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# Generating a framework for the evaluation of structural layout preferences within e-commerce websites

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**Generating a framework for the evaluation of structural layout preferences within  
e-commerce websites**

by

**Bennett Stone**

A thesis submitted to the graduate faculty  
in partial fulfillment of the requirements for the degree of

Master of Science

Major: Human Computer Interaction

Program of Study Committee:  
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Ames, Iowa  
2014

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## TABLE OF CONTENTS

	Page
LIST OF FIGURES .....	iv
LIST OF TABLES .....	vi
NOMENCLATURE .....	ix
ABSTRACT .....	x
CHAPTER 1. BACKGROUND .....	1
Research Goals .....	3
Hypothesis .....	4
CHAPTER 2. LITERATURE REVIEW .....	5
Web Atmospherics .....	6
Website Design Features .....	7
Website Appeal and Loyalty .....	8
Gender and Consumer Decision-Making in E-Commerce Sites .....	9
Cross-Cultural Comparisons of Aesthetics of E-Commerce Sites .....	10
Website Attraction and Cross-Cultural Differences .....	12
CHAPTER 3. METHODOLOGY .....	14
Introduction .....	14
Background .....	14
Evaluation of Existing Websites .....	16
Preparation of Scripts and Graphics for Analysis .....	18
Preparation of Test Websites .....	25
Data Collection Objectives .....	30
Data Collection Procedures .....	31
User Profile Questions .....	33
Online Purchasing Related Questions .....	34
Preference Evaluation Questions .....	35

CHAPTER 4. DISCUSSION .....	39
Pilot Study Results.....	41
Overview of Participant Demographics .....	42
Grouped Preferential Analysis.....	45
Demographic Results Analysis.....	46
Analysis of Layout Preferences .....	47
Analysis of Advertising Preferences .....	51
Analysis of Logo Placement Preferences .....	53
Analysis of Primary Navigation Preferences.....	55
Analysis of Secondary Navigation Preferences.....	57
CHAPTER 5. SUMMARY AND CONCLUSIONS.....	60
Limitations of Research.....	61
Conclusions .....	62
Future Research .....	63
REFERENCES .....	65
APPENDIX A LIST OF ANALYSIS WEBSITES.....	71
APPENDIX B ONLINE RECRUITMENT MESSAGE.....	73
APPENDIX C ANALYSIS SCRIPT .....	74
APPENDIX D INFORMED CONSENT .....	77
APPENDIX E RGB ASSIGNMENTS FOR ANALYSIS .....	80
APPENDIX F FULL ANALYSIS OUTPUT.....	81

## LIST OF FIGURES

	Page
Figure 1: Typical E-Commerce Structure .....	3
Figure 2: Atypical E-Commerce Structure .....	3
Figure 3: Amazon.com pre-overlay state .....	20
Figure 4: Amazon.com post-overlay state .....	20
Figure 5: Beachbody.com pre-overlay state .....	20
Figure 6: Beachbody.com post-overlay state .....	20
Figure 7: Amazon.com post-processed .....	21
Figure 8: BedBathandBeyond.com post-processed.....	21
Figure 9: Initial Template 1 .....	27
Figure 10: Initial Template 2 .....	27
Figure 11: Product Shape Replacement.....	28
Figure 12: Example Logo Evaluation Screen.....	30
Figure 13: Online Purchase Options.....	35
Figure 14: Preparatory question instruction for participants .....	36
Figure 15: Countdown Timer .....	37
Figure 16: Final format of preference evaluation screens .....	38
Figure 17: Reported Participant Employment Status .....	44
Figure 18: Reported Participant Relationship Statuses .....	44
Figure 19: Reported Participant Ages .....	45
Figure 20: Full Layout Analysis for all profiles .....	47

Figure 21: Structure Gender Analysis .....	48
Figure 22: Structure Income Analysis Results .....	50
Figure 23: Full advertising analysis for all profiles.....	52
Figure 24: Full logo placement analysis for all profiles.....	54
Figure 25: Full primary navigation analysis for all profiles.....	56
Figure 26: Full secondary navigation analysis for all profiles .....	58

## LIST OF TABLES

	Page
Table 1: Example Comparison of E-Commerce Structures .....	3
Table 2: Preliminary Website Coding .....	20
Table 3: Example of Post Processed Graphics .....	21
Table 4: Sample Analysis Output.....	23
Table 5: Analysis of Logo Placement.....	24
Table 6: Analysis of Primary Navigation Placement .....	24
Table 7: Analysis of Layouts.....	24
Table 8: Average Occupied Space for All Variables .....	25
Table 9: Initial Templates.....	27
Table 10: Example Specifications for Logo Evaluation.....	29
Table 11: Logo Locations.....	39
Table 12: Primary Navigation Locations.....	40
Table 13: Secondary Navigation Locations.....	40
Table 14: Layout Analysis.....	40
Table 15: Reported Participant Income .....	42
Table 16: Structure Gender Preference .....	48
Table 17: Structure Educational Analysis .....	49
Table 18: Structure Employment Analysis.....	49
Table 19: Structure Income Analysis .....	50

Table 20: Structure Frequency Analysis .....	51
Table 21: Structure Spending Analysis .....	51
Table 22: Advertising Age Analysis .....	52
Table 23: Advertising Gender Analysis .....	52
Table 24: Advertising Educational Analysis .....	52
Table 25: Advertising Educational Analysis .....	53
Table 26: Advertising Income Analysis .....	53
Table 27: Advertising Frequency Analysis .....	53
Table 28: Advertising Spending Analysis .....	53
Table 29: Logo Placement by Gender .....	54
Table 30: Logo Placement by Education.....	54
Table 31: Logo Placement by Employment .....	54
Table 32: Logo Placement by Income .....	55
Table 33: Logo Placement by Frequency .....	55
Table 34: Logo Placement by Spending.....	55
Table 35: Primary Navigation by Gender.....	56
Table 36: Primary Navigation by Education .....	56
Table 37: Primary Navigation by Employment.....	56
Table 38: Primary Navigation by Income .....	57
Table 39: Primary Navigation by Frequency .....	57
Table 40: Primary Navigation by Spending .....	57
Table 41: Secondary Navigation by Gender.....	58



Table 42: Secondary Navigation by Education .....	58
Table 43: Secondary Navigation by Employment.....	58
Table 44: Secondary Navigation by Income .....	59
Table 45: Secondary Navigation by Frequency .....	59
Table 46: Secondary Navigation by Spending .....	59

## NOMENCLATURE

SOC	United States Standard Occupational Classification System
ISCO	International Standard Classification of Occupations
UNSD	United Nations Statistics Division
B2C	Business to Consumer
C2C	Consumer to Consumer

## ABSTRACT

Global businesses are increasingly reliant on sales through electronic channels, and the importance of aesthetic satisfaction for e-commerce visitors is crucial to survival. A study by Korgaonkar and Wolin (Korgaonkar et al., 1999) shows that consumers are motivated to make purchases online based on "the aesthetic enjoyment and positive experience of emotion online," enhancing the need for websites that appeal to a visitors aesthetic preferences. Pursuing a competitive foothold within a shifting global marketplace, companies often seek out new visual bases for web presences, generating web designs based on perceived preferences of design. These designs are often assumed to be attractive to visitors, which may be inaccurate.

The goal of this research is to generate a framework that analyzes target audience structural design preferences for e-commerce websites. This study hypothesizes that clearly identifiable structural design preferences exist within e-commerce applications, and can be generalized within individual demographic profiles.

Forty-four websites were selected from publicly available listings of the most frequently visited global e-commerce websites. Service, rental, and listing websites were excluded from this research. A full size website image was taken using automated processing software for each website, and each image was analyzed to obtain a list of common features including: primary navigation, secondary navigation, company promotions, advertising from external advertisers, logo size and placement, and featured

products. A secondary script was created to analyze each image that calculated the exact number of pixels, location, and percentage of space dedicated to each feature.

A global pool of participants completed a user profile survey, an online purchasing evaluation assessing current and past online purchase behavior, and then were presented a series of questions. Each question screen evaluated only a single feature, and included between 2 - 6 variations of images of a custom e-commerce website created specifically for this study.

Results showed that clearly identifiable structural design preferences could be analyzed, that preferences could be generalized within both grouped profiles, and individual demographic profiles, and variable connections did travel together with consistent patterns.

## CHAPTER I

### BACKGROUND

According to many sources, it all began with a single sale of a compact disc; Sting's "Ten Summoners Tales" to be specific (Gilbert, 2004). From such humble beginnings, to the current state of electronic commerce (e-commerce) with nearly \$74 million in transactions per day, and quarterly sales in only the first quarter of 2014 of \$66.9 billion, or 6.2% of total sales for just the United States (Thomas, 2014), e-commerce is beyond comparison when evaluating the size and volume of electronic usage expansion. An ever-increasing volume of research is performed continually around the topic of e-commerce, however, only limited research has been performed on the topic of how the structural design of an e-commerce website affects consumer purchasing behavior. Also, to extend the topic further, limited research exists on how demographic variables affect consumer purchase behavior based on the structural designs of e-commerce websites.

Businesses are increasingly reliant on sales through electronic channels, and the importance of overall aesthetic satisfaction for e-commerce visitors is crucial in the survival of companies, and in particular- companies without a large brick-and-mortar presence. A 1999 study by Korgaonkar and Wolin (Korgaonkar et al., 1999) shows that consumers are largely motivated to make purchases online based on "the aesthetic enjoyment and positive experience of emotion online," further enforcing the need for e-commerce websites that appeal to a visitors aesthetic preferences in conjunction with

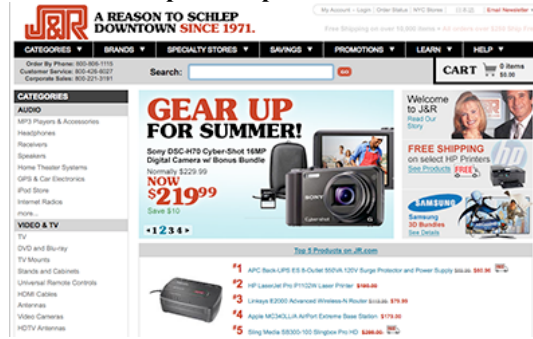
effective and competitive pricing structures. Pursuing a competitive foothold within this constantly shifting global marketplace, companies and individuals often seek out new visual bases for their web presence, generating web designs based on perceived preferences of design and layout. These designs are often assumed to be attractive to visitors, however, without statistically sound analysis, these assumed designs are capable of alienating or driving away large segments of their target markets in an environment where "only 36 percent of pure internet sellers, have profitable online businesses" (Quick, 2000).

This research was designed to determine variables specific to structural design within e-commerce websites, as opposed to the purely artistic taste and general appreciation of beauty commonly known as aesthetics. As the study of pure aesthetics is vast and contains an infinite number of possible variables for analysis, the term "structural design" seeks to determine the underlying factors altering preference and appreciation through evaluation of factors that are capable of being analyzed and quantified across any number of same-type entities; in this case e-commerce websites.

This particular area of evaluation however, is not without its inconsistencies and idiosyncrasies, many of which may be seen in the websites used in this research. Alexa's list of top visited shopping websites (Alexa Top Sites, 2014) consistently lists Amazon (amazon.com), and EBay (ebay.com) within the top 5 most visited e-commerce websites in the world, however, a brief visual comparison of either site to other websites in the same list represents a stark contrast in the overall structure, colors, graphics, and overall

aesthetic of each site- potentially leading to confusion when performing visual references (See Table 1: Example Comparison of E-Commerce Structures for example).

**Table 1: Example Comparison of E-Commerce Structures**



**Figure 1: Typical E-Commerce Structure**



**Figure 2: Atypical E-Commerce Structure**

## Research Goals

The primary goal of this research was to determine if there are variances in structural design preferences specific to e-commerce shopping that might be associated with core demographic variables. The secondary goal of this research was to generate a reliable framework by which structural design preferences for e-commerce websites could be grouped based on target audience demographic variables, and recreated as web development trends and designs change. For example, an e-commerce website specializing in clothes for middle-aged Japanese men would most likely have different requirements than an online marketplace for indoor lighting fixtures for commercial properties in order to provide a level of visual satisfaction for a sale to occur. The framework generated by this research is capable of providing general structure,

placement, promotional, and color-based recommendations for a wide range of targeted e-commerce platforms to further enable customer engagement. Furthermore, the recommendations provided by this analysis are designed to be updated periodically using easily updated scripts, and would be well suited for usage within a web-based service for designers, web developers, and business owners.

### Hypothesis

This study makes hypothesizes that clearly identifiable structural design constants exist within e-commerce applications, and user preference for each variance may be generalized within individual demographic profiles.



## CHAPTER 2

### LITERATURE REVIEW

The growth of online shopping is fueled by its advantages (Eroglu, Machleit, & Davis, 2001). Thus, firms are increasingly relying on ecommerce solutions to reach their project objectives (Freemantle, 2002). Unfortunately, many websites fail to help companies reach these objectives. Kearney (2001) found that 82% of online shoppers drop out of their shopping carts without completing the purchase. Another study found that websites fail to generate satisfying shopping experiences (Kane, 1999). Several studies contend that these failures are the result of neglected consumer needs (Neilson, 2000; Rosen and Purinton, 2004). Richard (2005) likened web design to store atmospherics and supported its criticality in determining effectiveness. Song and Zahedi (2005) argue that little is known about how websites should be designed to optimize the consumer experience. Rather than create virtual spaces that enhance the online shoppers' experience, companies often chose to either copy successful sites or construct websites that mirror their offline stores (Rosen & Purinton, 2004).

Unlike traditional information systems, e-commerce systems contain characteristics of both an information system and a marketing channel, thereby involving both machine and human elements contained within the human-computer interface. Effective web design requires looking at both of these factors from the user's viewpoint to ensure web sites provide required elements.

## Web Atmospherics

In traditional retailing, form and content of store atmospherics have become an established field of research study. There is wide acceptance of the importance of the retail environment (Bitner, 1992) and physical form of a product (Bloch, 1995) in creating certain effects in buyers (Kotler, 1973–1974; Bitner, 1992). However, there is a relatively small body of literature on web atmospherics (Lavie and Tractinsky, 2004).

Retail customer interface, commonly termed store atmospherics, may account for up to two-thirds of in-store purchases (Bandyopadhyay, Wieragama, and Khuller, 2000). In e-commerce web sites, atmospherics are included in the computer interface, yet little is currently known about how this interface affects consumers' purchase intentions (Richard, 2005). Web atmospheric research studies that have been conducted have been anchored in one or more number of traditions:

- 1) The tradition of 'experimental aesthetics' (Berlyne, 1974). This seeks to identify the isolated elements in the evaluated objects that elicit particular reactions. Schenkman and Jonsson (2000) tested the importance of different measures in the experience of a web page, finding a combination of pictures and beauty to be important constituents in appeal.
2. The exploratory tradition. This evaluates complete and natural stimuli rather than manipulated and artificial ones (Nasar, 1988). Schenkman and Jonsson (2000) used 13 commercial websites as stimuli while Lavie and Tractinsky (2004) used one or two websites as stimuli for each of four studies.

3. The Kantian view of aesthetics. This assumes aesthetic preferences to be universal. Given the presumption of universally held values, a number of studies of web aesthetics seek universal rather than segmented values (Schenkman and Jonsson, 2000; van der Heijden, 2003; Lavie and Tractinsky, 2004).

4. The interactionist position. This sees aesthetic perceptions as a function of individual perception (Porteous, 1990) rather than universal values leading to the search for segmented values (Leong, 1997; Miller and Arnold, 2000; Flanigan and Metzger, 2003; Oser, 2003). This position takes the perspective that products should be shaped around the ‘unique and particular needs’ of the customer (Hammer, 1995). In the field of branding, it translates into the view that there should be congruence between the brand personality and the consumer’s self-concept on the basis that purchases are thought to offer a vehicle for self-expression (Karande et al., 1997).

### **Website Design Features**

Within the Web environment, computer factors are those whose presence provides functionality (Liang and Lai, 2001). These are characterized by Richard (2005) as high task relevant. These elements include: technical aspects, navigation, impartiality, and information content, as computer factors. The human factors are those hedonic elements that add value to the Website by contributing to user satisfaction (Zhang and von Dran, 2000).

These categories of human factors on the Web include enjoyment, cognitive outcome, user empowerment, credibility, visual appearance, and organization of informational content. These correspond well with Richard's (2005) low task relevant features.

### **Website Appeal and Loyalty**

Several researchers have suggested that specific features including, download speed, reputation of merchant, variety of products available) have an impact upon website appeal because they perform particular underlying roles or functions.

Srinivasan, Anderson, and Donnavolu (2002) found eight functions of site features that impact customer loyalty to a retail site: 1) customization, 2) interactivity, 3) "cultivation" (i.e., provision of information and incentives to extend customer purchasing over time), 4) "care" (operationally, features that keep customers informed of the availability of preferred products and of the status of their orders, or features that minimize disruption in service), 5) "community" (i.e., provision of a structure to facilitate the exchange of user opinions and information about offered products/services), 6) "choice" (variety of products), 7) convenience, and 8) "character" (i.e., text/graphics/slogans, etc., projecting an image or personality of the web merchant). All of the aforementioned features except convenience were found to enhance customer loyalty.

Other researchers have considered the perceptual or evaluative dimensions a consumer uses in assessing the appeal of a website. Chen and Wells (1999) suggested that users evaluate a website along the three dimensions of how entertaining, how

informative, and how organized it is. Yoo and Donthu (2001) noted that users evaluate the quality of a site along four dimensions: ease of use, aesthetic design, processing speed, and security. From the perspective of consumer motives, Keeney (1999) derived 25 categories of online consumer shopping objectives. Objectives were categorized as means-oriented (e.g., maximize product information) or fundamentally ends oriented (e.g., maximize product quality). Parsons (2002) provided a taxonomy of online shopper motives, differentiating among the functional (e.g., convenience), the personal nonfunctional (e.g., diversion from daily routine), and the social non-functional (e.g., communication with like-minded others) motives.

### **Impulse Purchasing on E-Commerce Web Sites**

Chen et al. (2002) argue that e-retailers must do the following to create more effective online shopping experiences: 1) make users feel comfortable, 2) create sites that are fun to use, 3) entice consumers to spend more time and revisit, and 4) increase the likelihood of a purchase. However, this framework lacks the specificity necessary to determine the suitability of specific design elements (Hausman & Siekpe, 2009). This list is comparable to Srinivansan, Anderson, and Donnavolu's (2002) functions of a site to impact customer loyalty, as well as overlapping with Yoo and Donthu's (2001) list.

### **Gender and Consumer Decision-Making in E-Commerce Sites**

Not surprisingly, data reveals that both men and women to are important users of the web. In the US, similar proportions of men and women are said to be using the web

(Jupiter communications, 2002), with women accounting for about 51% of the total online adult population. European usage reported female usage of the web to be an average of 38% (Jupiter communications, 2002) with usage at 42% in the UK. This average is higher in Sweden (at 46%) but lower in Germany and France (at 39%), Italy (31%) and Spain (29%).

Moss et al. (2006) investigated the differences between male and female in their website preferences. In this study, they found statistically significant differences in 13 out of the 23 factors analyzed. Most of the significant differences occurred in the areas of visuals and language, with one difference occurring in the area of navigation. The four factors of self-denigration, expert language, the use of particular text color, and the use of horizontal layout produced the largest statistical difference between the two genders. Also differences centered on the use of blue/black typography, abbreviations, informal language and the formality of the images, and centered on the use of crest, a male figure, and formal typography.

### **Cross-Cultural Comparisons of Aesthetics of E-Commerce Sites**

With increases in technological advancement and the growth of e-commerce and a global marketplace, businesses must have a better understanding of how to more effectively cater to global consumers. These consumers differ in nation, creed, gender and task use. The United States is still currently the biggest exporter in the world with 80% of all software development (O'Sullivan, 2003), however, American companies are not prepared for the global online marketplace (Sun, 2001). Fernandes (1995) argues

that this is due to a lack of understanding of local customers culture. The impact of new technologies shows user resistance and that these users reject products with Western metaphors in favor of products that are localized according to their cultural customs (Zahedi, Van Pelt & Song, 2000). This problem has spurred research into the cultural aspects of interface design (Marcus, 2001).

Based on the definitions of existing cultural models, Marcus and Gould (2001) have tried to create localized interfaces for national cultures. They believe that “companies that want to do international business on the web should consider the impact of culture on the understanding and use of Web-based communication, content and tools.” They suggest cross-referencing existing works on culture from Edward T. Hall, David Victor, Fons Trompenaars and Geert Hofstede. Hofstede (1991) identified patterns in the way people act, feel and think and formulated a theory by defining 5 dimensions of culture. These were collectivism vs. individualism, femininity vs. masculinity, long vs. short-term orientation, power distance and uncertainty avoidance. Based on these dimensions, Marcus and Gould (2001) introduce guidelines for web site design for distinct countries that fall into the different categories. Jagne et al. (2006) argue that these guidelines are questionable since 1) no usability studies were provided from users from the various countries, 2) users originating from the same country do not necessarily fit into the cultural mold laid out by Hofstede, and 3) no other factor of web design has been taken into consideration.

However, Jagne et al. (2006) and Hall (2001) note that one apparent reason why classic cultural models have not been effective in the implementation of cross cultural interface models is that these existing cultural models were designed for different purposes and not for e-commerce applications.

### **Website Attraction and Cross-Cultural Differences**

Given that nations and cultures differ in media perceptions (e.g., Rice & D'Ambra,1998; Ross, 2001), it is not surprising that they have been found to differ in the role played by website features in attracting shoppers. Lynch et al., (2001) noted that nations differ in the role played by trust, site quality, and elicited affect in producing purchase intent and site loyalty. Jarvenpaa and Tractinsky (1999) determined that cultures vary in consumer expectations of what makes a web merchant trustworthy and in the consequences of those judgments of trustworthiness. Unfortunately, beyond work such as the above, there has been limited empirical and theoretical analysis of the nature of national differences in the drawing power of specific website features. More critically, there has not emerged a common conceptual framework for quantitatively assessing such differences.

Blake et al. (2004) presented a framework to identify the nature of cross-national differences in the appeal of online shopping site features. The objective of the framework or model was to identify the nature of cross-national differences in the appeal of online shopping site features. As clarified by Kollman (2001), the features are defined at a concrete or specific level (e.g., download speed) rather than more abstractly



(e.g., interactivity, flow). This was done to make the framework more actionable for practitioners without loss of value to researchers interested in theory development, as well as making it possible for study respondents to grasp more clearly the issue they were asked to evaluate.

The model included three "Types" of national differences in feature appeal—“Elevation”, “Differentiation”, and “Priority”. Elevation is the overall demand for, or responsiveness to, website features in general. Differentiation is the variability in the appeal of the various features in the eye of each individual shopper. Priority is the relative appeal of a feature compared to the appeals of the other features in the eyes of a particular shopper.

These national differences can occur at two levels, Individual and Societal. The framework assumed that the assessment of national differences in feature appeal is conducted in a hierarchical fashion, going from the most to the least general for the Types and from the more specific to the more abstract for the Levels. In each case, the examination begins with the most fundamental indicator(s) and builds from one level to the next, incorporating a consideration of the last level.

## CHAPTER 3

### METHODOLOGY

#### Introduction

As the core purpose of this research was to determine if structural design variances existed that could affect consumer preference, this Thesis focuses primarily on the methodology used to perform effective and detailed analysis on existing websites; as well as post processing and image analysis. These procedures were used throughout the course of this research, with each step being equally as important as the preceding steps. The procedures detailed below are the final procedures used for data collection and analysis, all of which were reviewed for accuracy and presentation upon tentative completion of each, until it was determined that the expected presentation and potential for analysis was correct.

#### Background

Prior to beginning any formal evaluation, it was determined that a reliable list of the most visited e-commerce sites must be located; and that the list should be available as a global list as opposed to a geographically restricted list to provide an effective starting point for future studies with a global participant pool. The websites used for reference and evaluations were to be selected solely on standing within this global list of the most visited e-commerce websites. The analysis of list items for primary and

secondary features was to be based solely on the presence of those features, and not factors such as: country of popularity, country of ownership, or position on the list.

A reliable, and regularly updated list of e-commerce sites was located at Alexa (Alexa Top Sites, 2014), and a criterion was created in order to ensure consistency of items used from this list. This criterion was secondarily generated in order to facilitate continued analysis while ensuring the same usable criteria for evaluation.

Of the compiled list, 44 E-commerce websites were selected from within the top 200, as ranked by number of visitors. Websites with business models based on selling services, rentals, or classifieds listings were excluded from this research as sales for those entities may be based on factors outside the control of the website, and as such; only e-commerce websites which directly, or as a third-party sell products (B2C or C2C) qualified for inclusion. Each website was further segregated into two distinct categories for the purposes of extended analysis as necessary based on the following types:

1. Specialty Group websites, defined as e-commerce websites, which sell either their own brand, or an individual product. For example, CD universe sells only CD's and music, HM sells only HM brand clothing and accessories
2. Assorted Group websites, defined as e-commerce websites selling a wide assortment of products with limited exclusions. Examples include amazon.com and buy.com which sell any number of categorical items to appeal to a wider range of consumers, with products provided either by the company directly, or by third-parties

## Evaluation of Existing Websites

Once a preliminary list of websites for evaluation was generated (Appendix A), automated processing software was used to output a high-resolution TIFF (tagged image file format). Each website image was processed using matched parameters; websites were allocated 60 seconds to load, with an additional 10 seconds to enable any deferred JavaScript requests that could impact the structure or aesthetic features within the viewport. Traditionally, screenshots are taken to represent only a constrained viewport<sup>1</sup>, with a current average screen resolution of 1366 pixels in width and 768 pixels in height<sup>2</sup>. The images for this study were, however, processed to the full available height and width of each individual website- with an average height of 1850.2px, and an average width of 985.1px so that a more reliable and comprehensive advanced graphical analysis could be completed based on actual intended presentation (Appendix A).

All collected images were checked for consistency, and cross-referenced with the associated e-commerce website to ensure that all applicable features and items had been collected for analysis in the image. Each image was then screened manually to evaluate common features, and determine whether those common features were applicable to inclusion. For example, some common features such as links in a footer were deemed unnecessary for the scope of this research due to the lack of variation in structure and content, while the features evaluated in this Thesis were highly visible and capable of

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<sup>1</sup> In web browsers, the viewport refers to the visible portion of the entire document

<sup>2</sup> Source: <http://www.w3counter.com/globalstats.php>

altering the user's experience of the website. The following features were evaluated in this study:

1. Primary Navigation: List of links presented in varying ways providing visitors a direct and readily accessible means of accessing other main pages internal to the website
2. Secondary Navigation: List of links presented in varying ways providing visitors direct and readily accessible means of accessing other sub-pages internal to the website such as sub-level category pages
3. Company Promotions: Prominently featured blocks of space allocated to internally promoting sales, or non-product-specific items available on the current website
4. Logo Size: Actual height and width in pixels of the logo. Refers specifically to the height and width of the logo as presented on the website, and not the native height and width of the graphic itself
5. Logo Placement: Though many websites feature a logo placed on the top-left, several had alternating positions, and as such this feature was deemed applicable for inclusion
6. External Advertising: Prominently featured advertising that does not provide any value-add for visitors, links to external locations, and serves as a added revenue source for the e-commerce website
7. Featured Products: Similar to Company Promotions, but focusing on specific products or items rather than non-specific or generic sales

8. Background Color: Although the majority of the e-commerce websites evaluated for the purposes of this study had white or light colored backgrounds, background color was added for evaluation as an extra measure both in image analysis, and presentation within the Preparation of Test Websites as a secondary point of evaluation
9. Layout: Specifically referring to the total number of vertical columns in which content may be presented

It is important to note that a study performed by Madhavaram and Laverie (Madhavaram et al., 2004) exploring stimuli associated with impulse purchasing in online environments showed that aesthetics as well as price were critical within the context of these variables, so while the features evaluated and noted within this Thesis are core structural design features common across the evaluated websites, price and pricing competitiveness is an outlying factor which was not evaluated for the purposes of this research, and is addressed in greater depth in the Limitations section.

#### Preparation of Scripts and Graphics for Analysis

Prior to any image alteration, manipulation, or analysis, each of the core features was assigned a fixed RGB value for future reference within automated script analysis, with each RGB value being distinct with no cross referencing in order to ensure the performance of the automated processing scripts. Each image was opened in Adobe

Photoshop, and a transparent overlying layer was applied to contain the color-coded blocks representing each fixed feature while retaining the integrity of the collected image. Images were then enlarged to view the contents at a 1px to 1px level comparison<sup>3</sup>, and the RGB color-coded blocks were applied over each area designated for evaluation with the same level of precision as the zoom level (1 to 1 ratio).

A sample of initial and post-blocked representation states can be seen in Table 2: Preliminary Website Coding. Great care was taken to ensure that the overlying boxes were drawn to the exact measurements of each corresponding area, and multiple manual crosschecks were implemented at the tentative completion of each alteration to each generated image, as any irregularities may have otherwise altered the results for each subsequent step of this research. As shown by the height decrease toward the middle in Figure 4 of the secondary navigation section (shown in purple), areas containing line-denoted or block-separated spaces were accounted for in addition to selectable navigation items in order to ensure full and complete analysis of the areas denoted by each colored block. The RGB specifications may be located in Appendix F.

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<sup>3</sup> Full zoom level for maximum clarity

Table 2: Preliminary Website Coding



Figure 3: Amazon.com pre-overlay state

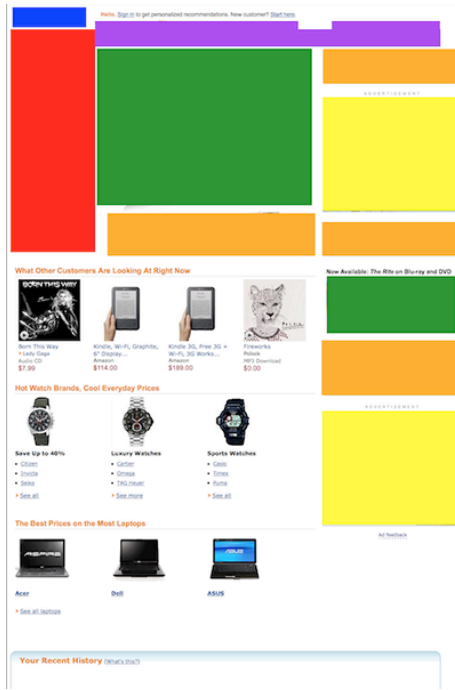


Figure 4: Amazon.com post-overlay state

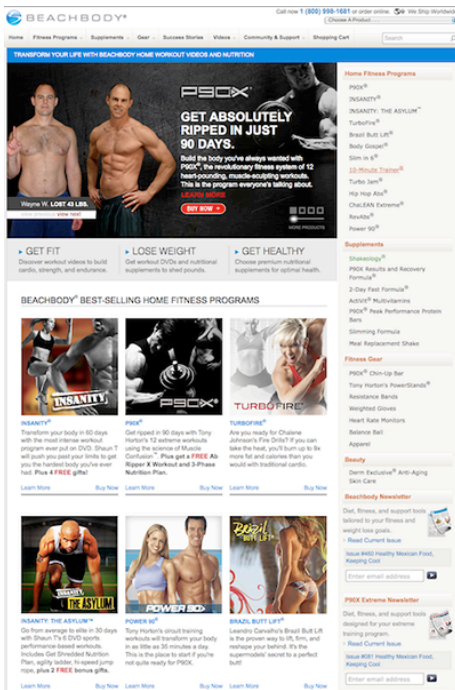


Figure 5: Beachbody.com pre-overlay state

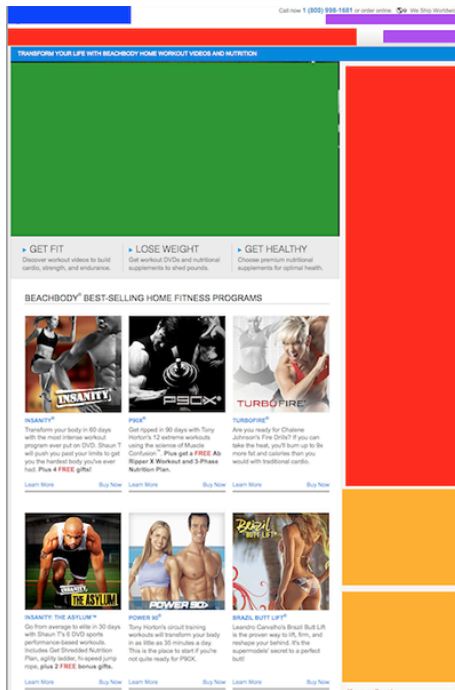
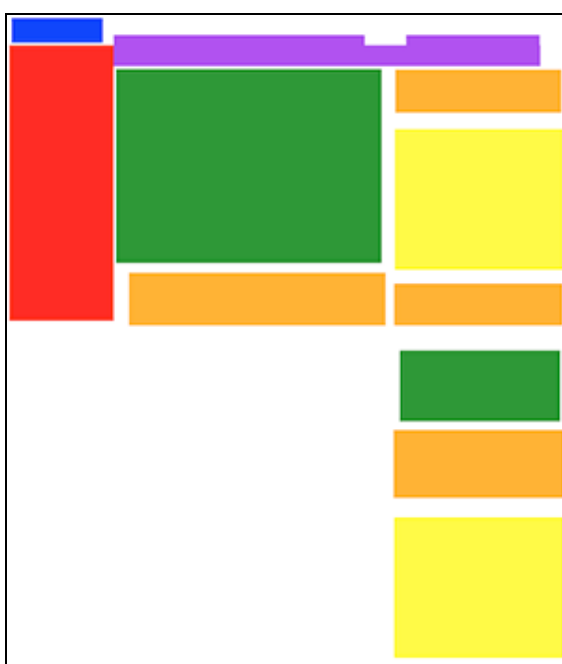


Figure 6: Beachbody.com post-overlay state



Once all applicable evaluative areas were correctly represented by the overlaid color coded blocks in all 44 images, the original layer containing the actual website contents was removed, and only the layer containing the overlaying blocks was exported as a second graphic in high resolution TIFF format for automated script processing as shown in the table below.

**Table 3: Example of Post Processed Graphics**



**Figure 7: Amazon.com post-processed**



**Figure 8: BedBathandBeyond.com post-processed**

After all of the images were processed and checked for accuracy, a Python programming script was coded specifically for the purposes of this study, and included Glob functions to analyze the contents of a specific directory, and Image extensions in order to handle the large quantity of files with enhanced image analysis capabilities, as

well as adding capabilities to perform RGB and dimensional analysis. The script performed the following series of functions<sup>4</sup>:

1. Scanning a predefined directory for TIFF files, and creating a list of the files to be used
2. Iterating through each image individually
3. For each image, the script determined:
  - a. Actual pixel size in height and width
  - b. Total number of distinct RGB values
  - c. Matched number of RGB values associated with a fixed series of values which correspond with the fixed color schema assigned to each feature of each e-commerce website
  - d. Compared the dimensions of the matched RGB value to the total image size
  - e. Calculated the exact number of pixels were occupied by each RGB value
4. For the group, the script determined averages for each RGB assignment, as well as minimums, maximums, and total values for all images and collective values
5. At script completion, the results were written to a CSV file for further analysis

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<sup>4</sup> The full script may be viewed in Appendix D: Analysis Script

The script used was altered multiple times throughout the image analysis process to ensure the most accurate results possible, and the final script was determined to be fully accurate at performing and calculating the steps above. After results of the image analysis were generated and placed into a spreadsheet, the data was reviewed again for accuracy, as well as being compared to manual measurements of the images used for this study. A sample of the raw output is in Table 4 below:

**Table 4: Sample Analysis Output**

<b>Area:</b>	<b>RGB:</b>	<b>Total pixels:</b>	<b>Total Image Size:</b>	<b>Percent Area:</b>
Company Promotions	255 165 0	90207 px	1924000 px	4.68851351351 <sup>5</sup> %
Featured Products	34 139 34	383957 px	1924000 px	19.9561850312%
Primary Nav	255 0 0	25284 px	1924000 px	1.31413721414%
Secondary Nav	160 32 240	215504 px	1924000 px	11.2008316008%
Logo	0 0 255	16951 px	1924000 px	0.881029106029%

The final step of analysis for existing e-commerce websites was to prepare the data for usage as a set of guidelines within the Preparation of Test Websites, which were used for data collection. This step added data that was determined to not be available programmatically such as: 1) logo placement within analysis websites, and percentage featuring a left, center, or right aligned logo, 2) primary and secondary navigation placement within analysis websites that were placed on the top, left, right, center, or

<sup>5</sup> Analysis values were not rounded, but it should be noted that pixels may only be represented on-screen as whole numbers

bottom of the website, and 3) number of columns within the layouts of each analyzed e-commerce website. The information gathered in this step was crucial to the test website creation step, as it added in valuable representative structural information by which new 'e-commerce websites' could be created.

**Table 5: Analysis of Logo Placement**

<b>Logo Location:</b>	<b>Count</b>	<b>Total Sites</b>	<b>Percentage</b>
Left	40	43	93.1%
Right	0	43	0.0000%
Center	3	43	6.9%

**Table 6: Analysis of Primary Navigation Placement**

<b>Primary Navigation Location:</b>	<b>Count</b>	<b>Total Sites</b>	<b>Percentage</b>
Top	35	43	81.4%
Left	8	43	18.6%
Right	0	43	0%
Center	0	43	0%

**Table 7: Analysis of Layouts**

<b>Layout (Columns)</b>	<b>Count</b>	<b>Total Sites:</b>	<b>Percentage</b>
1 column	12	43	27.9%
2 column	22	43	51.2%
3 column	8	43	18.6%
4 column	1	43	2.3%

**Table 8: Average Occupied Space for All Variables**

<b>Feature</b>	<b>Percent of Total</b>
Advertising:	0.66%
Company Promotions:	12.02%
Featured Products:	12.04%
Logo Size:	0.78%
Primary Navigation:	2.9%
Secondary Navigation:	4.14%

### Preparation of Test Websites

After a full analysis had been completed of existing websites, a structure was created from the collected data to ensure a strict set of guidelines by which the example e-commerce sites used for data collection could be generated, and a distinct separate set of guidelines was generated for each of the areas analyzed during the image analysis. Average values from analysis data was used in order to create a structure of familiarity, while providing participants with fewer possible points of evaluation than may have otherwise been generated through the creation of entirely original example websites. The guidelines generated provided structure for designs to evaluate the following areas individually while remaining within the fixed size and placement guidelines:

1. Logo placement: left, center, or right with two fixed sizes: 189px X 78px and 80px X 177px<sup>6</sup> with a fixed maximum total pixel size of 14,742px
2. Site layout: 1 column, 2 columns, or 3 columns with a maximum represented width of 985px, and fixed height of 1850px including example footer content

<sup>6</sup> Positional variance to accommodate separate example e-commerce designs

3. Primary navigation location: top, left, or right aligned with a fixed number of pixels totaling 54,175px and alternating height to width size of 985px X 55px vs. 55px X 985px
4. Secondary navigation location: top, left, right, or site-center
5. Advertising. All in same location with three variants: two 78px X 78px advertisements, one 156px X 156px advertisement, and no advertisement
6. Featured products. Matched locations with four variants, each populated with example items:
  - a. Eight separate 29px X 29px blocks
  - b. Four separate 117px X 117px blocks
  - c. Two 234px X 234px blocks
  - d. One 468px X 468px block
7. Company Promotions. Represented by three varying size blocks:
  - a. One 985px X 222px
  - b. Two 492px X 444px
  - c. Four 246px X 222px
8. Background Color. Evaluated using only solid primary colors- white, black, red, green, blue, and grey

In total, 29 example websites were created using two different commercially available Adobe Photoshop templates, both designed specifically to be generic regarding product placement, and were carefully chosen to be industry agnostic. Both starting-point designs also featured basic column structures, clearly defined placement locations, and color palettes that made use of primary colors with minimal variation.

Table 9: Initial Templates



Figure 9: Initial Template 1



Figure 10: Initial Template 2

After selection of the initial templates, both were adjusted to be exactly the same height and width of 985px wide, and 1200px tall. Both templates were also stripped of any visual representation of a physical or digital product to prevent any possible biases that could result from product or product type preferences during data collection. All

background images, textures, and patterns were removed, and all text was overwritten to be as generic as possible while still maintaining an indication of each applicable area. All product images were replaced with simple shapes such as triangles, squares, circles, or rectangles depending on the area specified for presentation of the ‘item’ to prevent any possible product preference that may have caused bias by participants. Once the templates had been generalized, they were separated into two distinct categories (see Background), and then subcategories to match each of the areas for evaluation described above prior to further alteration to ensure separation of contents and any subsequent cross-referencing of the items being evaluated in each.



Figure 11: Product Shape Replacement



Each individual graphic was then altered to match the specifications for the area being evaluated (Table 9), and the contents were saved as a PNG<sup>7</sup> image file for use within the survey software.

Initial review of the graphics within the context of the survey software presented the potential for participant confusion in determining which area of each graphic was being evaluated, specifically when preference was evaluated for the presence or absence of advertising, and the placement of both primary and secondary navigation. As the issue could have resulted in random selection by participants vs. the desired intentional selection, areas in the aforementioned e-commerce website representations that were **not** being evaluated had an opaque layer applied to reduce their visual notability and place a small amount of added emphasis on the areas that were being evaluated.

**Table 10: Example Specifications for Logo Evaluation**

Logo size:	14206px			189x78	<b>Logo Left</b>
Width:	985px			OR	<b>Logo Center</b>
Height:	1200 px			80x177	<b>Logo Right</b>
Background:	#ffffff				
Layout	2 Column				
Primary Nav:	Top	52307.85px		985x55	
Secondary Nav:	Top	75492px		206x362 (left/right)	985x76 (top)
Advertising:	12078px			245x50	
Featured Products:	219441px			234x234 (4)	
Co. Promotions:	219083px				

<sup>7</sup> Portable Network Graphics

## Data Collection Objectives

The data collection objectives for this thesis were designed to evaluate the hypothesis that “user preference for each variance may be generalized within global demographic subsets” as applicable to structural variances within the websites utilized for evaluation.

Data collection procedures as outlined below were designed to collect data to support or reject the hypothesis for analysis regarding the nine core structural design variables addressed in Evaluation of Existing Websites<sup>8</sup>, with specific support for fine-grained analysis in the areas of demographic profiles and/or possible cultural variances within grouped user preference.

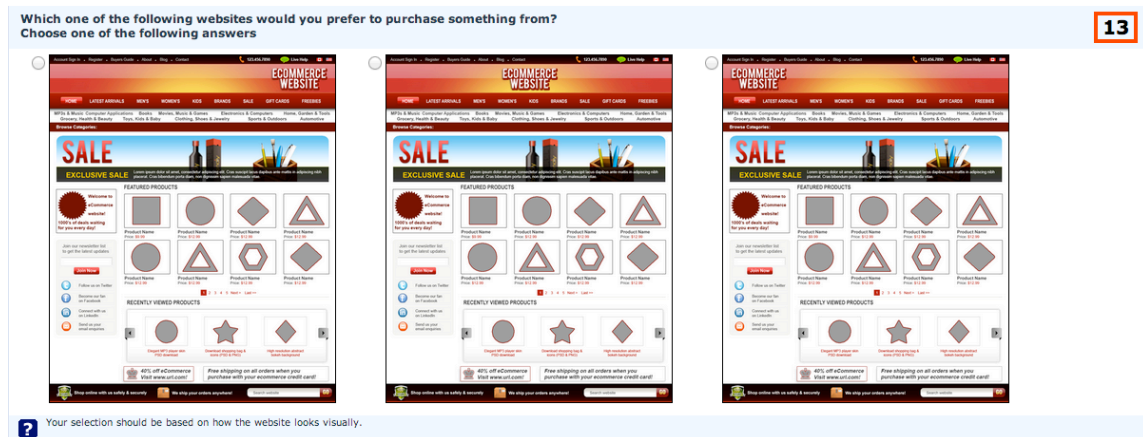


Figure 12: Example Logo Evaluation Screen

<sup>8</sup> Primary navigation, secondary navigation, company promotions, logo size, logo placement, external advertising, featured products, background color, and layout

## Data Collection Procedures

Data for this study was collected using self-hosted survey software called Limesurvey<sup>9</sup>. Limesurvey was chosen as the survey application for this research for its flexibility- both in number of respondents, and question formatting. Limesurvey is also open source, which provided the option of extending the survey tool, which was determined as a necessity in order to alter graphic presentation formatting. Due to the goal of this research providing a supporting structure for global preferences, a local or strictly collegiate sample of research participants would not have yielded relevant responses, and as such- no research participants for this study completed the study in-person. Research participants were recruited from a large sample set using an online research participant recruitment service<sup>10</sup>, with a recruitment message sent to 150 potential participants (Appendix B). Recipients of the recruitment message were selected for potential inclusion to fulfill the following criteria:

1. Participants must be geographically diverse. The ideal locations for participants involved in data collection for this Thesis consisted of (at a minimum) participants from the following countries: United States, China, Japan, Germany, India, Brazil, the United Kingdom, South Korea, France, and Italy, as ranked by worldwide internet usage statistics
2. Participants must include a wide range of ages

<sup>9</sup> “Open source survey application” located at <http://www.limesurvey.org>

<sup>10</sup> FindParticipants.com

3. Participants should be gender agnostic, with an ideal total collected sample of equal percentages Men and Women
4. Participants should have a diverse yearly income as income directly affects purchasing power, which was relevant to the data collection for this study

Outside of the system-sent recruitment message, no participants were contacted directly, and all participants who indicated willingness to participate were directed by the recruitment message to proceed directly to the online survey software. Participants arriving at the online study were first presented with a copy of the informed consent document, after which upon agreement, they were directed to complete 4 distinct groups of questions. Participants who did not agree to the informed consent document were shown a page thanking them for their interest, and were not allowed to participate in this study.

Question groups were separated into four primary sections, and inner questions were carefully phrased and evaluated to remove any implied perception of preference by the researcher, or any suggested action/selection by the participant. All individual questions, and question group responses were also timed in milliseconds by the survey software for analysis with regard to determinants of potential impulse purchase behavior. Upon completion of the study, participants were invited to provide their email address in order to be entered into a random drawing upon study completion. Any email addresses provided were entered as distinct values not stored with actual participant data to ensure anonymous responses.

## User Profile Questions

Questions for this section were designed to gather core demographic information on each participant. Questions covered only core demographics, and included: age, gender<sup>11</sup>, primary language, current country of residence, highest level of education received, current relationship status, current employment status, and current yearly income<sup>5</sup>. The options and presentation of these questions within this section were based on, and adapted from both the United Nations Statistics Division (UNSD) (United Nations Statistics Division, 2014), and the United States Statistics Divisions (USSD) (United States Census Bureau, 2010) information used to collect demographic profile information on individuals globally. Only minimal adaptations were made to available option format in order to present the data in a web-compatible format, including the addition of “Other” selections where users were asked to make a choice from a select menu, or where an alternate input may have been necessary or desired. Age selections were presented in range format, with a minimum selectable range of 18-20, and a maximum selectable range of “Over 85”. Yearly income selections were also presented in range format with \$9,999 ranges for each option; for example, “\$20,000 - \$29,999”, with a minimum of “Under \$10,000”, and a maximum of “Over \$350,000”. Yearly income, and gender selections included “Rather Not Say” in order to prevent the possible exclusion of participation by users uncomfortable with providing their financial information or gender determination.

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<sup>11</sup> Gender and income user profile questions included an option for “Rather Not Say”

### **Online Purchasing Related Questions**

Questions created to evaluate individual high-level web behavior such as total amount of time each participant had been an Internet user, how many hours each week spent online, frequency of online purchases and average self-reported amount on a per-online-purchase basis. Other questions in this question group were designed to evaluate the frequency and types of websites and/or e-commerce sites most frequently used by the participant. Responses for all questions in this section were provided in a fixed format (Select menu, selection array, or radio button option), with the exception of “How often do you buy things online” which did present an “Other” option to allow free-input.

Other questions were designed to evaluate individual types of online-behavior for future analysis regarding potential non-purchase behavior preferences, and determine on a more granular level how general internet usage ties into preference within the structural preference evaluation questions. These questions included:

- “How long have you been using the internet (including web-based email, shopping online, etc...)?”- Time range selection
- “How many hours did you spend on using the Internet last week?”- Time range selection
- “Indicate how often you visited the following during the past month:”- This option was presented as an array to evaluate types of websites ranging from email providers to photo sharing sites, and allowed possible selections of:
  - Hourly

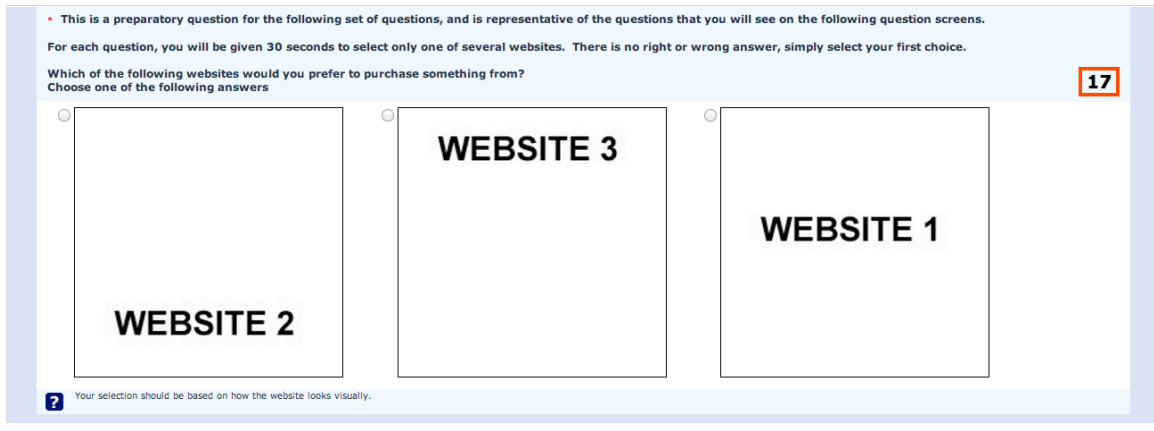
- Daily
  - Weekly
  - Monthly
  - Yearly
  - Never
- “How often do you buy things online?”- Time range selection
  - “In the past year, what have you bought online?”- Multiple-selection checkboxes (Figure 11)
  - “On average, how much do you spend on a single online purchase?”- Numeric input

In the past year, what have you bought online? Check any that apply	
<input type="checkbox"/> Musical Instruments	<input type="checkbox"/> Toys or Games
<input type="checkbox"/> Computer Software	<input type="checkbox"/> Clothing or Clothing Accessories
<input type="checkbox"/> Video Games	<input type="checkbox"/> Jewelry or Watches
<input type="checkbox"/> Electronics	<input type="checkbox"/> Arts, Crafts or Sewing
<input type="checkbox"/> Automotive Parts or Supplies	<input type="checkbox"/> Grocery or Gourmet Food
<input type="checkbox"/> Office Products	<input type="checkbox"/> Sports or Outdoors Products
<input type="checkbox"/> MP3 Downloads	<input type="checkbox"/> Services
<input type="checkbox"/> Movies or Television Shows	<input type="checkbox"/> Shoes
<input type="checkbox"/> Industrial & Scientific Products	<input type="checkbox"/> Tools or Home Improvement Supplies
<input type="checkbox"/> Cell Phones or Cell Phone Accessories	<input type="checkbox"/> Books
<input type="checkbox"/> Magazine Subscriptions	<input type="checkbox"/> Appliances
<input type="checkbox"/> Music	<input type="checkbox"/> Health or Personal Care
<input type="checkbox"/> Beauty Supplies	<input type="checkbox"/> Home, Garden & Pets
<input type="checkbox"/> Baby Products	<input type="checkbox"/> Other (Please specify): <input type="text"/>

**Figure 13: Online Purchase Options**

### Preference Evaluation Questions

During the preference evaluation section of the study, respondents were presented with twelve question screens, preceded by a ‘throw away’ preliminary question screen used to demonstrate how subsequent question screens would be presented, as well as providing the minimum possible instructional text (Figure 11).



**Figure 14: Preparatory question instruction for participants**

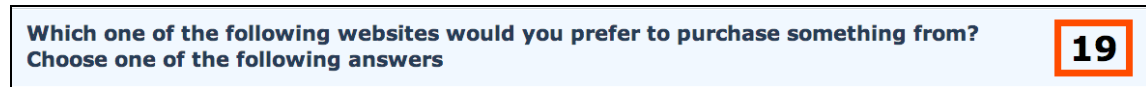
Each question screen presented participants with between three and six variations of the graphics prepared to represent simulated websites<sup>12</sup>. As two distinct sets of simulated websites were prepared, participants were presented with randomized variants of each, however, only graphics for a single simulated website were presented on each screen to prevent any possible confusion in the comparison of features. The order of all graphics across all preference evaluation questions was also randomized to prevent positional biases. All questions in this group followed a strict format, and all verbiage was the same across all questions. Each screen asked the user “Which one of the following websites would you prefer to purchase something from?” and had no written reference to which visual feature was being evaluated on each question screen. Help text was added at the bottom of each question screen as a result of preliminary participant questions which stated only, “Your selection should be based on how the website looks

<sup>12</sup> See “Preparation of Test Websites” section



visually,” as initially participants indicated product, price, and other feature seeking behavior which was not desired for this study.

A prominent, bold-text, red-bordered box with a countdown timer was presented on the top-right of all question screens for this section in order to reduce the time spent by participants, and all question screens began with 30 seconds on the timer, however, there was no penalty for failing to make a selection prior to the expiration of the timer. The determination to add a countdown timer was based on observation of preliminary in-person test participants<sup>13</sup>, and the otherwise extended durations spent on a per-question basis as well as the acquisition of data to be used for impulsivity analysis. Average time for selection across the question screens for preference evaluation was 15.908 seconds, and is discussed in greater detail in the Pilot Study Results section.

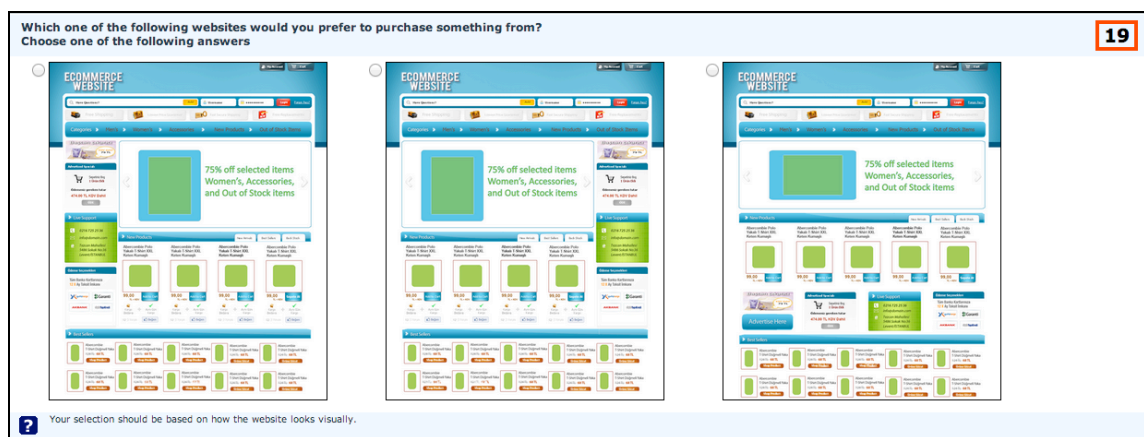


**Figure 15: Countdown Timer**

The presentation of preference evaluation questions went through multiple iterations before it was determined that the verbiage presented to users was clear enough to be evaluated, and each question choice was able to be selected with minimal action on the part of the participant. As only a single selection was allowed per screen group, radio button selection options were the desired presentation, however, this initially restricted the ease of preference selection by participants, as preliminary tests showed

<sup>13</sup> In person test participant data was not used for evaluation, and was only used to refine the parameters and questions for the pilot study

that users preferred to click the mouse cursor on the graphic as opposed to the radio button, so additional custom JavaScript code was added to the survey software to enable the expected behavior by participants. One-pixel wide solid black borders were also added to all images to reduce the likelihood of any visual carryover between the selections shown on each screen (Figure 16).



**Figure 16: Final format of preference evaluation screens**

The preference evaluation section of the data collection was crucial to this research, as in conjunction with the user profile data, it allowed for deeper analysis of preferences based on each of the 8 demographic data points collected for each participant, and each group of participants, and allowed for analysis to support or reject the hypothesis of this research<sup>14</sup>.

<sup>14</sup> 1) Clearly identifiable aesthetic and structural constants exist within e-commerce applications, and user preference for each variance may be generalized within global demographic subsets

## CHAPTER 4

### DISCUSSION

At its core, the nature of this research was based on the theory that there are distinct patterns and structures that may be evaluated<sup>15</sup>, and this was proven true. 93% of all evaluated websites had logos or company names placed in the top left of the website (Table 10), 81% presented primary navigation above other content (Table 11), and 74% presented secondary navigation within close proximity to primary navigation (Table 12). There was a wide spread of background colors used, with the majority being solid white (51%), and another four with white variants. Additionally, 51% of all analysis websites featured a two-column layout, while another 27% used only a single column (Table 13). Overall, a minimal number of quantifiable variants for each section of structural analysis were located throughout the analysis of existing and frequently visited e-commerce websites, with or without specific regard to the countries of popularity.

**Table 11: Logo Locations**

<b>Logo Location:</b>	<b>Count</b>	<b>Sites</b>	<b>Percentage</b>
Left	40	43	93.02%
Right	0	43	0.0000%
Center	3	43	6.98%

<sup>15</sup> Hypothesis 1: clearly identifiable structural design preferences exist within e-commerce applications, and can be generalized within individual demographic profiles

**Table 12: Primary Navigation Locations**

Primary Navigation Location:	Count	Sites	Percentage
Top	35	43	81.4%
Left	8	43	18.6%
Right	0	43	0%
Center	0	43	0%

**Table 13: Secondary Navigation Locations**

Secondary Navigation:	Count	Sites	Percentage
Top	32	43	74.4%
Left	7	43	16.3%
Right	1	43	2.3%
Center	2	43	4.7%
Bottom	1	43	2.3%

**Table 14: Layout Analysis**

Layout (Columns)	Count	Total Sites:	Percentage
1 column	12	43	27.9%
2 column	22	43	51.2%
3 column	8	43	18.6%
4 column	1	43	2.3%

The results of the analysis of existing e-commerce websites was also notable as though an infinite number of possible structures, columns, and layout types may be utilized, only a very select number of patterns were found to be implemented throughout the evaluated websites. This supports the observation that "the difference between one page design and another [...] falls in the subtle difference in type, layout, and color properties" used in each site (Park, 2007), and may direct ideal patterns by designers more toward adaptation within commonly used constraints.

The process of exploration within the field of web design, specific to structural and core elements is not well documented. Both formal and informal studies have been

published on related topics such as how design affects task efficiency (Michalski et al., 2006), how attitude toward usage affects actual usage (Van der Heijden, 2003), and the creation of cultural models by which websites ‘may’ be designed (Jagne et al., 2004), however, a more statistically based analysis of the features and their impacts within existing e-commerce sites as it relates to demographic profiles was not located, and as such was deemed to be a useful contribution to the field for the purposes of this research.

### Pilot Study Results

A random sample of 20 participants<sup>16</sup> was selected from a data set of 110 collected from participants, and consisted of ten US, and ten CA participants. After preliminary examination of the data collected from all participants, several rows of data were eliminated from possible analysis based on invalid or unusual patterns in data. For example, the question regarding average self-reported purchase price per-e-commerce purchase contained a value of \$50,000 for a single user, whereas the average reported single-transaction purchase price for all other participants ranged from \$20 - \$100.

After screening the available data from the pilot study results, it was determined that only enough participants were available for selection and randomization from Canada and the United States, as data was selected for usage based on quantity of participants in country so that demographic profiles including country of residence could be used for analysis with regard to preference.

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<sup>16</sup> N = 20 for all areas of evaluation

After completion of initial data screening, 42 data sets from the United States participants, and 41 data sets from Canadian participants were selected for randomization. Randomization of participants was achieved by adding two columns to separate spreadsheets containing responses for each country, populating the first new column with Microsoft Excel's "=RAND()" function, copying the values to the second blank column, and sorting the values. After sorting by the randomized column values, the top 10 rows of records were selected from each of the two country-specific data sets, and moved to a new spreadsheet for further analysis.

It is important to note that the analysis of results within this Pilot Study are used to show that the methodology will collect the necessary data to perform more advanced analysis, and the pilot study was designed to evaluate connections between variables to determine if a meaningful outcome could be analyzed in future studies based on the structural design guidelines methodology.

### **Overview of Participant Demographics**

The pilot study data for analysis was composed of 10 Canadian participants, and 10 United States participants, with 9 male, and 11 female participants between the ages of 21 and 45 (Figure 19). Eighteen of the twenty participants selected for analysis indicated 7 or more years of experience using the Internet, while one participant indicated less than 6 months, and one participant indicated 1-2 years. The reported participant income was evenly distributed among selection options, with 30% reporting income of \$30,000 - \$39,999 as shown in Table 15.

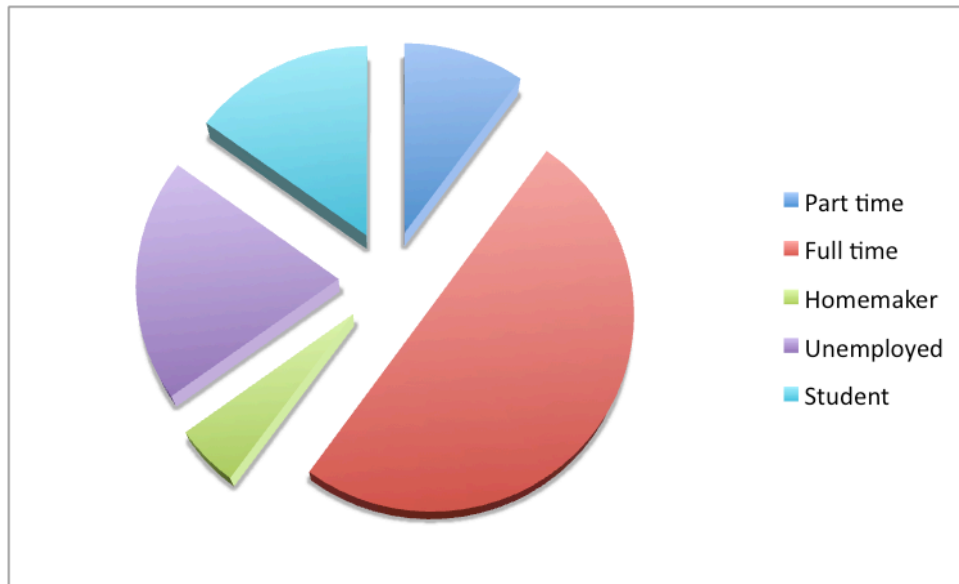
**Table 15: Reported Participant Income**

Reported Income	Number	Percentage
Under \$10,000	5	25%
\$10,000 - \$19,999	4	20%
\$30,000 - \$39,999	6	30%
\$50,000 - \$74,999	3	15%
\$151,000 - \$200,000	1	5%
Not Disclosed	1	5%

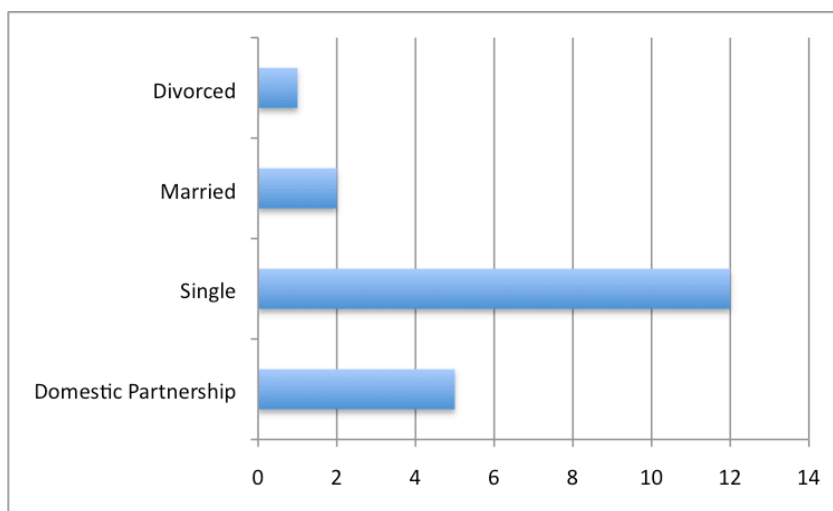
Of the selected sample, the average reported amount per individual online purchase was \$45.00, which was higher than expected, but consistent with other participant data that was not used for this analysis. 50% of the random sample also indicated an employment status of full-time, which was also higher than expected, although results were unknown as to the exact sample population based on the recruitment method (Figure 17). Twelve of the twenty participants indicated a relationship status of “Single”, with an additional 5 reporting “domestic partnership” (Figure 18).

The recruited sample set did fulfill the criteria for data collection for the purposes of a pilot study for this research with regard to age, income, and employment status; however, the data collected did not fully fulfill the ideal sample population with regard to country or language and is discussed in further detail in Limitations.

Pilot study data analysis was segregated into two distinct categories of analysis; 1) grouped preferential analysis, with no evaluation of demographic variables, rather seeking total preference determinations, and 2) demographic preference analysis on a per-profile basis.

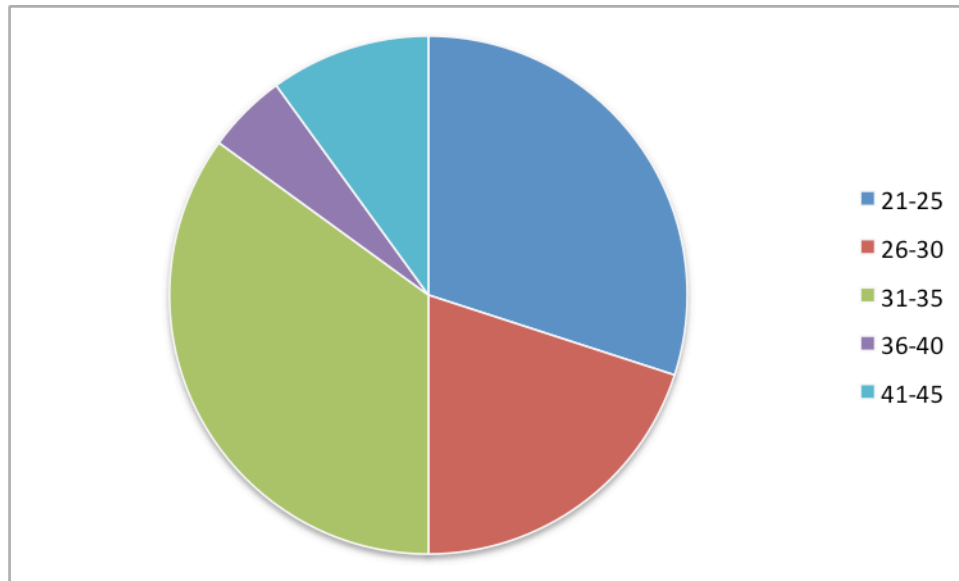


**Figure 17: Reported Participant Employment Status**



**Figure 18: Reported Participant Relationship Statuses**





**Figure 19: Reported Participant Ages**

### Grouped Preferential Analysis

Preliminary data analysis was performed on the pilot study data as a set, evaluating the collective preference without any regard to demographic profiling. The data set was tabulated for each of the following areas of preference analysis: 1) the presence of advertising, 2) the layout of the website, 3) the location of primary navigation, 4) the location of secondary navigation, and 5) the placement of the logo within the top bar. The results are as follows:

- 52.5% of users indicated a preference for the example e-commerce website that **did** contain an advertising feature
- 47.5% of users indicated a preference for layout represented by a large right column, and a small left column that included navigation, while

30% indicated preference for a large left column, and 22.5% were preferential towards a single large column with no sidebar

- 50% indicated preference for a left aligned logo, while 30% selected right aligned, and the remaining 20% selected centered logo as the preference
- 45% indicated preference for left aligned primary navigation, 30% preferred top aligned primary navigation, and 25% preferred right aligned primary navigation
- 52.5% indicated preference for left aligned secondary navigation, while 27.5% preferred top aligned, and 20% preferred right aligned navigation

The overall results of the grouped analysis show a preference for website that does contain advertising, contains left column primary navigation with a large right-aligned section for other website content, a left aligned logo, and left aligned secondary navigation. As the grouped preference included both primary and secondary navigation within the left column of the example websites, it could be inferred that the ideal presentation of both navigation features would be either in a vertical nested arrangement, or primary navigation above secondary navigation.

### Demographic Results Analysis

This section will discuss the more specific analysis of actual statistics based on demographic profiles, and is broken down into the following sections for more detailed analysis: 1) layout, 2) advertising, 3) logo placement, 4) primary navigation placement,

and 5) secondary navigation placement. Each structural data analysis set was tested against the hypothesis that there are clearly identifiable structural constants that in e-commerce websites that may be generalized within global demographic subsets. This hypothesis was proven true for all structural sections as compared to demographic and purchase profiles evaluated in this pilot study, and is detailed in each of the following sections.

### Analysis of Layout Preferences

Layout preferences were first tested based on gender, which showed significance in evaluation, with both men and women preferring the presented layout containing a left aligned sidebar containing navigation items, and a large right column containing other content such as sales items, and product grids. 54.55% of women preferred this layout, as well as 38.89% of men. As shown in Figure 20, the overarching preference across nearly all points of evaluation was “Two Columns Left”.

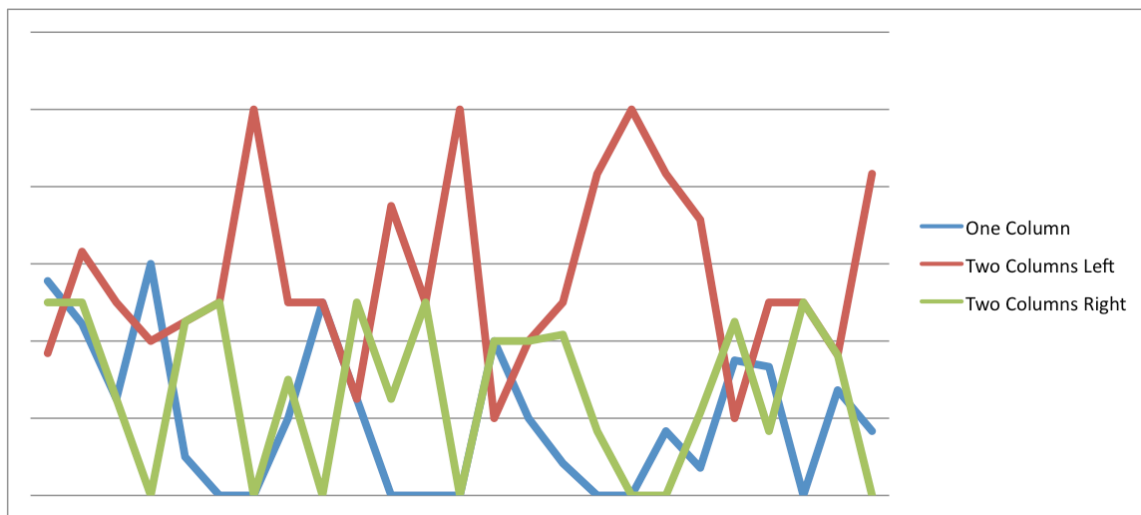
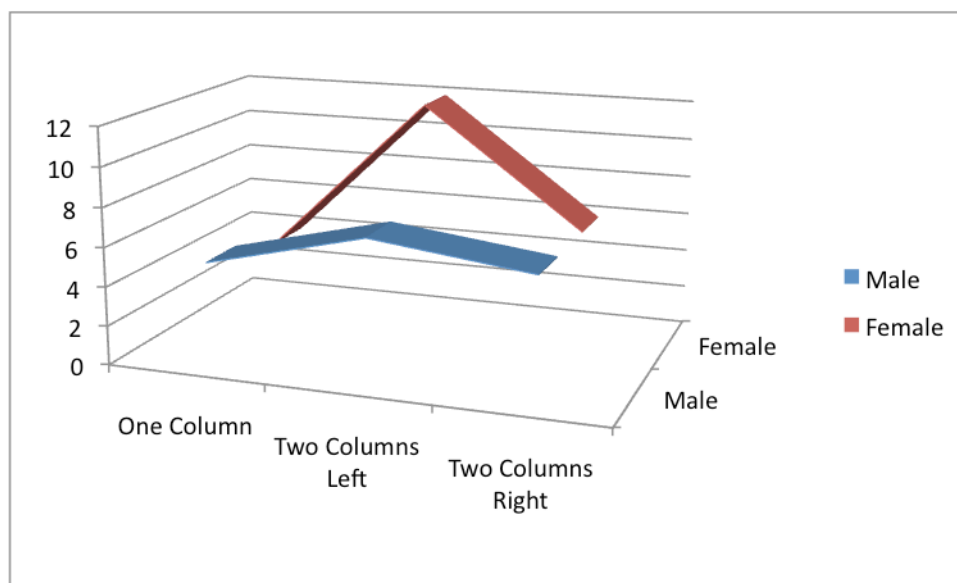


Figure 20: Full Layout Analysis for all profiles

**Table 16: Structure Gender Preference**

Gender	Layout	Count	Percent
Female	One Column	4	18.18%
Female	Two Columns Left	12	<b>54.55%</b>
Female	Two Columns Right	6	27.27%
Gender	Layout	Count	Percent
Male	One Column	5	27.78%
Male	Two Columns Left	7	<b>38.89%</b>
Male	Two Columns Right	6	33.33%

**Figure 21: Structure Gender Analysis**

Based on educational level, preferences were significant for Associates degree or similar, Some College, and PhD selections, however both Bachelors and Masters degree selections indicated mixed results as shown in Table 17.

**Table 17: Structure Educational Analysis**

<b>Layout</b>	<b>Associates</b>	<b>Some College</b>	<b>Bachelors</b>	<b>Masters</b>	<b>PhD</b>
One Column	25%	<b>60%</b>	10%	0%	0%
Two Columns Left	<b>50%</b>	40%	45%	50%	<b>100%</b>
Two Columns Right	25%	0%	45%	50%	0%

Employment statuses yielded similar results, with three of the five possible profiles representing strong preference. Full time, unemployed, and part time statuses showed preference, however, the “Homemaker” status may simply be related to a smaller respondent population as only one respondent indicated this status.

**Table 18: Structure Employment Analysis**

<b>Layout</b>	<b>Full Time</b>	<b>Student</b>	<b>Unemployed</b>	<b>Part Time</b>	<b>Homemaker</b>
One Column	20%	50%	25%	0%	0%
Two Columns Left	<b>50%</b>	50%	25%	<b>75%</b>	50%
Two Columns Right	30%	0%	<b>50%</b>	25%	50%

Income-based analysis of the six income tiers existing within the sample data showed stronger preferences than other areas of analysis when evaluating structural preferences, as shown in Table 19.

Income based analysis showed a strong preference toward two-columns left, in keeping with the majority of other specific evaluations.

**Table 19: Structure Income Analysis**

Layout	Rather Not Say	Under \$10,000	\$10,000 - \$19,999	\$30,000 - \$39,999	\$50,000 - \$74,999	\$151,000 - \$200,000
One Column	0%	40%	20%	8%	0%	0%
Two Columns Left	<b>100%</b>	20%	40%	<b>50%</b>	<b>83%</b>	<b>100%</b>
Two Columns Right	0%	40%	40%	41%	16%	0%

**Figure 22: Structure Income Analysis Results**

Trends regarding time spent on a per-week basis showed further trends in preference as shown in Table 20, and indicated a continuing trend in the preference for the two column layout as described above.

**Table 20: Structure Frequency Analysis**

Layout	5-10 hours	10-20 hours	20 or more hours
One Column	16.67%	7.14%	35%
Two Columns Left	<b>83.33%</b>	<b>71.43%</b>	20%
Two Columns Right	0%	21.43%	<b>45%</b>

**Table 21: Structure Spending Analysis**

Layout	<\$25	\$25-35	\$40-50	\$60-100
One Column	33.33%	0%	27.27%	16.67%
Two Columns Left	<b>50%</b>	50%	36.36%	<b>83.33%</b>
Two Columns Right	16.67%	50%	36.36%	0%

### Analysis of Advertising Preferences

The results of the advertising preference analysis were less conclusive than for other areas, with results only showing minor levels of significance for age, income, and employment status. However, the results for age, income, and employment status were only slightly more significant than for gender, education, time-per-week, or amount-spent per-purchase. These mixed result may be related to a combination of the small size of the represented advertisement, or the tendency by web users to ignore advertisements- thusly resulting in blind selections by users as shown in Table 22 for the 41 – 45 age group preferring advertising over no advertising (Figure 23).

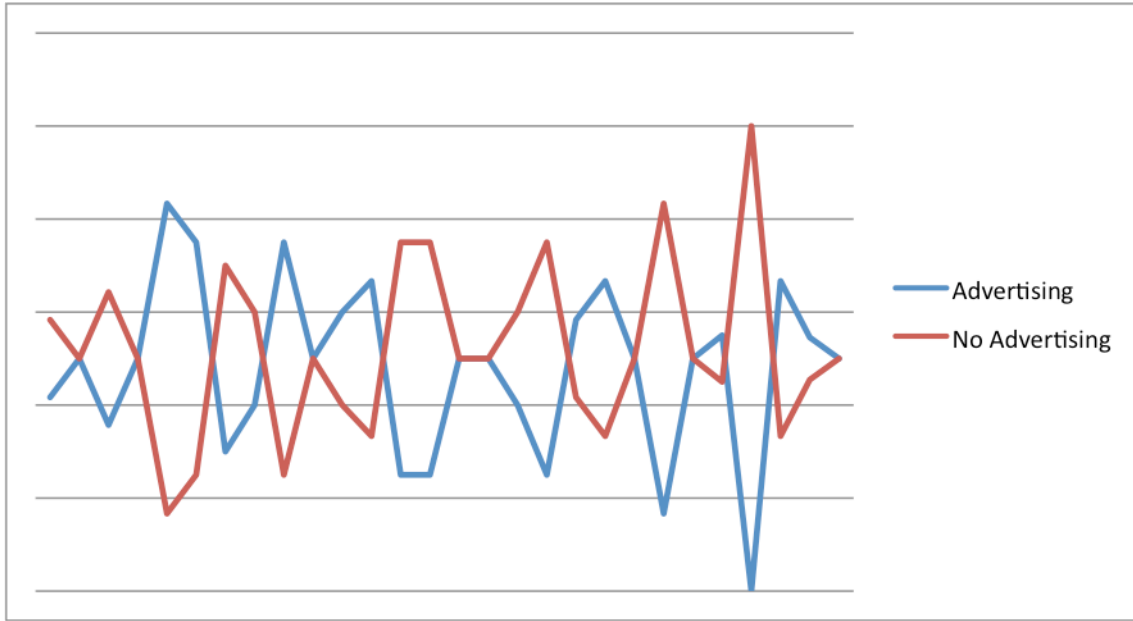


Figure 23: Full advertising analysis for all profiles

Table 22: Advertising Age Analysis

Preference	21 - 25	26 - 30	31 - 35	36 - 40	41 - 45
Advertising	41.67%	50%	35.71%	50%	<b>83.33%</b>
No Advertising	58.33%	50%	64.29%	50%	16.67%

Table 23: Advertising Gender Analysis

Preference	Female	Male
Advertising	45.45%	50%
No Advertising	54.55%	50%

Table 24: Advertising Educational Analysis

Preference	Associates or Similar	Some College	Bachelors	Masters	PhD
Advertising	<b>75%</b>	30%	40%	<b>75%</b>	50%
No Advertising	25%	<b>70%</b>	60%	25%	50%



**Table 25: Advertising Educational Analysis**

Preference	Full Time	Student	Unemployed	Part Time	Homemaker
Advertising	60%	66.67%	25%	25%	50%
No Advertising	40%	33.33%	75%	75%	50%

**Table 26: Advertising Income Analysis**

Preference	Rather Not Say	Under \$10,000	\$10,000 - \$19,999	\$30,000 - \$39,999	\$50,000 - \$74,999	\$151,000 - \$200,000
Advertising	50%	40%	25%	58.33%	66.67%	50%
No Advertising	50%	60%	75%	41.67%	33.33%	50%

**Table 27: Advertising Frequency Analysis**

Preference	5-10 hours	10-20 hours	20 or more hours
Advertising	16.67%	50%	55%
No Advertising	83.33%	50%	45%

**Table 28: Advertising Spending Analysis**

Preference	<\$25	\$25-35	\$40-50	\$60-100
Advertising	0%	66.67%	54.55%	50%
No Advertising	100%	33.33%	45.45%	50%

### Analysis of Logo Placement Preferences

Logo placement analysis by demographic profile showed similar trends in preferential behavior, primarily indicating a preference for a left aligned logo within the top bar of the website, as represented by the grouped sample analysis with a 50% preference indicator for left alignment.

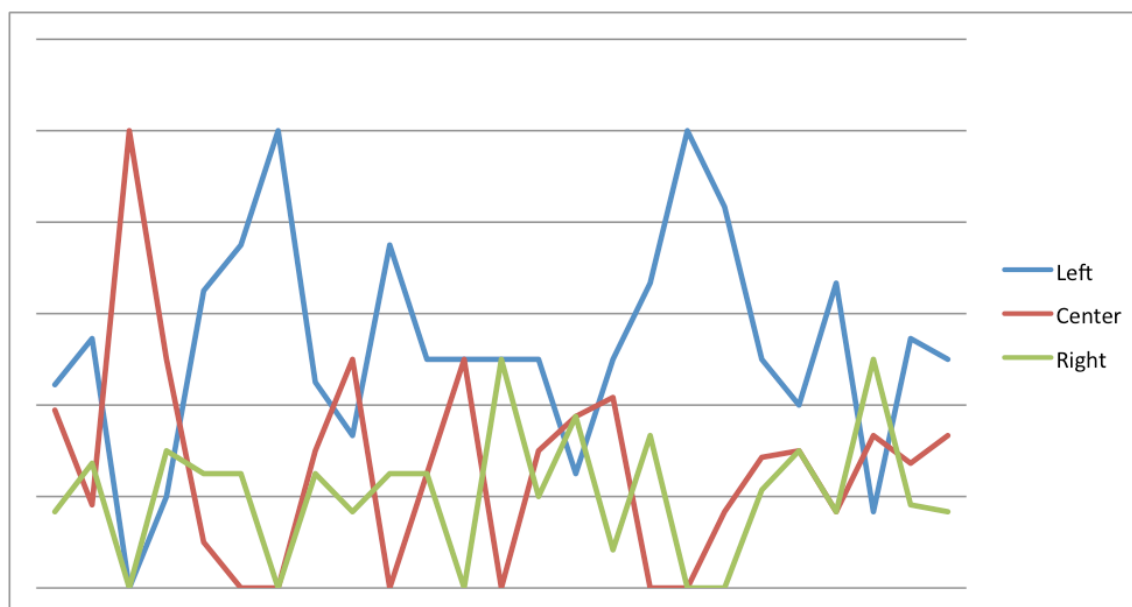


Figure 24: Full logo placement analysis for all profiles

Table 29: Logo Placement by Gender

Placement	Male	Female
Left	44.44%	54.55%
Center	38.89%	18.18%
Right	16.67%	27.27%

Table 30: Logo Placement by Education

Placement	Associates or Similar	Some College	Bachelors	Masters	PhD
Left	0%	20%	65%	75%	100%
Center	100%	50%	10%	0%	0%
Right	0%	30%	25%	25%	0%

Table 31: Logo Placement by Employment

Placement	Full Time	Student	Unemployed	Part Time	Homemaker
Left	45%	33.33%	75%	50%	50%
Center	30%	50%	0%	25%	50%
Right	25%	16.67%	25%	25%	0%

**Table 32: Logo Placement by Income**

Placement	Rather Not Say	Under \$10,000	\$10,000 - \$19,999	\$30,000 - \$39,999	\$50,000 - \$74,999	\$151,000 - \$200,000
Left	50%	<b>50%</b>	25%	<b>50%</b>	<b>66.67%</b>	<b>100%</b>
Center	0%	30%	37.50%	41.67%	0%	0%
Right	50%	20%	37.50%	8.33%	33.33%	0%

**Table 33: Logo Placement by Frequency**

Placement	5-10 hours	10-20 hours	20 or more hours
Left	<b>83.33%</b>	<b>50%</b>	<b>40%</b>
Center	16.67%	28.57%	30%
Right	0%	21.43%	30%

**Table 34: Logo Placement by Spending**

Placement	<\$25	\$25-35	\$40-50	\$60-100
Left	<b>66.67%</b>	16.67%	<b>54.55%</b>	<b>50%</b>
Center	16.67%	33.33%	27.27%	33.33%
Right	16.67%	<b>50%</b>	18.18%	16.67%

### Analysis of Primary Navigation Preferences

The results of the primary navigation location analysis were largely inconclusive with regard to the choice between top and left placement. This analysis did show trends indicating that the right aligned primary navigation was not desirable for any demographic.

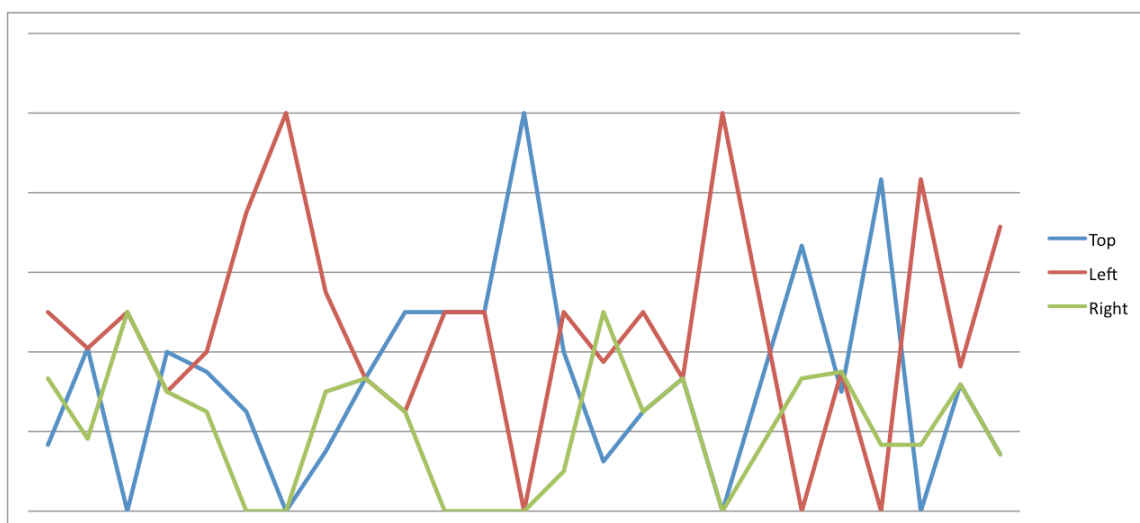


Figure 25: Full primary navigation analysis for all profiles

Table 35: Primary Navigation by Gender

Placement	Male	Female
Top	16.67%	40.91%
Left	<b>50%</b>	40.91%
Right	33.33%	18.18%

Table 36: Primary Navigation by Education

Placement	Associates or Similar	Some College	Bachelors	Masters	PhD
Top	0%	<b>40.00%</b>	35%	25%	0%
Left	50%	30%	<b>40%</b>	<b>75%</b>	<b>100%</b>
Right	50%	30%	25%	0%	0%

Table 37: Primary Navigation by Employment

Placement	Full Time	Student	Unemployed	Part Time	Homemaker
Top	15%	33.33%	<b>50%</b>	50%	50%
Left	<b>55%</b>	33.33%	25%	50%	50%
Right	30%	33.33%	25%	0%	0%

**Table 38: Primary Navigation by Income**

Placement	Rather Not Say	Under \$10,000	\$10,000 - \$19,999	\$30,000 - \$39,999	\$50,000 - \$74,999	\$151,000 - \$200,000
Top	100%	40%	12%	25%	33.33%	0%
Left	0%	50%	37.50%	50%	33.33%	100%
Right	0%	10%	50%	25%	33.33%	0%

**Table 39: Primary Navigation by Frequency**

Placement	5-10 hours	10-20 hours	20 or more hours
Top	33.33%	66.67%	30%
Left	50%	0%	35%
Right	16.67%	33.33%	35%

**Table 40: Primary Navigation by Spending**

Placement	<\$25	\$25-35	\$40-50	\$60-100
Top	83.33%	0%	31.82%	14.29%
Left	0%	83.33%	36.36%	71.43%
Right	16.67%	16.67%	31.82%	14.29%

### Analysis of Secondary Navigation Preferences

Secondary navigation preferences were more clearly identifiable across each of the profiles, with a predominant emphasis on left aligned placement; however, results for this analysis were inconclusive for analysis by amount spent (Table 46, Figure 26).

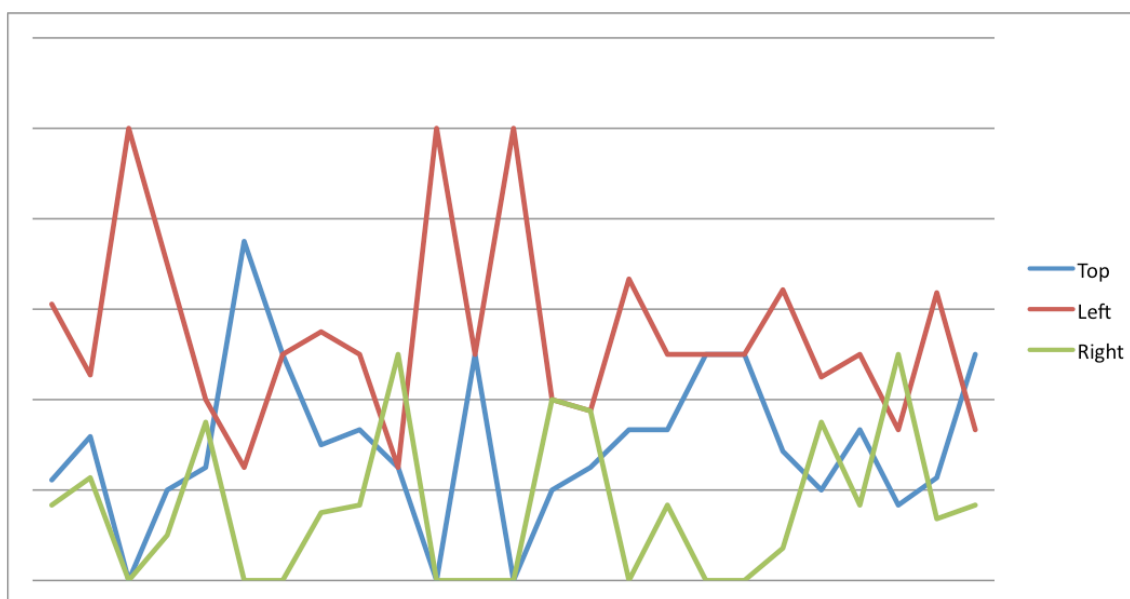


Figure 26: Full secondary navigation analysis for all profiles

Table 41: Secondary Navigation by Gender

Placement	Male	Female
Top	22.22%	31.82%
Left	<b>61.11%</b>	<b>45.45%</b>
Right	16.67%	22.73%

Table 42: Secondary Navigation by Education

Placement	Associates or Similar	Some College	Bachelors	Masters	PhD
Top	0%	20%	25%	<b>75%</b>	50%
Left	<b>100%</b>	<b>70%</b>	<b>40%</b>	25%	50%
Right	0%	10%	35%	0%	0%

Table 43: Secondary Navigation by Employment

Placement	Full Time	Student	Unemployed	Part Time	Homemaker
Top	30%	33.33%	25%	0%	50%
Left	<b>55%</b>	<b>50%</b>	25%	<b>100%</b>	50%
Right	15%	16.67%	<b>50%</b>	0%	0%

**Table 44: Secondary Navigation by Income**

Placement	Rather Not Say	Under \$10,000	\$10,000 - \$19,999	\$30,000 - \$39,999	\$50,000 - \$74,999	\$151,000 - \$200,000
Top	0%	20%	25%	33.33%	33.33%	50%
Left	<b>100%</b>	40%	37%	<b>66.67%</b>	<b>50%</b>	50%
Right	0%	40%	37%	0%	16.67%	0%

**Table 45: Secondary Navigation by Frequency**

Placement	5-10 hours	10-20 hours	20 or more hours
Top	50%	28.57%	20%
Left	50%	<b>64.29%</b>	<b>45%</b>
Right	0%	7.14%	35%

**Table 46: Secondary Navigation by Spending**

Placement	<\$25	\$25-35	\$40-50	\$60-100
Top	33.33%	16.67%	22.73%	<b>50%</b>
Left	<b>50%</b>	33.33%	<b>63.64%</b>	33.33%
Right	16.67%	<b>50%</b>	13.64%	16.67%

## CHAPTER 5

### SUMMARY AND CONCLUSIONS

Throughout the processes of web development and design, the end users level of comfort and likability of an e-commerce website is of utmost importance, and is capable of dissuading many potential customers from final purchase execution. There are a large number of factors to take into account throughout the process of building or adjusting an e-commerce website for optimal structural preferences and practical consumer experience; cultural constraints, pricing, effective iconography, user interface design, etc... However, this study seeks to provide a foundation that may provide useful data to address the starting point of all e-commerce websites- structural aesthetics.

By performing analysis on prevalent and variable features within some of the world's most visited and largest e-commerce websites, then generating a framework for user-centered analysis of variables individually, an effective design-recommendation framework based on the collected data can be compiled. This design framework will provide a starting point for new entrants to e-commerce websites, as well as techniques to increase customer bases amongst longstanding companies within e-commerce markets.

The findings of this research show that user preference does not contain significant variance from known website conventions, and data analysis indicates preference for structural designs contained within the majority of the websites analyzed. These findings may represent the effects of familiarity, however, the potential cost of



attempting groundbreaking or more creative structural designs within new or established e-commerce websites may exceed the added visual differentiation from competitors.

### Limitations of Research

Due to the nature of this thesis being based on the generation of a suitable and extendable framework for evaluation, this research is limited with regard to participant data collection. This research and any internal analysis may also be outdated at the time of reading, as the duration between iterations in modern web and e-commerce trends and available technologies fluctuate frequently as new utilities and preferences emerge. No grants or funding were provided for this research, and all data was collected in a single self-hosted online survey tool.

For the scope of this research, product price, and/or pricing competitiveness were not evaluated, and it should be noted that both variables may affect consumer purchase decision making as well as preferences for one site over another with regard to the sites used for analysis. Variables surrounding price may necessitate a third group for evaluation in addition to Specialty Group websites and Assorted Group websites in order to present structural aesthetic options that may vary amongst websites within categorically assigned price tiers.

Visual presentation of the example e-commerce sites for evaluation within the Preference Evaluation section of the pilot study did not allow a full-screen experience for each of the represented graphics, and each set of question screens presented between 1 and 3 e-commerce representations next to each other in horizontal rows (Figure 13:

Online Purchase Options). As the presentation was not that of a normal website viewing experience, the results of the preferences section of this study should only be used as a general guideline, and is designated as an item of future research. Although features for evaluation were visible, a full-screen or similar experience for each example e-commerce website- allowing the participants to more closely examine the images using either an on-mouseover or full screen mode may provide a more valuable representation of collected data results. The implementation of this functionality does require further review other possible methods regarding the most effective way of presenting the multiple variants of each evaluation area in a side-by-side view format. This extended research would more accurately determine the presentation allowing intended choices to be made by participants regarding their preference.

The sample population from the pilot study was not as geographically diverse as is necessary to perform a complete analysis that would be capable of producing a full result set of recommendations, and future research should include the recruitment of a large enough sample population to screen for a large N in each demographic profile.

## Conclusions

This research was of specific interest to the researcher, highly challenging, time intensive, and was an invaluable experience. Throughout the course of this research, the number of variables to take into account was constantly expanding, and it was necessary to continually refine the goals, and limits by which reliable, repeatable, and useful

information could be gathered. The data gathered by the analysis of existing e-commerce websites showed that there are reliable and repeatable structural design trends, and that certain aspects of the core features evaluated are capable of impacting consumer purchase decision-making on a level suitable for evaluation. Additionally, the method of analysis created in this research was generated in such a way that future research in the same area may be accurate, reliable, and extendible.

### Future Research

Future research in this area is an integral part of maintaining data accuracy and consistency, as addressed in Limitations of Research, and as such- any continued research on this topic must first involve a recreation of at minimum the steps outlined in the Methodologies as presented in order to achieve accurate visual representations by which an analysis could be completed.

Planned future research on this topic includes expanding the scope of this study, both in number of e-commerce websites used for evaluation, and the number of respondents used for more extensive data analysis. The ideal number of e-commerce websites analyzed by the methodology as described is 100 in order to include a wider sample of possible points for evaluation, while remaining within the core 9 points of evaluation. Additionally, expanding the functionality of Limesurvey or another survey software of choice to allow for either full-screen, or expanded viewing of the example websites used for Preference Evaluation would address similar limitations to provide more thorough analysis of the data collection in this area. Possible representation of

example e-commerce websites may be in a click-to-zoom format, on-hover zoom format, or slideshow-style format in a full-screen overlay to more closely represent an expected usage experience.

Regarding the exploration of impulse purchase decision-making using this same framework, effective analysis in this area may be completed for future research by creating actual standalone, and usable e-commerce sites which research participants are taken to with randomized single-page representations (including purchase flows). This method would require a larger sample population as the number of example websites shown to each participant would be limited to one, however, determining actual usage of the segregated example sites would provide valuable insight into data not available through image-based representation of the same websites.

Additional participant data collection is planned for future research, specifically through the recruitment of large sample populations from each of the countries with high rates of Internet usage<sup>17</sup>, as this is necessary to conduct a full analysis of demographic profiles and their correlation to preference.

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<sup>17</sup> United States, China, Japan, Germany, India, Brazil, the United Kingdom, South Korea, France, and Italy

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## APPENDIX A

## LIST OF ANALYSIS WEBSITES

Website	Width	Height
http://www.6pm.com	1000	1924
http://www.abercrombie.com	960	1143
http://www.adorama.com	953	1851
http://www.ae.com	953	1165
http://www.aeropostale.com	1089	1238
http://www.alibris.com	970	2755
http://www.amazon.com	994	2079
http://www.anthropologie.com	1002	1066
http://www.art.com	953	1574
http://www.barnesandnoble.com	990	3245
http://www.beachbody.com	964	2194
http://www.bedbathandbeyond.com	960	1122
http://www.bestbuy.com	960	1246
http://www.bluefly.com	953	1461
http://www.bonanza.com	963	1043
http://www.borders.com	984	1682
http://www.buy.com	1126	3105
http://www.cabelas.com	990	1915
http://www.cafepress.com	1000	2258
http://www.cars.com	954	2029
http://www.cdbaby.com	995	1789
http://www.cduniverse.com	953	1744
http://www.costco.com	953	1329
http://www.crutchfield.com	953	1754
http://www.dickssportinggoods.com	1021	2183
http://www.dillards.com	1039	1027
http://www.ebay.com	990	1485

<a href="http://www.egames.com">http://www.egames.com</a>	990	1617
<a href="http://www.emusic.com">http://www.emusic.com</a>	1020	2307
<a href="http://www.focalprice.com">http://www.focalprice.com</a>	981	4700
<a href="http://www.forever21.com">http://www.forever21.com</a>	953	937
<a href="http://www.frys.com">http://www.frys.com</a>	1010	1435
<a href="http://www.futureshop.ca_en-ca_home.aspx">http://www.futureshop.ca_en-ca_home.aspx</a>	953	2754
<a href="http://www.game.co.uk">http://www.game.co.uk</a>	1002	1876
<a href="http://www.gap.com">http://www.gap.com</a>	994	1275
<a href="http://www.gnc.com">http://www.gnc.com</a>	990	1718
<a href="http://www.hallmark.com">http://www.hallmark.com</a>	988	2179
<a href="http://www.hm.com_us">http://www.hm.com_us</a>	1060	1651
<a href="http://www.homedepot.com">http://www.homedepot.com</a>	970	5653
<a href="http://www.iherb.com">http://www.iherb.com</a>	961	1136
<a href="http://www.ikea.com_us_en">http://www.ikea.com_us_en</a>	953	1455
<a href="http://www.jcpenny.com">http://www.jcpenny.com</a>	953	843
<a href="http://www.jcrew.com">http://www.jcrew.com</a>	960	615

## APPENDIX B

## ONLINE RECRUITMENT MESSAGE

**Subject Line/Title:** Research Participants Needed for Ecommerce Evaluation Study

**Message/Post Body:**

Iowa State University graduate student needs research participants for a study evaluating aesthetic preferences within e-commerce websites.

Participation in this study will take approximately 25 minutes, and the study can be completed at any time by navigating to [URL HERE] in your web browser.

The following questions are to be answered in this research:

1. Do standard aesthetic preferences exist within multi-cultural environments for e-commerce websites?
2. Are demographic variables capable of predicting visual preference within e-commerce websites?

Participants may optionally provide an email address in order to be entered into a random drawing for one \$100 visa gift card, one of two \$50 visa gift cards, or 1 iPad.

Participants must be at least 18 years old to participate in this study.

For more information, or to participate in this study, please visit [URL HERE].

## APPENDIX C

### ANALYSIS SCRIPT

```

import glob
import sys
import Image

data = []

imgs = glob.glob("*.tif")
print "processing", len(imgs), "tifs\n"

#total_percent_per_color = [0.0] * 256 # list of 256 0.0s, each containing the
accumulated % of that pixel value
total_percent_per_color = {} # uses col_type as key
total_num_imgs = 0 #counts good imgs processed (could be less than len(imgs))
sum_of_x = 0
sum_of_y = 0
sum_of_sizes = 0

out = open("All_automated_img_analysis.csv", "w")
print >> out,"Automated Image Analysis Output: Spec and Asst Websites"
print >> out,"Layout options: 1 column (1) - 2 column (2) - 3 column (3),Logo
placement options: left - middle - right"
for fname in imgs:
    im = Image.open(fname)
    name = fname
    print "\n",name,"\n"
    print >> out,"\n",name,",",
    #check for correct tif format
    if im.mode != 'RGB':
        print "error - images must be RGB"
        continue

    total_number_of_pixels = im.size[0] * im.size[1]
    print "Size:",im.size, "Total Pixels:
",total_number_of_pixels,"(",im.size[0],"x",im.size[1],")"

    print >> out,"Total Pixel
Size:",",total_number_of_pixels,"(",im.size[0],"x",im.size[1],")"
    print >> out,"Navigation Location:,,",
    print >> out,"Secondary Navigation Location:,,",
    print >> out,"Advertising? (Y/N):,,Background Color:,,",
    print >> out,"Layout Format:,,Logo Location:,,",
    print >> out,"Area:,RGB Colour:, Total Size for Area:,Total Image
Size:,Percent for Area:"

    for c in im.getcolors():

        total_number_of_pixels = im.size[0] * im.size[1]
        if (c[1] == (255, 255, 255)) or (c[1] == (255, 255, 253)) or
(c[1] == (255, 255, 252)) or (c[1] == (211, 232, 211)) or (c[1] == (253, 254,
253)):
            #col_type = "White(ish)"
            continue
        elif (c[1] == (255, 0, 0)) or (c[1] == (255, 127, 127)):
            col_type = "Primary Navigation"

```

```

elif (c[1] == (0, 0, 255)) or (c[1] == (127, 127, 255)):
    col_type = "Logo"
elif (c[1] == (160, 32, 240)) or (c[1] == (207, 143, 247)):
    col_type = "Secondary Navigation"
elif (c[1] == (255, 255, 0)) or (c[1] == (255, 255, 127)):
    col_type = "Advertising"
elif (c[1] == (34, 139, 34)) or (c[1] == (144, 197, 144)):
    col_type = "Featured Products"
elif (c[1] == (255, 165, 0)) or (c[1] == (255, 210, 127)):
    col_type = "Company Promotions"
else:
    col_type = "Unknown Area"
#else:
#    continue

# percent of pixels of the current color
pct = (c[0] / float(total_number_of_pixels)) * 100

# make a string representation of the RGB tuple
rgb = c[1]
RGB_as_str = "%i %i %i" % (rgb[0], rgb[1], rgb[2])

# print out info about the current color type (col_type)
print col_type, RGB_as_str, c, pct
print >>
out,col_type,",",RGB_as_str,",",c[0],"px,",total_number_of_pixels,"px,%" ,pct

# test if we could get a value from key col_type, if that fails
(b/c there's no value stored yet
# for that key), init that key's value with 0
if not total_percent_per_color.get(col_type):
total_percent_per_color[col_type] = 0
total_percent_per_color[col_type] += pct # add to total
percentage of this color
sum_of_sizes += total_number_of_pixels
sum_of_x += im.size[0]
sum_of_y += im.size[1]

#print >> out,"Total image size:",im.size,"Total
Pixels:",total_number_of_pixels,"Total Pixels for
colour:",RGB_as_str,"Percent:",%" ,pct
total_num_imgs += 1 # got one more good img

average = (sum_of_sizes / total_num_imgs)
total_x_y = sum_of_x * sum_of_y
x_avg = (sum_of_x / total_num_imgs)
y_avg = (sum_of_y / total_num_imgs)
print "\nFor all Images, Average Size:",average,"Average Total Pixels:\n"
print "X: ",sum_of_x,"\n"
print "Y: ",sum_of_y,"\n"
print total_x_y
print >> out,"\nTotal Pixels all Images",total_x_y,"px ,Average
Size:",average,"px,Average Total Pixels:",x_avg,"X",y_avg

# pull out all keys (each corresponds to a color "index" tuple)
tot = 0
print "\n---- SUMMARY ----"
print >> out,"\n---- SUMMARY ----\n"
for k in sorted(total_percent_per_color.keys()):

```

```
pct = total_percent_per_color[k] # get accumulated % for that color
norm_pct = pct / float(total_num_imgs)
rgb = c[1]
RGB_for_print = "%i %i %i" % (rgb[0], rgb[1], rgb[2])
print k,": ", norm_pct, "% of total"
print >> out,k,":", norm_pct, "% of total"
#print >>out,col_type,"",RGB_for_print,"", norm_pct, "% of total\n"
tot += norm_pct
print "total sum", tot
print >> out,"Total Sum,", tot,"/100%"
out.close()
```



## APPENDIX D

## INFORMED CONSENT

**Title of Study:** Analysis of multi-cultural demographic visual preferences online

**Investigators:** Principle Investigator: Bennett Stone, BS, MS  
Debra Satterfield, Supervising Faculty Member

This is a research study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time by contacting Bennett Stone at [blstone@iastate.edu](mailto:blstone@iastate.edu).

**INTRODUCTION**

The objective of this study is to establish a framework of aesthetic web standards and recommendations that may be isolated based on demographic variables.

The following questions are to be answered in this research:

3. Do standard aesthetic preferences exist within multi-cultural environments for e-commerce websites?
4. Are demographic variables capable of predicting visual preference within e-commerce websites?

The results of this study may be presented at conferences or published in academic journals.

You must be at least 18 years old to participate in this study.

**DESCRIPTION OF PROCEDURES**

If you agree to participate, your participation will last approximately 25 minutes, and the following procedures will be followed:

1. You will be asked to complete a user profile survey, followed by an online purchase questionnaire.
2. You will then be shown up to 30 question screens, each with up to 6 images of a website and asked to select one website image from each screen based on preference, and enter a rationale for your selection if desired.
3. You will be allowed (optional) to provide an email address in order to be entered into a random drawing for one \$100 visa gift card, one of two \$50 visa gift cards, or one iPad.

During the testing, mouse cursor recording software may be used to record user interactions and steps within the browser window. The mouse cursor recording software

will record interaction within the testing window, and **will not** function outside of the testing window.

## **RISKS**

There are no foreseeable risks at this time from participating in this study.

## **BENEFITS**

If you decide to participate in this study there will be no direct benefits to you. The knowledge and information gathered in this research will assist companies and e-commerce web designers in creating effective online presences that are tailored to specific clients and customers.

## **COSTS AND COMPENSATION**

You will not have any costs from participating in this study. You may optionally provide your email address in order to be entered into a drawing for any of the following: One \$100 visa gift card, one of two \$50 visa gift cards, or one iPad. The drawing will be completed at the end of the study lifespan (at a time at which a preset number of participants have completed the study), and participants who have been randomly selected via computer randomization will be notified directly via email of their winning.

You will need to complete a form to receive payment. Please know that payments may be subject to tax withholding requirements, which vary depending upon whether you are a legal resident of the U.S. or another country. If required, taxes will be withheld from the payment you receive.

You may need to provide your social security number (SSN) and address on the form in order for us to pay you. This information allows the University to fulfill government reporting requirements. Confidentiality measures are in place to keep this information secure. You may forego receipt of payment(s) and continue in the research study if you do not wish to provide your social security number and address. Information regarding documentation required for participant compensation may be obtained from the Controller's Department; +1-515-294-2555 or <http://www.controller.iastate.edu>.

## **PARTICIPANT RIGHTS**

Your participation in this study is completely voluntary and you may refuse to participate or leave the study at any time. If you decide to not participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled. You can skip any questions that you do not wish to answer.

## CONFIDENTIALITY

Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, the following measures will be taken:

There are no identifiers in the questionnaires, and your identity will be anonymous throughout the survey. Your email addresses (if entered) will not be stored or associated with study data, and will be deleted immediately after the drawing. Only the researchers will have access to the data. The data will be entered and kept in a password-protected computer located on the PI's computers. The online questionnaire results will be deleted after all information has been collected on the PI's computers. If the results are published, your identity will remain confidential.

## QUESTIONS OR PROBLEMS

You are encouraged to ask questions at any time during this study.

- You are encouraged to ask questions at any time during this study. For further information about the study contact Debra Satterfield at: [debra815@iastate.edu](mailto:debra815@iastate.edu), or Bennett Stone at 312-772-3018 or email [blstone@iastate.edu](mailto:blstone@iastate.edu)
- If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, [IRB@iastate.edu](mailto:IRB@iastate.edu), or Director, (515) 294-3115, Office for Responsible Research, Iowa State University, Ames, Iowa 50011.

## APPENDIX E

## RGB ASSIGNMENTS FOR ANALYSIS

Area	RGB Assignments
Logo	0, 0, 255 <b>or</b> 127, 127, 255
Primary Navigation	255, 0, 0 <b>or</b> 255, 127, 127
Secondary Navigation	160, 32, 240 <b>or</b> 207, 143, 247
Advertising	255, 255, 0 <b>or</b> 255, 255, 127
Featured Products	34, 139, 34 <b>or</b> 144, 197, 144
Company Promotions	255, 165, 0 <b>or</b> 255, 210, 127

APPENDIX F  
FULL ANALYSIS OUTPUT

<b>http_www.6pm.com.tif</b>		<b>Total Pixel Size: 1924000 ( 1000 x 1924 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Company Promotions	255 165 0	90207 px	1924000 px	% 4.68851351351
Featured Products	34 139 34	383957 px	1924000 px	% 19.9561850312
Primary Navigation	255 0 0	25284 px	1924000 px	% 1.31413721414
Secondary Navigation	160 32 240	215504 px	1924000 px	% 11.2008316008
Logo	0 0 255	16951 px	1924000 px	% 0.881029106029
<b>http_www.abercrombie.com.tif</b>		<b>Total Pixel Size: 1097280 ( 960 x 1143 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	9144 px	1097280 px	% 0.833333333333
Company Promotions	255 165 0	206748 px	1097280 px	% 18.8418635171
Secondary Navigation	160 32 240	5175 px	1097280 px	% 0.471620734908
Logo	0 0 255	23652 px	1097280 px	% 2.15551181102
<b>http_www.adorama.com.tif</b>		<b>Total Pixel Size: 1764003 ( 953 x 1851 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	349086 px	1764003 px	% 19.7894221268
Primary Navigation	255 0 0	30579 px	1764003 px	% 1.73350045323
Company Promotions	255 165 0	198255 px	1764003 px	% 11.2389264644
Secondary Navigation	160 32 240	129295 px	1764003 px	% 7.32963606071
Logo	0 0 255	12144 px	1764003 px	% 0.688434203343
<b>http_www.ae.com.tif</b>		<b>Total Pixel Size: 1110245 ( 953 x 1165 )</b>		

Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	26433 px	1110245 px	% 2.38082585375
Company Promotions	255 165 0	255836 px	1110245 px	% 23.0432021761
Secondary Navigation	160 32 240	16197 px	1110245 px	% 1.45886718697
Logo	0 0 255	13144 px	1110245 px	% 1.18388283667
<b>http_www.aeropostale.com.tif</b>		<b>Total Pixel Size: 1348182 ( 1089 x 1238 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	381230 px	1348182 px	% 28.2773394097
Primary Navigation	255 0 0	19803 px	1348182 px	% 1.46886696307
Company Promotions	255 165 0	87700 px	1348182 px	% 6.50505643897
Secondary Navigation	160 32 240	27177 px	1348182 px	% 2.01582575646
Logo	0 0 255	33150 px	1348182 px	% 2.45886682955
<b>http_www.alibris.com.tif</b>		<b>Total Pixel Size: 2672350 ( 970 x 2755 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	139239 px	2672350 px	% 5.21035792467
Primary Navigation	255 0 0	41170 px	2672350 px	% 1.54059161412
Company Promotions	255 165 0	158189 px	2672350 px	% 5.9194716261
Secondary Navigation	160 32 240	28653 px	2672350 px	% 1.0722023687
Logo	0 0 255	10082 px	2672350 px	% 0.377270941306
<b>http_www.amazon.com.tif</b>		<b>Total Pixel Size: 2066526 ( 994 x 2079 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	195773 px	2066526 px	% 9.47353190814
Primary Navigation	255 0 0	89424 px	2066526 px	% 4.32726227495
Company Promotions	255 165 0	122689 px	2066526 px	% 5.93696861302

Secondary Navigation	160 32 240	40083 px	2066526 px	% 1.93963202011
Advertising	255 255 0	148552 px	2066526 px	% 7.18848928104
Logo	0 0 255	7084 px	2066526 px	% 0.342797525896
<b>http_www.anthropologie.com.tif</b>	<b>Total Pixel Size: 1068132 ( 1002 x 1066 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	40848 px	1068132 px	% 3.82424644145
Company Promotions	255 165 0	18552 px	1068132 px	% 1.7368639831
Secondary Navigation	160 32 240	29859 px	1068132 px	% 2.79544101291
Logo	0 0 255	28665 px	1068132 px	% 2.68365707609
<b>http_www.art.com.tif</b>	<b>Total Pixel Size: 1500022 ( 953 x 1574 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	170079 px	1500022 px	% 11.338433703
Primary Navigation	255 0 0	182742 px	1500022 px	% 12.1826213216
Company Promotions	255 165 0	48007 px	1500022 px	% 3.20041972718
Secondary Navigation	160 32 240	18551 px	1500022 px	% 1.23671519484
Logo	0 0 255	5376 px	1500022 px	% 0.358394743544
<b>http_www.barnesandnoble.com.tif</b>	<b>Total Pixel Size: 3212550 ( 990 x 3245 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	746079 px	3212550 px	% 23.223887566
Primary Navigation	255 0 0	85712 px	3212550 px	% 2.66803629515
Company Promotions	255 165 0	145787 px	3212550 px	% 4.53804610045
Secondary Navigation	160 32 240	22602 px	3212550 px	% 0.703553252089
Logo	0 0 255	11832 px	3212550 px	% 0.368305551665
<b>http_www.beachbody.com.tif</b>	<b>Total Pixel Size: 2115016 ( 964 x 2194 )</b>			

Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	254698 px	2115016 px	% 12.0423675282
Primary Navigation	255 0 0	243613 px	2115016 px	% 11.5182580179
Company Promotions	255 165 0	132783 px	2115016 px	% 6.2781085344
Secondary Navigation	160 32 240	10791 px	2115016 px	% 0.510208906221
Logo	0 0 255	9918 px	2115016 px	% 0.468932622732
<b>http_www.bedbathandbeyond.com.tif</b>		<b>Total Pixel Size: 1077120 ( 960 x 1122 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	115515 px	1077120 px	% 10.7244318182
Company Promotions	255 165 0	175732 px	1077120 px	% 16.3149881165
Secondary Navigation	160 32 240	58872 px	1077120 px	% 5.46568627451
Logo	0 0 255	13299 px	1077120 px	% 1.23468137255
<b>http_www.bestbuy.com.tif</b>		<b>Total Pixel Size: 1196160 ( 960 x 1246 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	426408 px	1196160 px	% 35.6480738363
Primary Navigation	255 0 0	36480 px	1196160 px	% 3.04975922953
Secondary Navigation	160 32 240	19086 px	1196160 px	% 1.595605939
Logo	0 0 255	3978 px	1196160 px	% 0.332564205457
<b>http_www.bluefly.com.tif</b>		<b>Total Pixel Size: 1392333 ( 953 x 1461 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	20544 px	1392333 px	% 1.47550909158
Company Promotions	255 165 0	560308 px	1392333 px	% 40.2423845445
Secondary Navigation	160 32 240	20288 px	1392333 px	% 1.45712268545
Logo	0 0 255	18070 px	1392333 px	% 1.29782171363



<b>http_www.bonanza.com.tif</b>		<b>Total Pixel Size: 1004409 ( 963 x 1043 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	24090 px	1004409 px	% 2.39842534266
Company Promotions	255 165 0	10845 px	1004409 px	% 1.07973942886
Secondary Navigation	160 32 240	72663 px	1004409 px	% 7.2344035149
Logo	0 0 255	7473 px	1004409 px	% 0.744019617506
<b>http_www.borders.com.tif</b>		<b>Total Pixel Size: 1655088 ( 984 x 1682 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	284344 px	1655088 px	% 17.1799928463
Primary Navigation	255 0 0	33048 px	1655088 px	% 1.99675183434
Company Promotions	255 165 0	115872 px	1655088 px	% 7.00095704881
Secondary Navigation	160 32 240	53448 px	1655088 px	% 3.22931469505
Logo	0 0 255	9296 px	1655088 px	% 0.561661978094
<b>http_www.buy.com.tif</b>		<b>Total Pixel Size: 3496230 ( 1126 x 3105 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	432280 px	3496230 px	% 12.3641751258
Primary Navigation	255 0 0	36864 px	3496230 px	% 1.05439287461
Company Promotions	255 165 0	137504 px	3496230 px	% 3.93292203316
Secondary Navigation	160 32 240	44752 px	3496230 px	% 1.28000732217
Logo	0 0 255	8856 px	3496230 px	% 0.253301413237
<b>http_www.cabelas.com.tif</b>		<b>Total Pixel Size: 1895850 ( 990 x 1915 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	32670 px	1895850 px	% 1.72323759791
Company Promotions	255 165 0	220364 px	1895850 px	% 11.6234934198

Secondary Navigation	160 32 240	48614 px	1895850 px	% 2.56423240235
Logo	0 0 255	9860 px	1895850 px	% 0.520083339927
<b>http_www.cafepress.com.tif</b>				
<b>Total Pixel Size: 2258000 ( 1000 x 2258 )</b>				
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	28650 px	2258000 px	% 1.26882196634
Company Promotions	255 165 0	18135 px	2258000 px	% 0.803144375554
Secondary Navigation	160 32 240	52734 px	2258000 px	% 2.3354295837
Logo	0 0 255	8510 px	2258000 px	% 0.376882196634
<b>http_www.cars.com.tif</b>				
<b>Total Pixel Size: 1935666 ( 954 x 2029 )</b>				
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	24123 px	1935666 px	% 1.24623772903
Secondary Navigation	160 32 240	180873 px	1935666 px	% 9.34422570836
Advertising	255 255 0	102348 px	1935666 px	% 5.2874824479
Logo	0 0 255	14220 px	1935666 px	% 0.734630871235
<b>http_www.cdbaby.com.tif</b>				
<b>Total Pixel Size: 1780055 ( 995 x 1789 )</b>				
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	203704 px	1780055 px	% 11.4436913466
Primary Navigation	255 0 0	61971 px	1780055 px	% 3.4814092823
Company Promotions	255 165 0	23504 px	1780055 px	% 1.32040863906
Secondary Navigation	160 32 240	36324 px	1780055 px	% 2.04061110471
Logo	0 0 255	14840 px	1780055 px	% 0.833682105328
<b>http_www.cduniverse.com.tif</b>				
<b>Total Pixel Size: 1662032 ( 953 x 1744 )</b>				
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	174464 px	1662032 px	% 10.4970301414

Primary Navigation	255 0 0	129280 px	1662032 px	% 7.77843025886
Secondary Navigation	160 32 240	39098 px	1662032 px	% 2.35242161402
Logo	0 0 255	7379 px	1662032 px	% 0.44397460458
<b>http_www.costco.com.tif</b>	<b>Total Pixel Size: 1266537 ( 953 x 1329 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	434781 px	1266537 px	% 34.3283299264
Primary Navigation	255 0 0	33660 px	1266537 px	% 2.65764047951
Company Promotions	255 165 0	46132 px	1266537 px	% 3.64237286396
Secondary Navigation	160 32 240	41990 px	1266537 px	% 3.31533938606
Advertising	255 255 0	93796 px	1266537 px	% 7.4057054788
Logo	0 0 255	6164 px	1266537 px	% 0.486681399754
<b>http_www.crutchfield.com.tif</b>	<b>Total Pixel Size: 1671562 ( 953 x 1754 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	16912 px	1671562 px	% 1.01174829291
Company Promotions	255 165 0	333021 px	1671562 px	% 19.9227429195
Secondary Navigation	160 32 240	77574 px	1671562 px	% 4.64080901576
Logo	0 0 255	30257 px	1671562 px	% 1.8101033644
<b>http_www.dickssportinggoods.com.tif</b>	<b>Total Pixel Size: 2228843 ( 1021 x 2183 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	23994 px	2228843 px	% 1.07652266221
Company Promotions	255 165 0	70750 px	2228843 px	% 3.17429267113
Secondary Navigation	160 32 240	234055 px	2228843 px	% 10.5011882847
Advertising	255 255 0	74053 px	2228843 px	% 3.32248615089
Logo	0 0 255	10557 px	2228843 px	% 0.473653819493

<b>http_www.dillards.com.tif</b>		<b>Total Pixel Size: 1067053 ( 1039 x 1027 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	40482 px	1067053 px	% 3.7938134282
Company Promotions	255 165 0	412976 px	1067053 px	% 38.7024824446
Secondary Navigation	160 32 240	51795 px	1067053 px	% 4.85402318348
Logo	0 0 255	9086 px	1067053 px	% 0.85150409586
<b>http_www.ebay.com.tif</b>		<b>Total Pixel Size: 1470150 ( 990 x 1485 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	70744 px	1470150 px	% 4.81202598374
Primary Navigation	255 0 0	48320 px	1470150 px	% 3.28673944836
Company Promotions	255 165 0	36297 px	1470150 px	% 2.46893174166
Secondary Navigation	160 32 240	43588 px	1470150 px	% 2.96486753052
Logo	0 0 255	6048 px	1470150 px	% 0.411386593205
<b>http_www.egames.com.tif</b>		<b>Total Pixel Size: 1600830 ( 990 x 1617 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	208127 px	1600830 px	% 13.0011931311
Primary Navigation	255 0 0	5828 px	1600830 px	% 0.364061143282
Company Promotions	255 165 0	97487 px	1600830 px	% 6.08977842744
Secondary Navigation	160 32 240	20574 px	1600830 px	% 1.2852082982
Logo	0 0 255	28830 px	1600830 px	% 1.80094076198
<b>http_www.emusic.com.tif</b>		<b>Total Pixel Size: 2353140 ( 1020 x 2307 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	95824 px	2353140 px	% 4.07217590114
Primary Navigation	255 0 0	29403 px	2353140 px	% 1.2495219154

Company Promotions	255 165 0	138824 px	2353140 px	% 5.89952149043
Secondary Navigation	160 32 240	14994 px	2353140 px	% 0.637191157347
Logo	0 0 255	4851 px	2353140 px	% 0.206150080318
<b>http_www.focalprice.com.tif</b>	<b>Total Pixel Size: 4610700 ( 981 x 4700 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	2884200 px	4610700 px	% 62.5544928102
Primary Navigation	255 0 0	25704 px	4610700 px	% 0.557485848136
Company Promotions	255 165 0	151945 px	4610700 px	% 3.29548658555
Secondary Navigation	160 32 240	156116 px	4610700 px	% 3.38595007266
Logo	0 0 255	9204 px	4610700 px	% 0.199622616956
<b>http_www.forever21.com.tif</b>	<b>Total Pixel Size: 892961 ( 953 x 937 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	11523 px	892961 px	% 1.29042589766
Company Promotions	255 165 0	507768 px	892961 px	% 56.8634016491
Secondary Navigation	160 32 240	40154 px	892961 px	% 4.49672494095
<b>http_www.frys.com.tif</b>	<b>Total Pixel Size: 1449350 ( 1010 x 1435 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	401418 px	1449350 px	% 27.6964156346
Primary Navigation	255 0 0	54000 px	1449350 px	% 3.72580812088
Company Promotions	255 165 0	252890 px	1449350 px	% 17.4485114017
Secondary Navigation	160 32 240	115087 px	1449350 px	% 7.94059405941
Advertising	255 255 0	47145 px	1449350 px	% 3.25283747887
Logo	0 0 255	27588 px	1449350 px	% 1.90347397109
<b>http_www.futureshop.ca_en-ca_home.aspx.tif</b>	<b>Total Pixel Size: 2624562 ( 953 x 2754 )</b>			

Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	1186788 px	2624562 px	% 45.218516461
Primary Navigation	255 0 0	156818 px	2624562 px	% 5.97501602172
Company Promotions	255 165 0	174292 px	2624562 px	% 6.64080330356
Secondary Navigation	160 32 240	58876 px	2624562 px	% 2.24326954364
Logo	0 0 255	22365 px	2624562 px	% 0.85214218601
<b>http_www.game.co.uk.tif</b>		<b>Total Pixel Size: 1879752 ( 1002 x 1876 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	308160 px	1879752 px	% 16.3936519286
Primary Navigation	255 0 0	28260 px	1879752 px	% 1.50338980887
Company Promotions	255 165 0	334852 px	1879752 px	% 17.8136264784
Secondary Navigation	160 32 240	174766 px	1879752 px	% 9.29729028085
Logo	0 0 255	7992 px	1879752 px	% 0.42516246824
<b>http_www.gap.com.tif</b>		<b>Total Pixel Size: 1267350 ( 994 x 1275 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	30294 px	1267350 px	% 2.39034205231
Company Promotions	255 165 0	82670 px	1267350 px	% 6.5230599282
Secondary Navigation	160 32 240	27656 px	1267350 px	% 2.18219118633
Logo	0 0 255	3780 px	1267350 px	% 0.29826014913
<b>http_www.gnc.com.tif</b>		<b>Total Pixel Size: 1700820 ( 990 x 1718 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	393296 px	1700820 px	% 23.12390494
Primary Navigation	255 0 0	38571 px	1700820 px	% 2.2677884785
Company Promotions	255 165 0	108342 px	1700820 px	% 6.36998624193

Secondary Navigation	160 32 240	42919 px	1700820 px	% 2.523429875
Advertising	255 255 0	34776 px	1700820 px	% 2.04466081067
Logo	0 0 255	10152 px	1700820 px	% 0.596888559636
<b>http_www.hallmark.com.tif</b>	<b>Total Pixel Size: 2152852 ( 988 x 2179 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	298300 px	2152852 px	% 13.8560384086
Primary Navigation	255 0 0	37468 px	2152852 px	% 1.74038902814
Company Promotions	255 165 0	354963 px	2152852 px	% 16.4880354061
Secondary Navigation	160 32 240	76662 px	2152852 px	% 3.56095077599
Logo	0 0 255	12168 px	2152852 px	% 0.56520373904
<b>http_www.hm.com_us.tif</b>	<b>Total Pixel Size: 1750060 ( 1060 x 1651 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	19845 px	1750060 px	% 1.13396112133
Company Promotions	255 165 0	122652 px	1750060 px	% 7.00844542473
Secondary Navigation	160 32 240	5934 px	1750060 px	% 0.339074088888
Logo	0 0 255	3978 px	1750060 px	% 0.227306492349
<b>http_www.homedepot.com.tif</b>	<b>Total Pixel Size: 5483410 ( 970 x 5653 )</b>			
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	1776309 px	5483410 px	% 32.3942400805
Primary Navigation	255 0 0	13284 px	5483410 px	% 0.242258010982
Company Promotions	255 165 0	3032736 px	5483410 px	% 55.307482023
Secondary Navigation	160 32 240	37846 px	5483410 px	% 0.690190957816
Logo	0 0 255	3780 px	5483410 px	% 0.0689352063771
<b>http_www.iherb.com.tif</b>	<b>Total Pixel Size: 1091696 ( 961 x 1136 )</b>			

Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	25947 px	1091696 px	% 2.37676056338
Company Promotions	255 165 0	7172 px	1091696 px	% 0.656959446586
Secondary Navigation	160 32 240	386072 px	1091696 px	% 35.3644237956
Logo	0 0 255	7520 px	1091696 px	% 0.688836452639
<b>http_www.ikea.com_us_en_.tif</b>		<b>Total Pixel Size: 1386615 ( 953 x 1455 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Featured Products	34 139 34	331731 px	1386615 px	% 23.9238000454
Primary Navigation	255 0 0	28768 px	1386615 px	% 2.07469268687
Company Promotions	255 165 0	92844 px	1386615 px	% 6.69573024956
Secondary Navigation	160 32 240	25434 px	1386615 px	% 1.8342510358
Logo	0 0 255	8568 px	1386615 px	% 0.617907638386
<b>http_www.jcpenny.com.tif</b>		<b>Total Pixel Size: 803379 ( 953 x 843 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	20124 px	803379 px	% 2.50491984481
Company Promotions	255 165 0	483966 px	803379 px	% 60.2413057847
Secondary Navigation	160 32 240	24994 px	803379 px	% 3.11110945145
Logo	0 0 255	7007 px	803379 px	% 0.872191082914
<b>http_www.jcrew.com.tif</b>		<b>Total Pixel Size: 590400 ( 960 x 615 )</b>		
Area:	RGB Colour:	Total Size for Area:	Total Image Size:	Percent for Area:
Primary Navigation	255 0 0	13104 px	590400 px	% 2.21951219512
Company Promotions	255 165 0	8720 px	590400 px	% 1.47696476965
Secondary Navigation	160 32 240	19709 px	590400 px	% 3.33824525745
Logo	0 0 255	5112 px	590400 px	% 0.865853658537