundle, and the part-worths calculated by the model to predict the same aggregate statistic.

The side-by-side bar chart shows which variable level respondents stated they preferred when directly asked. Ignoring two exceptions, respondents were able to identify their own

preferences relatively accurately for variables like Vertical vs Horizontal and Large vs Small. For Dynamic vs Static buttons, every single respondent stated they preferred buttons that responded to user interaction, yet the model revealed this design element to have no noticeable impact on rank whatsoever. For Mobile vs No Mobile custom design, nearly every user stated a preference for tailored mobile viewing. While the model supports this preference, it also shows respondents may have overstated their preference compared to other design elements.

Evaluating H2

The final two bar charts visualize background data collected on respondents viewing the eight websites. The metrics on respondent site usage showed little connection to the ranking of sites. The slight downward trend in the number of clicks per site could be attributed to order of viewing. Users began by looking at Site 1, and as they became more familiar with the content and layout of the sites they felt less need to interact. The results of the time aggregation follow the overall rankings of sites, which suggest a link between time spent and site utility. The results of background data analysis support the retention part of H2.

Evaluating H3

For the linear regressions by gender, only one respondent selected “Non-binary/Other,” so this response was not included. Utility results for men and women shown in the bar charts generally had the same outcome but demonstrated several small differences. The utility of design elements by gender revealed a few interesting differences, the most notable being a preference for static buttons in women and dynamic buttons in men. Women also preferred sites with mobile design more than men, while men disliked websites with a dark theme and more spacing more than women. Based on the literature review, the difference in preference for theme color and

interactive buttons seems most important. In a previous study, male participants looking at sample websites showed greater satisfaction with sites that used animations and interactivity, with some participants also stating this in interviews. In that same study, female participants showed greater satisfaction with sites that used more than just standard light colors or a white background and stated this in interviews (Cyr & Bonanni, 2005). To some degree, the results support H3.

Limitations

One factor that limited the results of the survey was the method of hosting websites. Pages were uploaded to the University of Vermont's internal server, and the collection of usage data relied on an internal database. This meant that only students and faculty of UVM could access the websites using their provided university accounts. As noted by Tigre Moura et al., the culture of users plays a significant role in their perception of the site, so greater cultural diversity in the pool of respondents would likely yield results with greater overall accuracy. However, a website cannot be easily adapted to cater to several cultures at once to produce the desired benefits for all users. Instead, localized surveys such as this one give researchers insights into best practice for designing a website used in a specific geography, or by a specific culture (Tigre Moura et al., 2016).

Another potential problem stems from participants not reading directions. Participants received clear instructions to look at the websites on both a computer and a phone, and to exit the websites using buttons visible at the top and bottom of the webpage. First, using two devices affects rankings because some sites have poor optimization for smaller screen sizes. Second, study participants were instructed to exit websites via one of two clearly marked links, otherwise the time they had spent on the current page would not be logged. Due to the potential for

participants to have not followed this instruction, metrics on time spent may not be entirely accurate. Errors in recording times may also be uniform throughout, minimizing impact.

Additionally, the results of this study may not apply to other kinds of e-commerce. The study used an online clothing store because of the prevalence of apparel in e-commerce, and because it provided the most likely environment that all study participants were familiar with.

An important consideration must be made to understand the differences in data collection between the survey and the background usage collection. The survey that respondents filled out did not allow incomplete submissions so that all responses would provide maximum usability for analysis. However, the database collecting website user data on an individual basis logged four more respondents than there were survey submissions. This shows that four people started but neglected to complete the survey after having looked at each of the test websites. To enable individualized data collection, the database collected UVM NetID as a direct identifier. This feature would not help remove records of individuals who did not submit a response to the survey because the Qualtrics survey kept respondents anonymous.

Discussion

Final Analysis and Takeaways

The predicted average rank of this hypothetical site, roughly 6.84, demonstrates an important concept. Web designers clearly cannot make a site perfect in every way, and one size does not fit all for aesthetics. 6.84 falls short of a maximum of 8 because of variation in taste between users, and this effect may even amplify at larger scales. However, the variable level part-worths also demonstrate that several individual design elements do affect the perception of a website, and that combining favorable design elements can significantly improve the perception of a website.

While website utility may not have had a significant impact on the number of page views generated, websites with higher utilities did appear to make participants spend greater amounts of time browsing. Improving user retention and increasing browsing times gives life to ecommerce websites for two reasons. First, users spending more time learning about products through browsing will more likely make a purchase than users who quickly glance at products and move on. Second, as the amount of time spent browsing increases, users are more likely to make impulsive or otherwise unplanned purchases that represent sales an online vendor would not have made otherwise (Xia, 2010). Additionally, aesthetically pleasing websites generate higher rates of impulse purchases on their own, so raising utility and retention has a significant combined effect (Liu et al., 2013). Those in ecommerce should seek to maximize their site utility because it represents an increase in sales.

Finally, the study revealed possible opportunities for improving website utility for both men and women. As the most noticeable example, men had greater preference for sites that used

interactive design features like animations on buttons, and women had less distaste for sites that used colors effectively like a non-white background. Business owners should look for aesthetic combinations like these design elements to upgrade their website because they are not mutually exclusive. Simultaneous improvements for different user demographics raise the utility for the entire customer base.

Future Research

One significant opportunity for a future study involves finding a method to accurately measure any difference in overall website utility due to the combined effects of multiple design elements. In retrospect, the implementation of the seven design elements did not account for interaction between multiple elements having a different or amplified effect on participant utility. For example, the “Vertical” level of the navigation variable used a centered column of links to other pages on the site at the top of every page. When paired with the “More” level of the spacing variable, vertical navigation took up a massive portion of each page, forcing participants to scroll more and detract from the content. This may explain why both vertical navigation and more spacing had the strongest negative effects on participant utility. The study did not have controls to explicitly separate the effects of variables primarily because every web design choice alters the entire user experience inherently. Although the data offers little information, the interaction between web design elements certainly deserves further exploration in future research. At least one past study has used a method similar to conjoint analysis for websites called multivariate landing page optimization. While this approach has the potential to capture some amount of combined design element effect on utility, it has only been applied to a single page per website and only includes landing page conversion rate as a measure of participant

engagement and retention (Gofman et al., 2009). Combining the broader scope of this study with a slightly more advanced analytical method could produce more informative results.

The study design has more opportunities for improvement. Looking back on participant answers to the multiple choice questions asking for variable level preferences, the question design did not cover the full scope of opinions. As previously stated, conjoint studies excel at measuring whether a variable level had a positive, negative, or insignificant effect on participant utility. If multiple choice preference questions included a third option for participants to state their indifference over a particular design element, maybe unconscious part-worth utilities compared to conscious answers would look significantly different.

As a final thought for future improvements, consider participant segmentation in the sense of marketing. Companies will often group their customers based on tastes, buying patterns, and other factors to target their marketing efforts more effectively (Kansal et al., 2018). If a future study grouped participants by website taste and various utility levels using k means clustering or some other statistical method, website designers could tailor design elements for the user segments they expect to interact with their websites most frequently. Online shoppers have already been segmented based on their motivations for using different ecommerce platforms with significant results, so applying this thinking to design element utility has potential (Prashar et al., 2016).

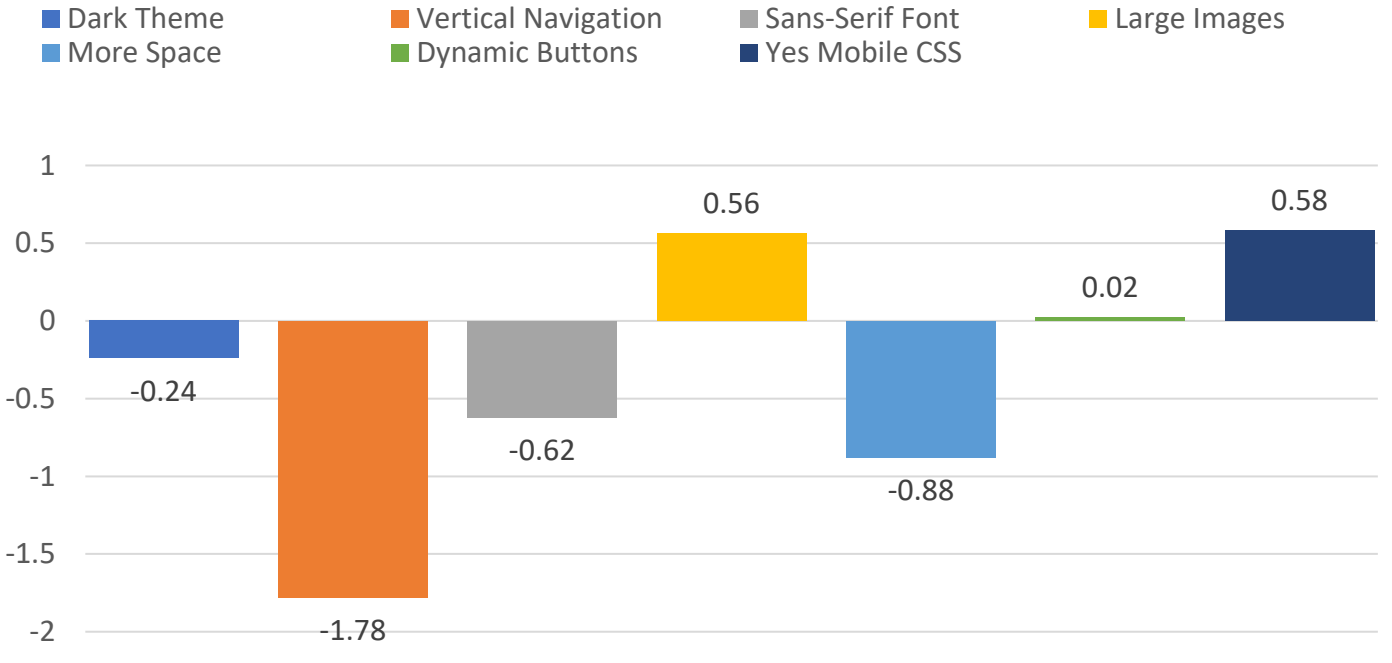
Conclusion

In summary, the study revealed three important observations. First, different aesthetic choices for web design elements have different levels of utility for website users. This means that a generally optimal website design exists, and small business owners can now achieve it more

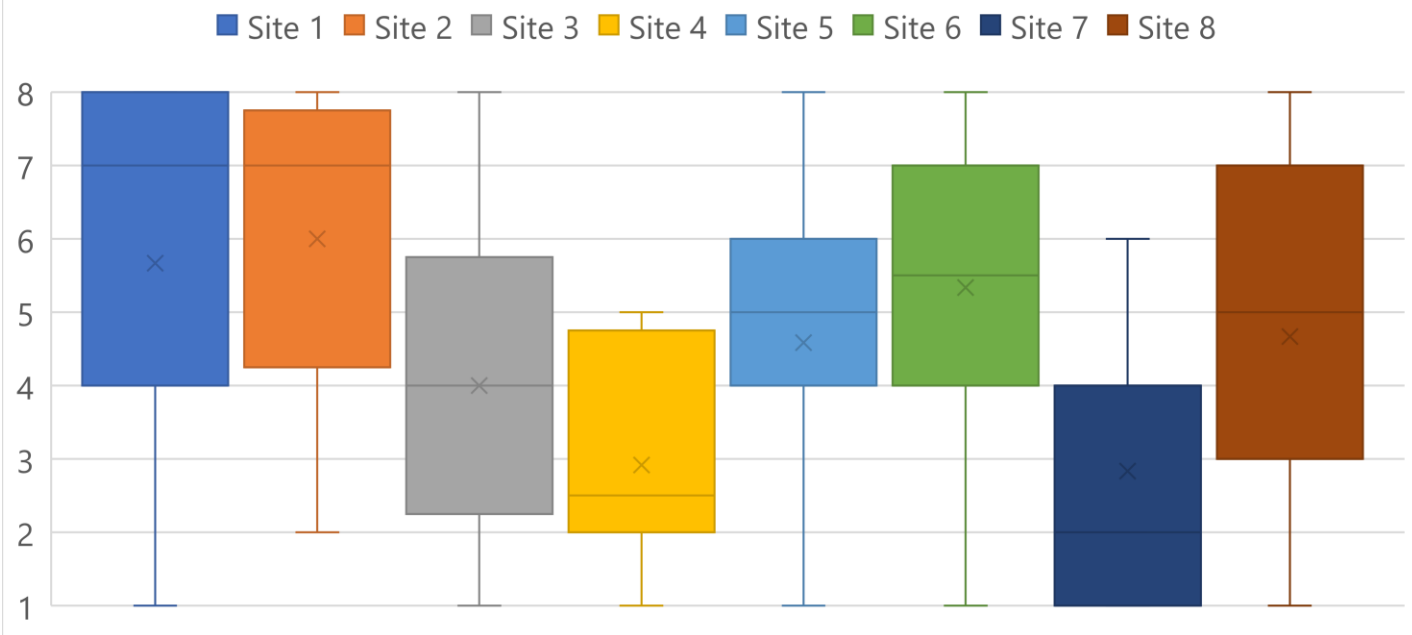
easily. Second, small business owners should make it a priority to have their website emulate the characteristics of the optimal combination because higher site utility increases the retention time of users on a page. For ecommerce, more time spent browsing means more sales, so connecting higher utility to higher browsing times makes the findings for the first hypothesis much more valuable to online entrepreneurs. Finally, different customers have different needs and tastes, so business owners should prioritize optimizing their online presence for all.

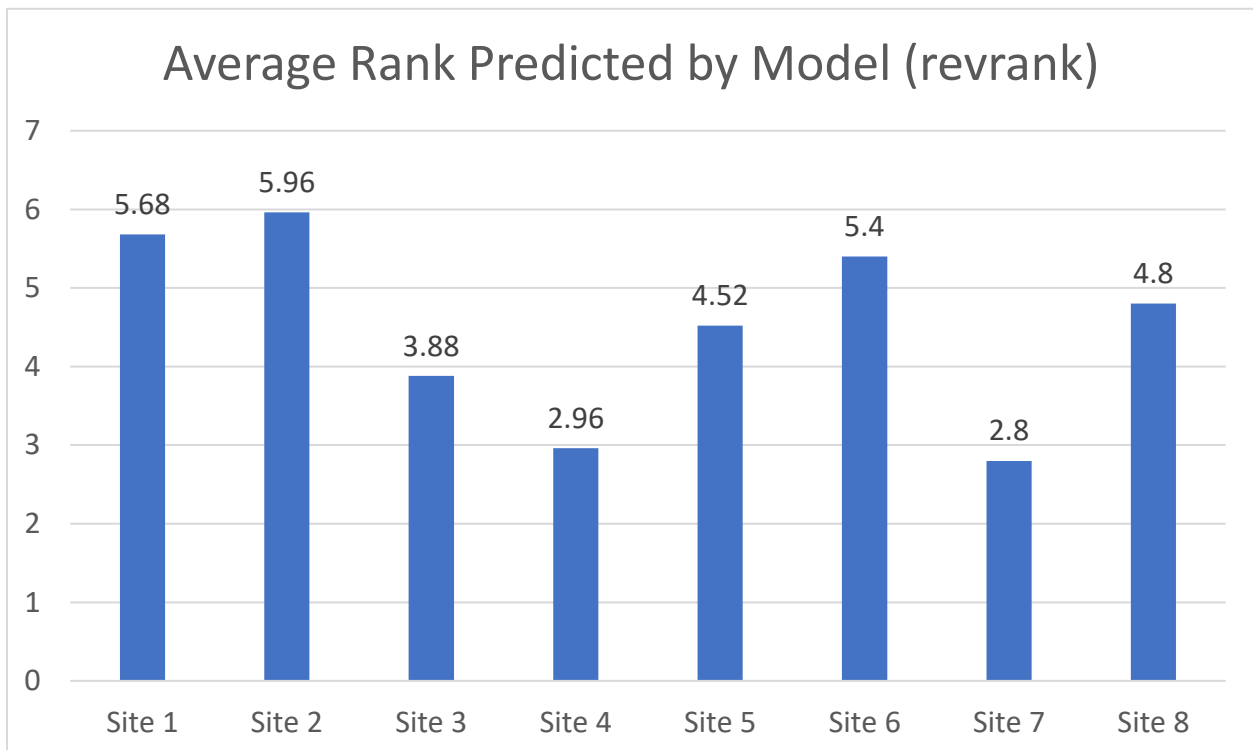
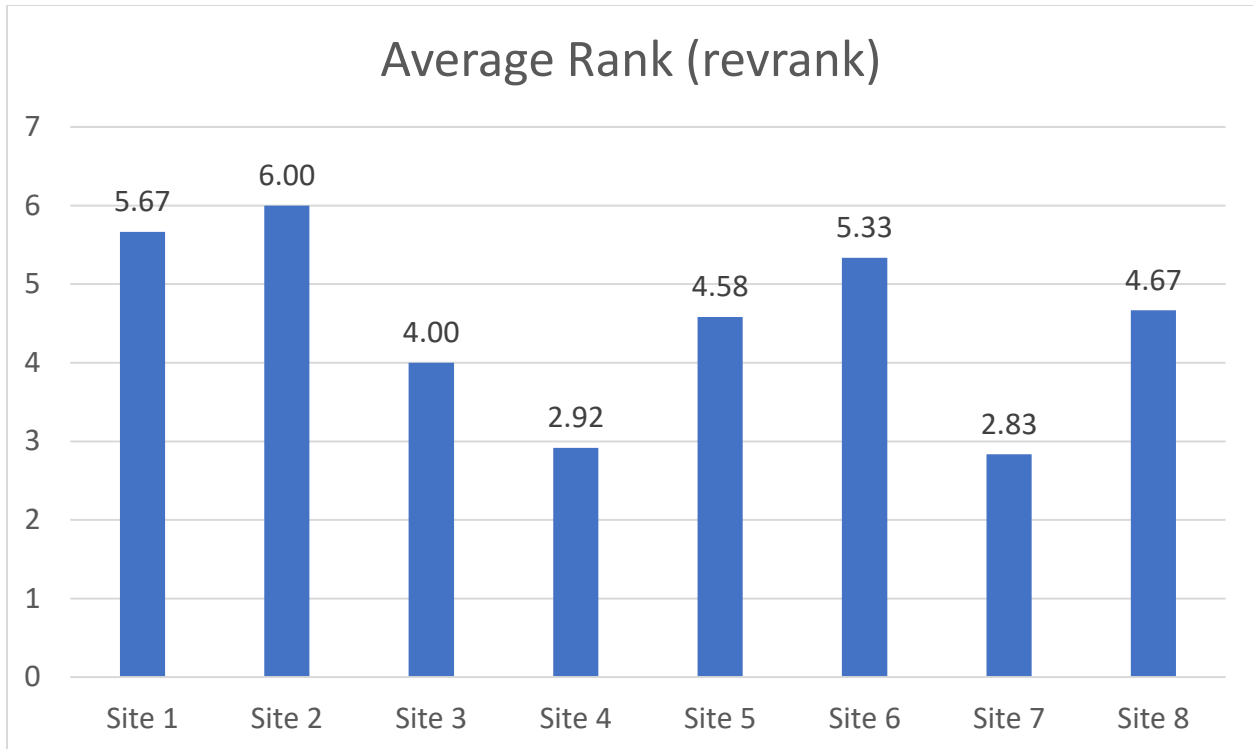
Appendix

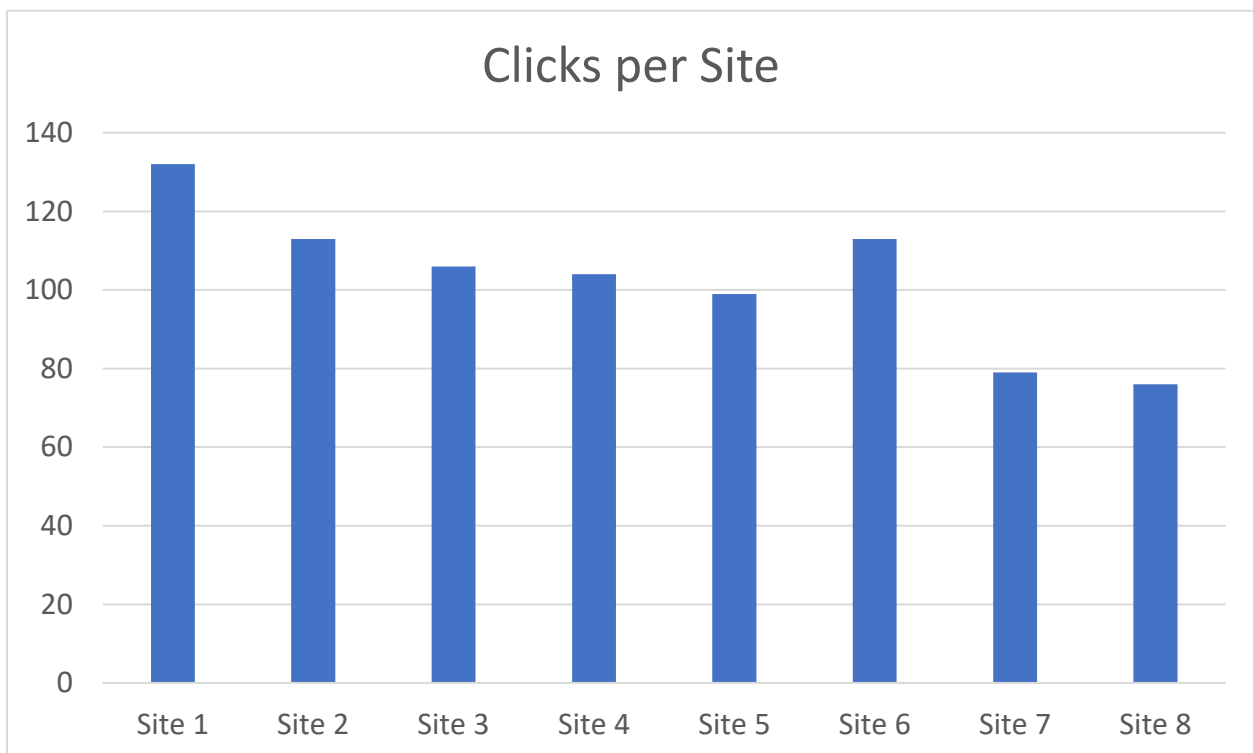
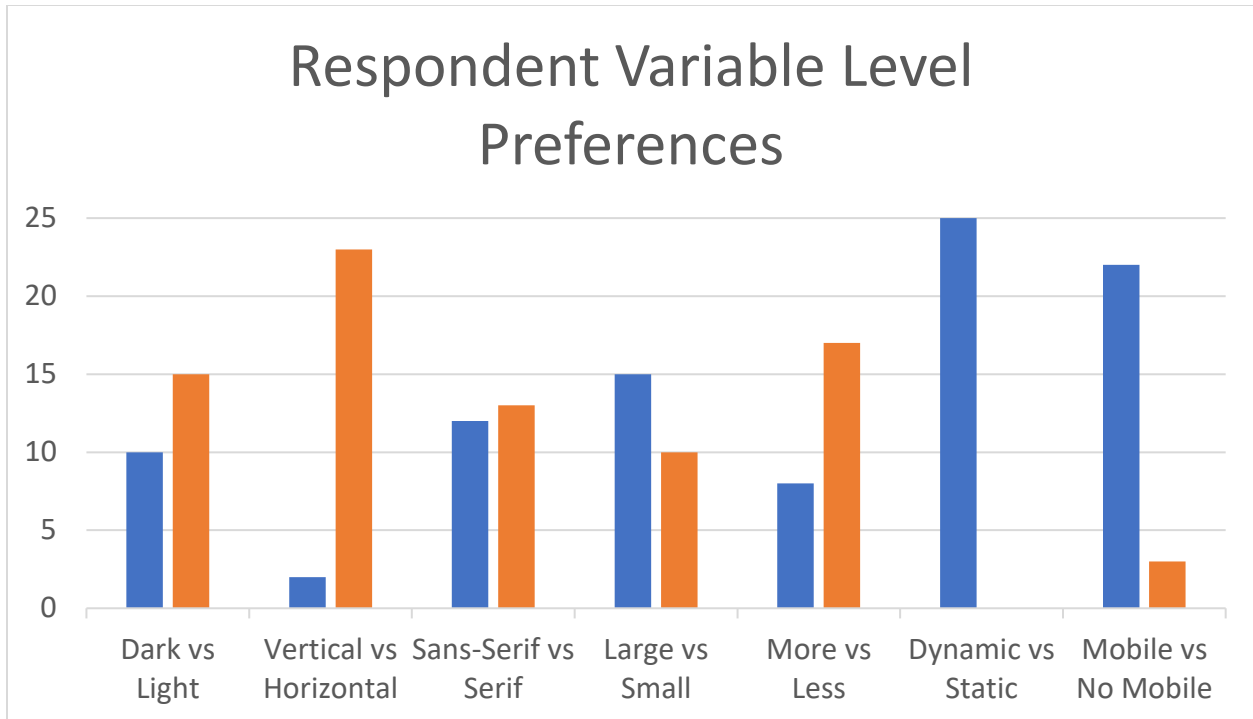
Part-Worths of Non-Reference Bundle Values

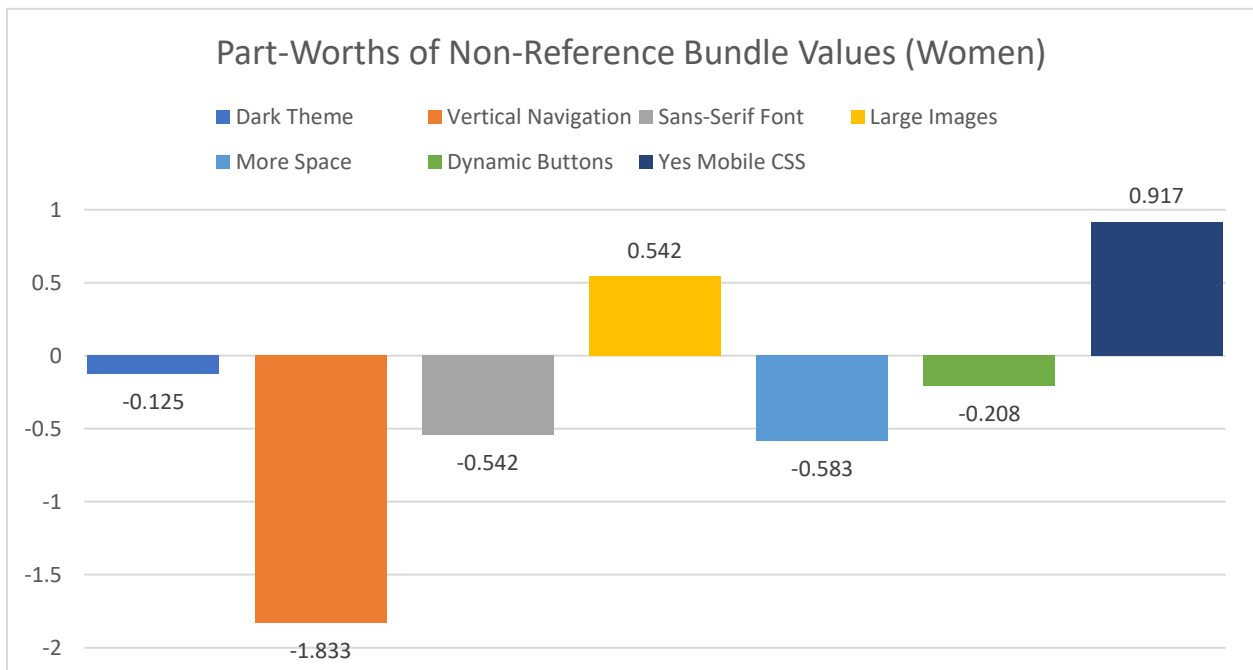
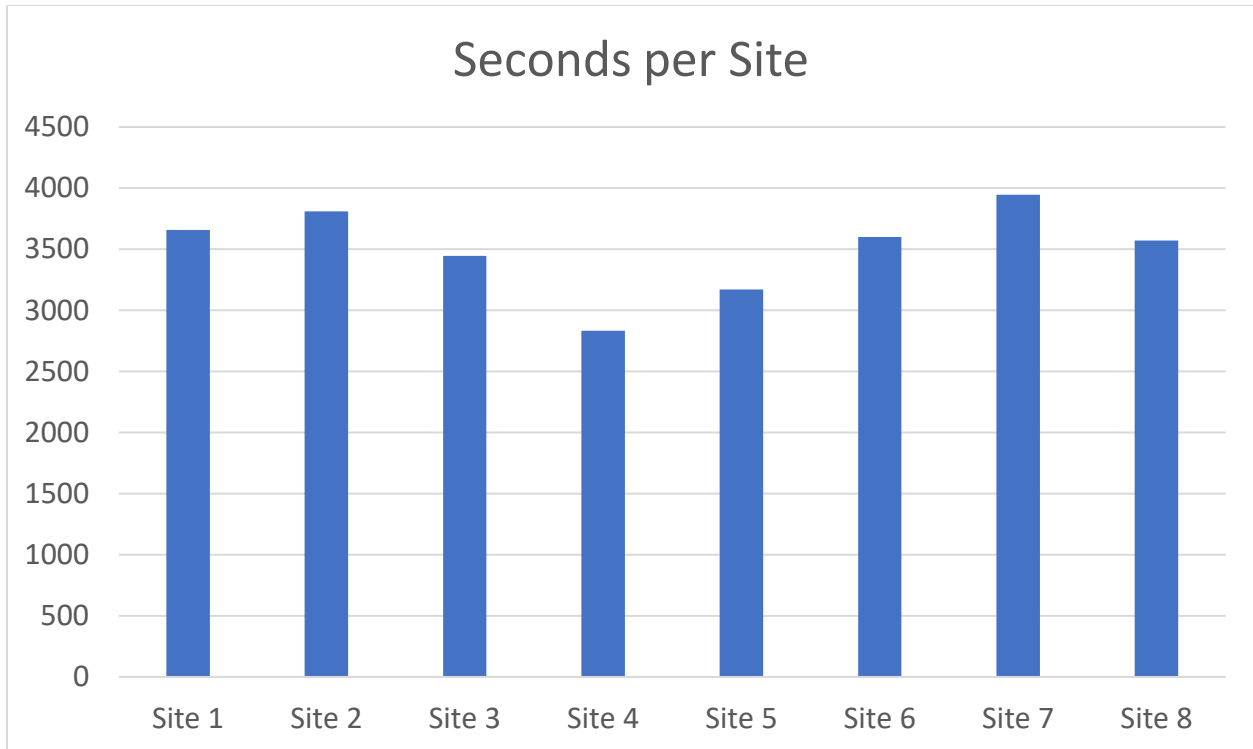


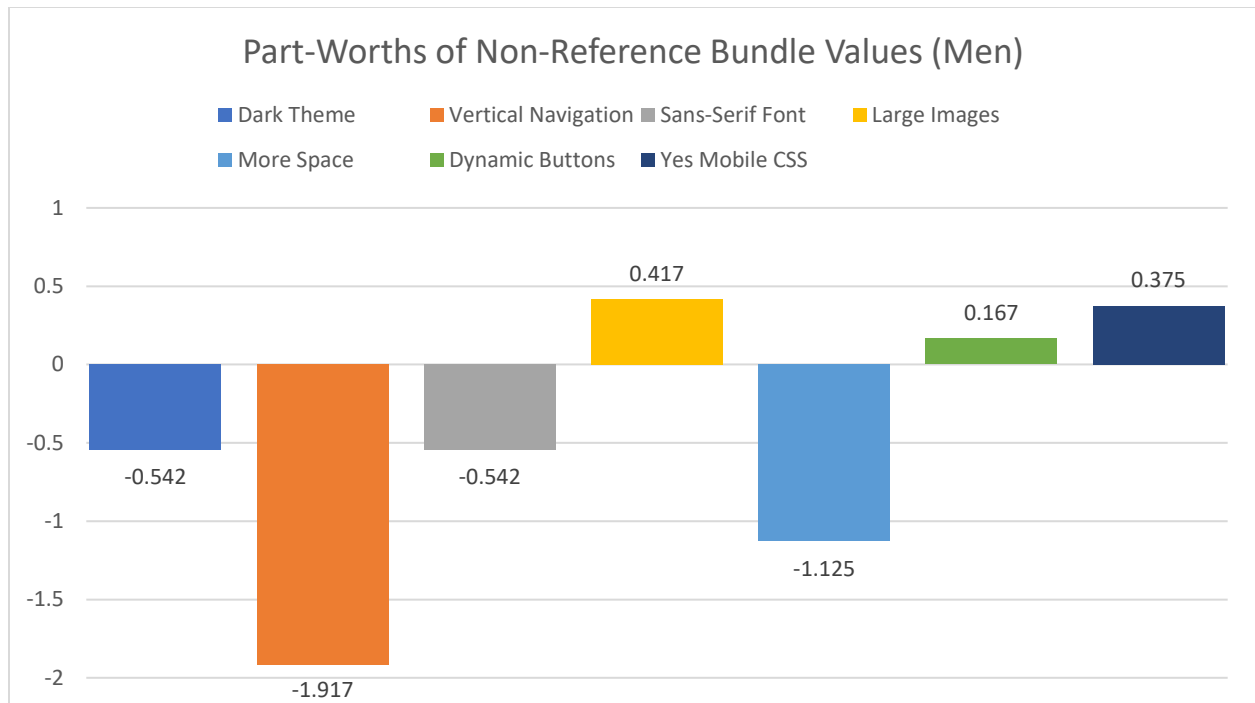
Site Rankings (revrank)











References

- Arghashi, V., & Yuksel, C. A. (2022). "Interactivity, Inspiration, and Perceived Usefulness! How retailers' AR-apps improve consumer engagement through flow," *Journal of Retailing and Consumer Services*, 64, 102756. <https://doi.org/10.1016/j.jretconser.2021.102756> .
- Ashraf, A. R., Thongpapanl, N., and Spyropoulou, S. (2016). "The connection and disconnection between e-commerce businesses and their customers: Exploring the role of engagement, perceived usefulness, and perceived ease-of-use," *Electronic Commerce Research and Applications*, 20, 69-86. <https://eprints.whiterose.ac.uk/108369/3/ECRA-D-15-00385R2--Revised%20Manuscript.pdf> .
- Chang, S., Chih, W., Liou, D., and Hwang, L. (2014). "The influence of web aesthetics on customers' PAD," *Computers in Human Behavior*, 36, 168-178. <https://doi.org/10.1016/j.chb.2014.03.050> .
- Cyr, D., and Bonanni, C. (2005). "Gender and Website Design in e-Business", *Int. J. Electronic Business*, 3(6). [https://www.dianne Cyr.com/docs/Gender%20and%20website%20design%20\(IJEB\)%20final.pdf](https://www.dianne Cyr.com/docs/Gender%20and%20website%20design%20(IJEB)%20final.pdf) .
- Cyr, D., and Head, M. (2013). "Website design in an international context: The role of gender in masculine versus feminine oriented countries," *Computers in Human Behavior*, 29(4), 1358-1367. <https://doi.org/10.1016/j.chb.2013.01.050> .
- Feldman, K. J. (February 26, 2010). "Use of Conjoint Analysis for the Design of New Website," iSixSigma. <https://www.isixsigma.com/voc-customer-focus/use-conjoint-analysis-design-new-website/> .

- Garbarino, E., and Strahilevitz, M. (2004). "Gender differences in the perceived risk of buying online and the effects of receiving a site recommendation," *Journal of Business Research*, 57(7), 768-775. [https://doi.org/10.1016/S0148-2963\(02\)00363-6](https://doi.org/10.1016/S0148-2963(02)00363-6) .
- Garett, R., Chiu, J., Zhang, L., & Young, S. D. (July 2016). "A Literature Review: Website Design and User Engagement," *Online Journal of Communication and Media Technologies*, 6(3), 1-14. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4974011/> .
- Gofman, A., Moskowitz, H.R. and Mets, T. (2009), "Integrating science into web design: consumer-driven web site optimization", *Journal of Consumer Marketing*, 26(4), 286-298. <https://doi.org/10.1108/07363760910965882> .
- Haan, Katherine (February 2023). "Top Website Statistics For 2023," *Forbes Advisor*. <https://www.forbes.com/advisor/business/software/website-statistics/> .
- Hasley, J. P. & Gregg, D. (2019). "Using conjoint analysis to assess website information utility," *Journal of Technology Research*, 9, 1-29. <https://www.aabri.com/manuscripts/193015.pdf> .
- Kansal, T., Bahuguna, S., Singh, V., and Choudhury, T. (2018). "Customer Segmentation using K-means Clustering," *International Conference on Computational Techniques, Electronics and Mechanical Systems (CTEMS)*, Belgaum, India, 135-139. https://ieeexplore.ieee.org/abstract/document/8769171?casa_token=f-AEt280XXkAAAAA:IPYJrbNJKJtHq2hiwEdGFfjwJscJc2snhcbaa_e-mkXaWkwBqArgtbVelg2djYhLBYKzNt-hMQ .

- Liu, Y., Li, H., and Hu, F. (2013). "Website attributes in urging online impulse purchase: An empirical investigation on consumer perceptions," *Decision Support Systems*, 55(3), 829-837. <https://doi.org/10.1016/j.dss.2013.04.001> .
- Mailchimp (2022). "Top Online Shopping Categories," *Intuit*.
<https://mailchimp.com/resources/top-online-shopping-categories/> .
- Main, Kelly (2024). "Small Business Statistics Of 2024," *Forbes Advisor*.
<https://www.forbes.com/advisor/business/small-business-statistics/> .
- Prashar, S., Vijay, T. S., and Parsad, C. (2016). "Segmenting Online Shoppers: A Study of Consumers' Web Portal Selection Motivations for E-Shopping," *Asian Academy of Management Journal*, 21(1), 27-46. https://smartlib.umri.ac.id/assets/uploads/files/0dfdd-aamj21012016_2.pdf .
- Tigre Moura, F., Singh, N., & Chun, W. (2016). "The Influence of Culture in Website Design and Users' Perceptions: Three Systematic Reviews," *Journal of Electronic Commerce Research*, 17(4). http://www.jecr.org/sites/default/files/2016vol17no4_Paper3.pdf .
- Xia, Lan (2010). "An examination of consumer browsing behaviors," *Qualitative Market Research*, 13(2), 154-173. <https://doi.org/10.1108/13522751011032593> .