

**Persuasively Architecting E-commerce Experiences:
Context Effect and Extremeness Aversion in Online Product Catalog Design**

by

Joanna Wiebe

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Abstract

Previous research has shown the impact of the context effect on the ability of consumers to make a decision when presented with options. Building on previous research, this study examines the impact of the context effect—and extremeness aversion in particular—on consumers in e-commerce environments, specifically Canadian consumers using a product catalog page when shopping for online tax software. Consistent with the hypothesis, the results of this two-group experiment reveal that participants presented with a product catalog page designed to leverage the context effect (i.e., persuasively architected) were more likely to make a decision to purchase than those not presented with the page; the ability of consumers to assess their options when organized to promote contextual decision-making led to a greater proportion of purchases. However, design stimuli other than the context effect may have influenced the results to an unmeasured degree.

Introduction

Every page on every website is designed, whether the design is informed by principles of web design and information architecture or not. It behooves the designers of e-commerce websites to architect each page with intention to promote the optimum experience—be that an ideal usability or decision-making experience—for site visitors.

This research tests the causal effect of persuasively architected e-commerce catalog pages on web conversion, or completed online purchases. Recent scholarship (Karlsson, 2007; Teoh, Ong, Lim, Liong, & Yap, 2009) has revealed factors beyond usability that affect conversion on a website—factors that are ultimately related to the concept of persuasion (Fogg, 2002; Schaffer, 2009)—such as emotion or affect (Johar, Maheswaran, & Peracchio, 2006) and consumer decision-making psychology. Defined as “*an attempt to change attitudes or behaviors or both (without using coercion or deception)*” (Fogg, 2002, p. 15, emphasis his), persuasion in e-commerce environments influences users’ beliefs and attitudes (Kim & Fesenmeier, 2008). As a necessary addition to web usability, persuasion is a point of significant opportunity in e-commerce.

A term coined by Brian Eisenberg and Jeffrey Eisenberg (Creating Persuasion Architecture Online, 2006), persuasion architecture is a new approach to information architecture wherein information elements, such as taxonomy, are married with persuasive elements, such as social proof (Cialdini, 1993; Kim & Fesenmeier, 2008), to influence the online user experience and persuade users to act without exerting unnecessary cognitive effort (Krug, 2000). Web information designers highlight persuasive elements in messaging, dialogue boxes, or iconography (Fogg, 2002) and architect the interaction of pages and the user flow to elevate such elements in the web hierarchy. Differing from usability, which focuses primarily on functionality, persuasion causes users to stay on task longer in information-rich, stimuli-heavy e-commerce environments (Zhang & von Dran, 2007) and better understand their options (Fogg,

2002) so they are able to make decisions rather than mitigating the burden of decision-making by simply avoiding a decision entirely.

With principles of human decision-making at the core of this study, I will test two page designs, one of which is persuasively architected and the other of which is not, on a high-traffic Canadian e-commerce website to determine which design, if any, will better influence users to purchase. The study stimulus in question is a product catalog page, which displays options and encourages users to select just one, making it a prime locus for narrowing options. The persuasion principle tested on the product catalog page is *context effect*, which holds that users make decisions not by absolute evaluation but by comparing one option against a reference (Chernev, 2004; Chernev, 2005; Murali, Böckenholt, & Laroche, 2007; Simonson, 1989; Vlaev & Chater, 2006; Wernerfelt, 1995). A classic example of the context effect is this: to make a large sailboat appear small, position it next to a cruise ship; to make that same sailboat appear moderate in size, position a dingy on its other side.

The results of this study will illuminate the strategies that online information designers and architects can apply to tap into decision-making behaviors and, in turn, persuade users to purchase. The findings of this study will contribute to scholarship in persuasive information architecture, an area lacking in academic research (Kim & Fesenmeier, 2008).

Literature Review

Persuasion is an outcome of consumer information processing, which Johar, Maheswaran and Peracchio (2006) divided into two approaches: motivation and cognition, and implicit processing. The overarching, widely held theory on persuasion related to motivation and cognition is that consumers use peripheral cues to form attitudes when motivations and abilities are low and that, “under some conditions (e.g., high arousal), only cues perceived to be diagnostic are used” (Johar et al., 2006, p. 141).

Implicit processing, as explored by Fitzsimmons and Shiv (2001) and Janiszewski (as referenced in Johar et al., 2006, p. 142), holds that non-conscious processes impact consumers' purchase and consumption decisions; Martin (2008) leveraged this theory to argue that evolutionary adaptations compel consumers to seek cues to minimize the effort required to make decisions. These two approaches suggest that humans do not evaluate our options in isolation but rather with the aid of diagnostic cues, such as context effect, and non-conscious processes and, accordingly, provide the theoretical background for this study.

Persuasion and Usability

This study of persuasion online requires an understanding of web usability because a website cannot persuade if visitors cannot use the site. Defined as “the extent to which particular users can attain specific goals with efficiency and satisfaction in a particular environment” (Karlsson, 2007, p. 75), usability focuses on the *functionality* of a web experience over its *affective* qualities (Karlsson, 2007). Based on Herzberg's Dual-Factor Theory (DFT) of job satisfaction and motivation for employees (Shipley & Kiely, 1986) and on the results of tests by Maddox (1981) and Swan and Combs (as cited in Maddox, 1981) that adapt Herzberg's DFT to study product satisfaction, Zhang and von Dran (2007) proposed a DFT of web design, which is comprised of hygiene factors (i.e., usability) and motivator factors (i.e., persuasion). Arguing that satisfied users spend more time on a website, revisit it, and recommend it to others, later echoed by Kim and Fesenmeier (2008), Zhang and von Dran stated that hygiene factors are of higher priority on websites as they increase usage. Motivator factors “enhance satisfaction with the website... as long as the... hygiene factors are in place” (Kim & Fesenmeier, 2008, p. 1256) and, accordingly, motivator factors rank after hygiene factors in order of importance in information architecture and design. Thus a website cannot be persuasive unless it is first usable.

Kim and Fesenmeier (2008) suggested that persuasion architecture is a necessary addition to usability and that web architects have to-date overemphasized usability at the expense of persuasion. Suggesting that motivator factors—not simply hygiene factors—persuade users to stay on a site longer, Kim and Fesenmeier argued for the importance of architecting sites with both hygiene and motivator factors in mind as well as their six dimensions of persuasion: informativeness, usability, credibility, inspiration, involvement, and reciprocity. Kim and Fesenmeier found that inspirational elements (e.g., aesthetically pleasing graphic design) had the most significant impact on users' first impressions, with usability following as second-most significant. Finally, Kim and Fesenmeier highlighted opportunities for persuasion architecture, including building credibility with visual cues, leveraging reciprocity by allowing two-way information exchange, and encouraging interactivity with product recommenders.

Motivation and Cognition: Peripheral Cues Assist in Decision-making

E-commerce environments create information overload, resulting in a burden of information for consumers and a corresponding crippling effect in option selection; humans have evolved to seek cues that simplify decision-making. Donadabian (2006), Huang, Wingyan Chung, and Chen (2003), and Steckel et al. (2005) showed that abundant information online causes consumers to find methods *alternative* to cognitively exhausting information-sorting to make decisions. Steckel et al. showed that although “more information [creates] the potential for customers to make more informed choices... [t]he downside is that information overload can lead to decision biases due to selective processing of information” (p. 310-311). Product recommendation engines as collaborative information-filtering tools (Huang et al., 2003), comparison matrices, and intelligent shopbots can structure information (Steckel et al., 2005), reduce search effort, and improve decisions. Donadabian (2006) found that increases in decision ambiguity consistent with increases in product information *decrease* rational choice and cause

consumers to defer to social influence choice; this study builds on Donadebian's work but suggests that consumers will defer to *diagnostic* cues, such as context effect, to help them make a decision.

The research of Chen (2008) and Huang and Chen (2006) showed that consumers follow herd behavior, or the actions of others—a type of social influence choice—when purchasing books in information-rich e-commerce environments. Rather than sorting through abundant information on their own, consumers use such cues as the “evaluations, intentions, or purchase behaviors of referent others” (Chen, 2008, p. 1978) in the form of star ratings, sales volumes, and recommendations to make purchasing decisions, all of which are common persuasion techniques online.

Implicit Processing: Non-conscious Processes Impact Decisions

According to Martin (2008), consumers' tendencies to imitate others in ambiguous decision-making environments is based on an evolutionary survival instinct wherein individuals rank competing stimuli and give attention to the stimuli that ensure survival or reproduction; individuals negotiate additional stimuli by following the behavior of the herd. Hantula, Brockman, and Smith (2008) suggest that, further to the evolutionary need for implicit processing, *foraging* needs shape decision-making and must be considered in persuasion. Hantula, Brockman, and Smith argue that human consumption—online and off—is a bio-behavioral phenomenon, and humans as consuming organisms are behaviorally adapted to search for, handle, and consume materials in a manner similar to foraging. They argue that delays during handling are common in e-commerce environments, where abundant information, product choices (Huang & Chen, 2006; Steckel et al., 2005; Yang & Wu, 2007), and lengthy page load times are common. To help consumers progress to the point of consumption, high-converting websites minimize delay by simplifying information and selection on key pages in the conversion funnel, such as the product catalog.

Merrilees and Fenech (2007) found that opportunities for persuasive design in online catalogs include making the catalog 'feel' like print, highlighting security, and enabling inter-personal contact via interactivity (e.g., chat agents). These findings are in keeping with related research (Kim & Fesenmeier, 2008; Zhang & Von Dran, 2007). Like Chen (2007), Huang and Chen (2006), and Steckel et al. (2005), these persuasion techniques focus on adding elements to an experience (e.g., shopbots, star ratings) rather than re-architecting the design of a page to leverage cues such as context.

The Context Effect as a Sorting Tool in E-commerce Catalog Design

In complex choice settings, consumers exert cognitive energy mentally sorting unwanted products; the web architect must simplify product sorting for users on pages that list all options. The average product catalog page lists products in a predetermined sorting order as opposed to an endogenous non-order. Steckel et al. (2005) found that "the arrangement of multiple items [in catalogs] impacts choice" (p. 314). Kim and Fesenmeier (2008) argued that primacy in lists influences purchase behavior, while Johar, Maheswaran, and Peracchio (2006) argued for the 'recency effect' in lists, where information provided late in an experience is more persuasive than that provided early. In their studies of list-sorting in online product catalogs, Cai and Xu (2008) showed that the order in which multiple items are listed is key to decision-making. Some users are willing to sort through lists to find information, but the majority are "unwilling to spend more cognitive power to reorganize information [in lists]" (Cai & Xu, 2008, p. 705). Carefully designed product lists on catalog pages improve information-processing and simplify product selection.

Counter to the assumption that humans make decisions independently of alternatives—or that the preference between options does not depend on the presence or absence of other options (Luce, 1959, as cited in Chernev, 2004)—context effect holds that humans make decisions based on relative or contextual information rather

than absolute information (Chernev, 2005; Valley & Chater, 2006). Various principles exist in the category of context effect, including attribute balance (Chernev, 2005), trade-off contrast (Simonson & Tversky, 1992, as cited in Chernev, 2005), compromise effect (Mourali, Böckenholt, & Laroche, 2007; Simonson, 1989; Wernerfelt, 1995) and attraction effect (Mourali et al., 2007; Simonson, 1989), all of which fall into the category *extremeness aversion* (Chernev, 2004; Chernev, 2004, Simonson & Tversky, 1992, as cited in Chernev, 2005). Extremeness aversion contends that “an option with relatively more extreme values tends to be viewed as *less* attractive than an otherwise equivalent option with moderate values” (Chernev, 2004, p. 249, emphasis mine). Simply put, when given a choice, consumers are more prone to choose the ‘middle ground’. As a diagnostic cue, the context effect reduces friction in decision-making; thus it does not simply compel consumers towards the middle ground but also—and central to this study—acts as a cue to help consumers make a decision whatsoever, eliminating decision-ambiguity.

Although principles of persuasion, such as social proof (Cialdini, 1993; Griskevicius, Goldstein, Mortensen, Sundie, Cialdini & Kenrick, 2009) and herd behavior (Martin, 2008; Morone & Samanidou, 2008), have been applied in studies on the topic of persuasion architecture, prior research has not investigated the influence of extremeness aversion on consumers’ ability to make decisions on e-commerce catalogs. In the present paper, I seek to fill this gap.

The Study

Based on studies of context effect, we can predict that participants will rely on the organization of the choice set on the catalog page to help them make a decision. Those participants who are presented with the treatment that is architected with consideration to context effect—in particular, extremeness aversion—will be better able to make a

decision than will those participants who are presented with the treatment that removes extremeness aversion and leads with a single product that has no alternative.

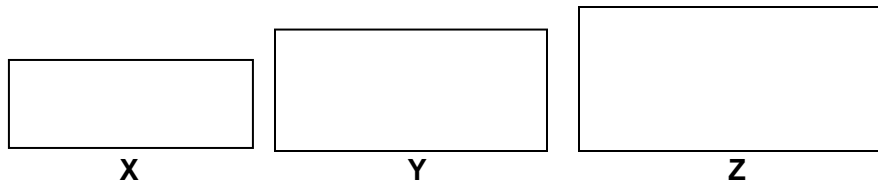
HYPOTHESIS: A catalog page persuasively architected to leverage the context effect will convert users at a higher rate than a non-persuasively architected catalog page.

To illustrate the concept of extremeness aversion in context effect, consider Figure 1, which illustrates a choice set similar to that described by Chernev (2004), where y is positioned between x and z $\{x, y, z\}$; the placement of y signifies a middle ground or neutrality, with x and z being extreme alternatives. In this figure, both the positioning of x , y , and z and the size of the boxes suggest that x has greater, or more extreme, disadvantages and z has greater, or more extreme, advantages (accordingly, this figure best represents the design used in this experiment). Further, the presence of three alternatives in a choice set is critical to extremeness aversion.

Two subsets of extremeness aversion are *polarization* and *attraction* effect. Consumers polarize their options in decision-making scenarios where options are asymmetric, or unbalanced (e.g., difference in number or utility of features, different prices): As shown in Figure 1, y is perceived to be more attractive when evaluated in a set of three $\{x, y, z\}$ than in a pair in which its position would suggest that y is the extreme, that being $\{x, y\}$ (Chernev, 2004). Further, the attraction effect holds that “adding to an existing core set of two alternatives a third alternative that is dominated by one of the original alternatives but not by the other increases the attractiveness and choice probability of the [middle ground alternative]” (Simonson, 1989, p. 159); Chernev (2004) explains that “adding an adjacent nondominated alternative [to a set] will draw a larger share from the *extreme* rather than from the *middle* alternative” (p. 249, emphasis mine). Our assumption is that consumers presented with a choice set in this manner will choose y over the more extreme x and z .

Figure 1

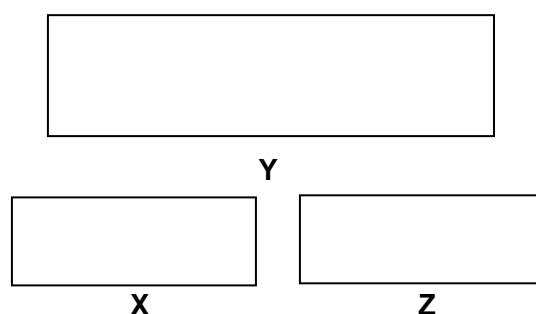
Extremeness Aversion



To illustrate the effect of removing extremeness aversion from the design of a product lineup or choice set, consider Figure 2, which is designed based on the assumption that selection of an option is independent of the presence or absence of other options (Luce 1959, as cited in Chernev, 2004), where y is positioned in the absence of other options as other options are subordinated $\{x, z\}$. This assumption is counter to the assumption of this test and, accordingly, influences the design for the non-persuasively architected treatment. Our assumption is that consumers presented with a choice set in this manner will not benefit from the decision-making aid that is extremeness aversion—where option advantages and disadvantages are defined relative to one another—and, in turn, will be less likely to make a purchasing decision (i.e., a conversion) *whatsoever* on this page. The lack of a cue humans have evolved to use in decision-making will make the decision-making process more burdensome for consumers who forage to acquire information quickly (Hantula, Brockman & Smith, 2008).

Figure 2

Selection Independent of Alternatives



Importantly, in this experiment, the *presence* of extremeness aversion, including polarization and the attraction effect, is not hypothesized to cause a visitor to choose the middle-ground option. Nor will the product (i.e., SKU) purchased by each visitor be studied as doing so would both increase complexity in requiring *multiple* treatments, thus rendering the test multi-way or multivariate rather than two-way; and prove ethically challenging in that visitors could be manipulated to purchase a product that either fails to meet or exceeds their tax software needs and budget. Rather, the presence of extremeness aversion and its subsets is hypothesized to aid in decision-making in general, where the measure of its effectiveness is in simplifying decision-making and facilitating the possibility of making a purchasing decision: did the visitor convert? This is not a question of *which* product is purchased but *whether* any product is purchased.

In matters like this experiment, which concerns more than one row of items in a product choice set, it is critical also to consider the primacy effect, which holds that the order in which multiple items are arranged in a list or catalog influences selection or purchase behavior (Cai & Xu, 2008; Kim & Fesenmeier, 2008; Steckel et al., 2005). In Figure 1, the product 'list' is comprised of just three choices and follows a horizontal hierarchical structure (i.e., broad and shallow) rather than a vertical hierarchical structure (i.e., narrow and deep), as is standard in lists. In Figure 2, the product 'list' is also

comprised of just three choices but follows a vertical hierarchical structure, better resembling a traditional list and positioning the top product as the first to be viewed and, in turn, the most likely to be clicked. Accordingly, the primacy effect may—like many psychological principles not discussed here due in large part to the breadth of the subject—influence this experiment. However, given that both treatments are comprised of more than three choices and, in turn, ultimately follow a vertical hierarchical structure, complete with vertical scrolling (Cockburn & Gutwin, 2009), the primacy effect will influence both; it is not possible to say which treatment, if any, will be more impacted by the primacy effect. Holding with Johar et al. (2006), this study suggests that the key diagnostic cue—the cue influencing users more than any other cue—will be the primary difference between the two: the presence or absence of the context effect.

Further to the influence of the primacy effect on both catalog pages, it is important to consider the influence of scrolling and the presence of the ‘fold’ in the e-commerce environment. Cockburn and Gutwin (2009) acknowledge that scrolling is a key component of human-computer interaction and that it has been reported to complicate a user’s task completion because it allows a target (i.e., the product one is seeking) to be outside a viewable region of a page, requiring the user to exert effort—both physical and mental—to acquire the target in the list. The ‘fold’ is the imagined line at the bottom of the physical computer monitor screen, the information presented above with requires no scrolling to access. In a study of scrolling and nonscrolling conditions, Cockburn and Gutwin (2009) found that “[i]n the nonscrolling conditions, users can rapidly visually locate and point to the data [in a list], but in the scrolling conditions, the user must manipulate the interface as a precursor to visual inspection” (p. 292). To sum, scrolling to acquire a target or information below the fold slows the computer user; one may extend this observation to determine that extensive scrolling will lead to fatigue for the user. Thus, the further a choice is positioned below the fold, the less likely a user

will scroll to reach it and the less likely a user will consider it in his or her decision-making process. This point is crucial to recognizing the importance of focusing the persuasive architecture of the page on those options above the fold. Of note is that both designs required some scrolling; neither benefitted from having all information placed above the fold.

Study Procedure and Design

Forty-four thousand six-hundred fifty-two (44,652) visitors to the catalog page of a Canadian e-commerce website participated in this study, a two-group posttest-only randomized experiment, commonly called an A/B test. Participants shopped in a live online environment without knowledge of their participation in this non-harmful experiment that tracked no information about the participant (i.e., “site user”) outside of whether they did or did not purchase a product in that session and their IP addresses, for security purposes; no identifying information was otherwise recorded. Due to the fact that this study is based on the psychology of consumer decision-making, it precludes the possibility of participants exerting cognitive energy—or, simply, *thinking* about the experiment; further, this experiment is informed by studies on neural antecedents to decision-making, which suggest that *true* anticipation of acquisition is critical to understanding consumer decision-making (Knutson & Greer, 2008). Accordingly, participants were not informed of their participation. Website visitors who did not land on the catalog page at any point during their visit were not included as participants in this study.

The study ran during a nine-day period in the month of April 2010, specifically April 1 to April 9, 2010. Study participants were randomly assigned to either of two groups, Control and Treatment; exactly 22,351 participants were in Control, and 22,301 were in Treatment, or 50.06% and 49.94% of traffic, respectively. Proprietary third-party web experimentation software Omniture Test & Target, similar to Google Website

Optimizer, managed random assignment of site visitors. Control received the non-persuasively architected page; Treatment received the persuasively architected page. In notational form, this design is depicted as:

$$\begin{array}{ccc} R & X_1 & O \\ R & X_2 & O \end{array}$$

where:

R = the random assignment of participants in a group

X_1 = the control

X_2 = the treatment

O = the measure applied

The control was a catalog page design that failed to leverage extremeness aversion and instead lead with a single product above the fold. (See Appendix A.) The treatment was a catalog page design architected to leverage extremeness aversion. (See Appendix B.) Both benefitted from strong visual design that matched the branding on the rest of the website, making the experience of interacting with the treatment and the control visually seamless for participants.

Control variables included running treatments in parallel during the same period of time (i.e., time-sensitivity); random assignment of the treatment and the control to participants; and proportionate distribution of the treatment and the control. Intervening variables affecting the independent variables include motivation of participants to convert; participant status in the product research and acquisition cycle; participant attitudes towards shopping online (e.g., security threats); and state of learning of the participant, where participants may view the catalog page numerous times or only one time in one visit or in multiple visits.

Measurement in this experiment was completed using Omniture Test & Target, which tracked—for the control and the treatment—number of visitors, number of

conversions, conversion percentage, total sales, average order value, and revenue per visitor. The metric in question for the purposes of this study is conversion percentage.

Sampling and External Validity

The population of interest for this study was online shoppers in Canada who use catalog pages in making purchasing decisions. Participants were randomly selected leveraging a standard sampling model in which a fair sample is drawn from the population about which a generalization is to be made (i.e., online shoppers who use catalogs). The population accessible to this study was *all* user traffic arriving at the catalog page on the e-commerce website during the experiment period, including the visitors who bounce (i.e., leave the catalog page within 10 seconds of arrival). The e-commerce website used in this experiment attracted Canadians wishing to file their taxes using web-based do-it-yourself tax software; accordingly, the sample selected is most representative of Canadian consumers who are of legal age to work and file taxes, or Canadians between the ages of (approximately) sixteen and seventy, and who are relatively competent computer users.

The demographics of the visitors to this website are largely representative of online shoppers, the population a generalization is to be made to, but, with regards to the ways these visitors differ from the larger population, there exist two possible threats to external validity. The posttest threat to external validity (Campbell & Stanley, as cited in Ferguson, 2004) may affect this study because the experiment involved visitors who, although a relatively strong proxy of the larger population, were potentially more technologically savvy as they purchased do-it-yourself web-based tax software. Accordingly, this experiment may not be generalized to the larger population due to a somewhat biased subject selection; the presence of this threat may indicate a need for replication of this study with a more technologically diverse sample of users to avoid selection based on convenience. Secondly, the external validity threat of multiple

treatment interference (Campbell & Stanley, as cited in Ferguson, 2004) may affect this study. The tool used to divide traffic and render treatments for traffic, Omniture Test & Target, drops a cookie in a user's computer or browser cache to ensure that returning users receive the same treatment each subsequent time they arrive at the catalog page during the course of the test. If a user clears their cookies, however, Omniture Test & Target will not know to render the same treatment that the user previously received, and the user may receive a different treatment. This may cause multiple treatment interference.

Internal Validity

To establish a causal relationship, this experiment met three criteria. The first is the criteria of temporal precedence, where this study ensured the program was administered prior to measuring effects. The second is the co-variation of cause and effect, where a syllogistic, binary relationship is demonstrated in this experiment as follows:

If a user encounters the treatment, they will convert more.

If a user does not encounter the treatment, they will not convert more.

A potential threat exists in that variations in stimuli on the two page designs may compromise a clear causal relationship.

The third criterion is the exclusion of plausible alternative explanations for an effect. To meet this third criterion, it is necessary to rule out the primary multiple group threat possible in this experiment: selection bias, or the possibility that the two groups involved in the experiment were not comparable prior to the commencement of the experiment, leading to posttest differences. This threat is not plausible given that the traffic-splitting tool used in this experiment divided the participants (i.e., site visitors) as evenly and randomly as possible, without any knowledge of the participants, outside of their IP addresses (which will not be considered in the experiment split). Accordingly,

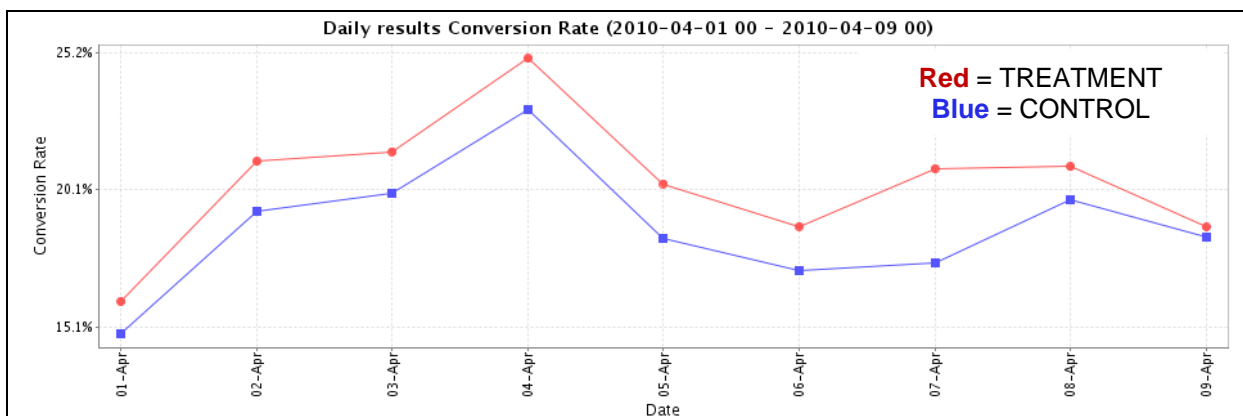
there are no *plausible* alternative explanations for the effect, and causal relationship may be determined.

To achieve internal validity, the two groups were ensured to be comparable due to the use of unbiased software (i.e., Omniture Test & Target) that randomly assigned participants in the sample to the two groups.

Results and Analysis

The mean conversion rate for the treatment, which included 22,301 participants, is 20.38%, with a standard error of 0.27%. The mean conversion rate for the control, which included 22,351 participants, is 18.71%, with a standard error of 0.26%.

As predicted, the treatment page converted catalog visitors at a higher rate than the control, which had a negative lift of 8.92% by the end of the experiment period. (See Appendix C.) The following chart highlights the day-to-day trend.



Using the chi-square (X^2) test, where degrees of freedom (df) = 1, $X^2 = 18.86$, I find that this result for the observed frequencies is statistically significant ($\alpha = 0.05$, chi square = 3.841). The null hypothesis is rejected and the probability is low that the observed difference happened by chance ($p < \alpha$). As the observed difference is in the expected direction, the treatment is confirmed to be more effective than the control.

Discussion and Future Research

Context effect, including extremeness aversion, as a principle of persuasion has been demonstrated previously; this research focused on highlighting the influence of extremeness aversion alone in page design. For the purposes of this experiment, the designs tested (i.e., control, treatment) strived to be as similar as possible in order to control for variations among influential elements. However, challenges with the organization owning the website on which this test was run led to subtle variations between the two designs: the control included iconography highlighting such persuasive messages as money-back guarantees; the control lacked detailed messaging for all products save the top-most product; and design elements such as whitespace and shading could not be matched. Accordingly, a threat to this study is determining exactly which factors most influenced the outcome—if it was extremeness aversion alone.

This study focused on measuring conversion rates; however, revenue per visitor and average order value were also measured. Although average conversion rate and average revenue per visitor were higher on the treatment—at a 20.78% conversion rate for the treatment (versus 18.93% for the control) and \$4.07 average revenue per visitor for the treatment (versus \$3.89 for the control)—the average order value proved lower for the treatment (\$19.58) than for the control (\$20.54). With a higher conversion rate but a lower average order value, it can be surmised that visitors to the treatment purchased a greater proportion of lower-priced SKUs. Both designs incorporated free SKUs, and both designs subordinated those free SKUs below the fold as well as below the three paid SKUs; the two lowest-positioned content boxes on both designs are for free SKUs. (See Appendix A and B.) The variation in the *display* of the free SKUs may be a factor in this discrepancy: the control lists the free SKUs vertically; and the treatment lists the free SKUs horizontally. It may be argued that positioning the free SKUs horizontally limits the need to scroll or better positions the free products as “equal to” the paid products, which

are also listed horizontally. An opportunity accordingly exists for a subsequent study of horizontally versus vertically listed subordinated products, especially where the top-most products in the visual hierarchy are designed leveraging the results of this study, to control for the design of that space on the page.

Finally, it is also imperative to note that factors outside of persuasion (and usability) impact a site visitor's propensity to convert and, accordingly, impact every experiment on this topic—this experiment and others. These factors must be noted. An oft-cited conversion heuristic in *business* conversion experiments is the Marketing Experiments Conversion Sequence (“Beyond Landing Pages”, 2009):

$$C = 4m + 3v + 2(i-f) - 2a$$

where

“C” = probability of conversion

“m” = motivation of the site visitor to purchase

“v” = clarity of the value proposition for a product or service

“i” = incentive to purchase

“f” = friction elements of process

“a” = anxiety, especially anxiety about entering one's payment information on a website

This study, like most A/B tests, addressed just one element of the sequence: friction. In architecting the page to sort information in a manner that acts as a cue to facilitate decision-making via extremeness aversion, this study eliminated a level of friction but did not directly or intentionally address the other elements.

With the conversion sequence in mind, it is imperative to consider motivation as a factor—arguably the most important factor, according to the sequence—of conversion. Motivation on this tax software website was particularly high during the period in which the A/B test was run, that being the month of April, which is the peak period in the tax season; Canadian visitors to this website were motivated to purchase tax software in

order to prepare and file their taxes before the deadline. Although little empirical data readily exists to support the theory that motivation strongly influences conversion, an assumption can be made based on the conversion rates on this site: the conversion rates shown in the analysis of this study ranged from 18.71% to 20.31%, which are higher than the site conversion rate average during the month of February, which was 12.2% (L.C. Jones, personal communication, July 24, 2010); lower than the conversion rate average of 26.9% during the final week of April, nearing the tax filing deadline (L.C. Jones, personal communication, July 24, 2010); and considerably higher than industry-standard conversion rate averages of 2.9% (Forrester Research cited in Gold, 2007). It can therefore be assumed that the impending tax deadline spiked motivation to purchase. If increased motivation indirectly influenced the outcome of this study, an argument may be made to run the same experiment again when visitor motivation to purchase a product offering is stabilized.

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Appendix C

The screenshot displays the Omniture Test&Target interface. At the top, there are navigation tabs for 'Home', 'Campaigns', 'Offers', 'Mobile', and 'mboxes'. Below this, the report title 'Ca 2010 QT Jocatalog' is shown along with its status and time range. A toolbar contains various actions: Approve, Copy, Delete, Archive, Automate, Email, Review MVT Design, and View in OnSite. The main area is titled 'Reports' and includes sub-tabs for Summary, Graph, Daily Results, Success Metrics Report, Element Contribution, and Audit. A filter panel allows users to select a date range (Last two months) and time period (Time period). It also includes filters for Metrics, Week Day, Extreme Order, and Segment. A dropdown menu for 'Success metric' is set to 'Conversion Rate'. Below the filters is a table with the following data:

Experience	Visitors	Conversion Rate	Lift	Confidence	AOV	RPV	Sales	Engagement
Campaign	100.00% (44,652)	19.86% (8,866)	--	--	\$20.04	\$3.98	\$177,690.00	4,035.06 (29,468,010.16)
Default [CONTROL] <i>push winner</i>	49.94% (22,301)	20.78% (4,635)	--	--	\$19.58	\$4.07	\$90,767.72	4,001.78 (15,426,877.11)
New Catalog	50.06% (22,351)	18.93% (4,231)	-8.92%	--	\$20.54	\$3.89	\$86,922.28	4,072.25 (14,041,133.04)

At the bottom of the interface, there is a 'Contact Us' section with links for 'Contact Omniture', 'Test&Target Support', and 'Test&Target Feedback'. The footer contains the Adobe logo and copyright information: 'Copyright 1996-2009, Adobe Systems Incorporated. All rights reserved. Terms of Use Privacy Center. Omniture® is a registered trademark of Adobe Systems Incorporated in the United States, Japan, and the European Community. Omniture products and services are licensed under the following Netratings patents.'

For reasons specific to the website tested, the treatment shown in this figure is referred to as the *control* in this report.