Determinants of choice satisfaction in a high-involvement product choice

Martin Fassnacht
WHU – Otto Beisheim School of Management

Toni Schmidt
WHU – Otto Beisheim School of Management

Jürgen Pannek
WHU – Otto Beisheim School of Management

ABSTRACT

People search to improve the outcomes of their choices. One outcome should be satisfaction. This paper investigates a unique set of determinants to enhance our understanding of choice satisfaction after an in-store decision. It researches the role of three classes of determinants: individual determinants, determinants of the choice set, and determinants related to visual attention, using eye-tracking data from a field experiment. Results show that individual determinants have a strong influence on choice satisfaction. Measures of in-store attention appear to have only little influence, indicating that visual attention in the store is mostly not an important determinant of choice satisfaction.

Keywords: Choice satisfaction, in-store decision making, point of purchase marketing, visual attention, in-store experiment

1. INTRODUCTION

Satisfaction is a key construct in marketing research. There are different forms of satisfaction, such as choice satisfaction versus consumption satisfaction, or cumulative versus transaction-specific satisfaction. This article will focus on a specific type: Transaction-specific choice satisfaction. It has not received as much research attention as consumption satisfaction (Heitmann et al., 2007), although it appears to be an especially relevant construct in a retailing context: If a retailer sells a manufacturer brand product, post-usage satisfaction is mostly beyond the retailer's influence – it is determined by the product meeting or exceeding the consumer's expectations (according to the expectancy-disconfirmation paradigm). This is the realm of the product's manufacturer rather than the retailer (except for private label products where the retailer assumes a manufacturer role). Fitzsimons et al. (1997) "propose that while consumption satisfaction is more strongly related to consumer intentions and behavior that have consequences for the brand (and thus its manufacturer), decision satisfaction is more strongly related to intentions and behavior with consequences for the store in which the product was purchased" (p. 0).

The choice in an offline setting is often made in a retailer's most direct sphere of influence: the point of purchase (POP), which in this context is a retailer's physical store. Understanding the determinants of choice satisfaction in this setting can yield insights into how retailers should design their POPs to improve choice satisfaction among shoppers. According to Shankar et al. (2011), "given the high degree of decision-making in the store, there is considerable upside in doing a better job of marketing at the point of purchase" (p. S31). Choice satisfaction could be closely attributed to the retailer by the shopper – and the retailer should enhance such satisfaction, e.g. through how it presents its merchandise in the store or through the information material it offers.

To gather empirical data on choice satisfaction, a field experiment in two stores of a leading German DIY retailer was conducted. The field setting is a central aspect to lend the research external validity.

This paper investigates how choice satisfaction varies as a function of three categories of determinants: Individual determinants, determinants of the choice set, and visual attention-related determinants. According to Heitmann et al. (2007), individual determinants and determinants of the choice set have been shown to influence choice satisfaction. Hence the model includes two individual determinants (anticipated regret and perceived search costs) and one determinant of the choice set (assortment attractiveness). It also encompasses visual attention-related determinants (attention to products, to information material, and to price labels), in order to assess the role of visual attention in determining choice satisfaction. Most of the information intake of a shopper in a store happens through the visual channel (Häusel, 2010), hence the inclusion of data on visual attention in the model. Despite being the prime source of information intake, it is unclear whether visual attention is also an important determinant of choice satisfaction.

The data on which the analyses are performed stem from two different sources: a post-choice survey conducted right after the experiment and eye-tracking data gained during the experiment to assess the role of the degree of attention in determining choice satisfaction. The paper shows that these different data sources can be combined in one model that leads to meaningful results. Nonetheless, this approach also requires caution when interpreting the results, because the variables from the eye-tracking experiment are measured on a different scale from the variables of the survey.

As the example product category, the high-involvement, multi-attribute category "cordless screwdrivers" was chosen, because purchase decisions in such categories tend to be rather extensive and therefore generate lots of data with the eye-tracking device. This setting

of the empirical study delivers a new angle on satisfaction research through its setup as a field experiment and its inclusion of visual attention data from a modern, state-of-the art eye-tracking device in the model.

The goal of the paper is to answer the following research question: Do anticipated regret, perceived search costs, assortment attractiveness, and the degree of attention paid to products, information material, or to price information at the POP significantly influence choice satisfaction?

2. THEORETICAL BACKGROUND

2.1 Choice satisfaction

Choice satisfaction, the key theoretical construct in the model, is the satisfaction a shopper derives from making a subjectively successful choice. It is different from consumption satisfaction, as it is measured "earlier" – not after the product or service was consumed, but after the product or service was chosen. Although the characteristics of these two kinds of satisfaction might often be closely tied to each other, they are not the same. Heitmann et al. (2007) mention that "relatively little is known about how these two forms of satisfaction are related to each other" (p. 234). Fitzsimons et al. (1997) point to a positive correlation between choice and consumption satisfaction. This paper neither intends to delve into the relationship of these two kinds of satisfaction, nor does it cover aspects of consumption satisfaction, because this construct has been extensively researched (e.g., Oliver, 1980; Oliver and Linda, 1981; Taylor, 1997). Choice satisfaction has received less attention.

Another distinction between kinds of satisfaction can be drawn between transaction-specific and cumulative consumer satisfaction (Anderson et al., 1994). The former is "a post-choice evaluative judgment of a specific purchase occasion"; the latter comprises the "overall evaluation based on the total purchase and consumption experience with a good or service over time" (Anderson et al., 1994, p. 54). This paper covers the transaction-specific satisfaction arising after a single choice, not a cumulative concept of satisfaction.

In sum, the paper does not focus on aspects of satisfaction derived from using the chosen product, but on the satisfaction gained from making a single product choice.

Decision behavior is usually contingent on the choice task (e.g., Payne, 1982; Payne et al., 1993; Tversky and Kahneman, 1981). The research deals with a choice in a high-involvement product category, in which purchases do not happen on a regular basis, primarily for practical reasons: Choice processes in this context are normally not habitual, but rather extensive, which allows the eye-tracking device to generate more data per participant. The choice of a high-involvement example category also has theoretical implications, however. Precisely because decision behavior differs across the types of choices made, the findings should be mainly relevant to high-involvement product choices, not habitual, low-involvement choices. As will be further detailed later on in the description of the sample, the study participants were average shoppers interested in purchasing a screwdriver for home-use in the near future. They were not professional craftsmen with an extraordinarily high level of experience in the product category. The level of expertise among the study participants was thus the level one can expect from an average shopper in a DIY store. Information on the product category and specific products at the POP should, therefore, be rather relevant to the participants while making a choice.

Figure 1 (Appendix) shows the research model, which includes several potential determinants of choice satisfaction. The following paragraphs will motivate the hypotheses regarding their expected relationships with choice satisfaction.

2.2 Antecedents of choice satisfaction

Why do people search in the first place? Typically, they search to improve their choice outcomes. The subjective outcome of a search is the satisfaction or dissatisfaction with a choice (Griffin and Broniarczyk, 2010). Heitmann et al. (2007) have shown that individual determinants and determinants related to the choice set can drive choice satisfaction[1]. A third class of potential determinants was added with the inclusion of eye-tracking data. These determinants can shed light on how the shopping process of the individual took place, specifically where the participant guided her visual attention to, and whether this has an influence on choice satisfaction levels. The authors selected three types of visual-attention related determinants, covering important aspects of the shopping process in the example category: attention to products, attention to information material, and attention to price information.

The paper investigates the influence of the individual determinants anticipated regret and perceived search costs. These determinants are individual as they vary across participants. Anticipated regret describes the feeling or even fear of a shopper that she will later regret her choice. Bell (1982) defines this as "a desire by decision makers to avoid consequences in which the individuals will appear, after the fact, to have made the wrong decision even if in advance, the decision appeared correct with the information available at the time" (p. 961). Anderson (2003) points out that anticipated regret is an emotion that can influence choice behavior, and further that "the general hypothesis is that individuals seek to minimize regret resulting from decisions" (p. 148). Zeelenberg (1999) also finds that people take regret into account in a consumer decision-making context. Therefore, it is assumed that anticipated regret could be a strong determinant of choice satisfaction, in a detrimental way: high levels of anticipated regret should decrease the satisfaction derived from the choice.

H$_1$: Anticipated regret has a negative influence on choice satisfaction

Perceived search cost could be another individual determinant of choice satisfaction. Two notions are conceivable: That higher search costs boost choice satisfaction, because finishing a costly search could promote satisfaction. Or that higher search costs lower choice satisfaction, because a costly search process would still overshadow one's choice. Heitmann et al. (2007) have shown that associating high costs with the search prior to making a choice can have a detrimental effect on derived satisfaction from the choice. Lynch Jr and Ariely (2000) and Yamauchi (2010) show that a reduction in the costs associated with a search can lead to higher satisfaction levels. Anderson (2003) mentions the general principle of "conservation of energy" (p. 140) that organisms tend to follow, i.e. that they try to conserve energy for moments when "an appropriate opportunity or need presents itself" (p. 140). Higher search costs in reaching a decision mean a higher expenditure of energy that might decrease satisfaction derived from the decision. Therefore, the following hypothesis is proposed:

H$_2$: Perceived search costs have a negative influence on choice satisfaction

---

[1] Heitmann et al. (2007) also include a social factor in their research as an additional class of potential antecedents of satisfaction.

Determinants of the choice set are constant for every shopper but can still influence individual choice satisfaction. Here, assortment attractiveness was included, which is a construct that captures the overall attractiveness of the entire range of options on offer.

As Dröge and Mackoy (1995) pointed out, it is not intuitive to assume competing alternatives are important to consider in prechoice, but not in postchoice research: "When one considers the intensive prechoice processing which involved alternatives (…), it seems unreasonable to assume that thoughts or feelings about alternatives not selected become totally irrelevant to postchoice satisfaction formation" (p. 532). Taylor (1997) shows in two studies that the attractiveness of unchosen options can indeed influence choice satisfaction. Simonson (1999) also stresses the importance of analyzing the assortment context in which product choices take place, rather than merely considering the utility of the chosen option itself. If a shopper perceives the assortment at the POP as attractive, she might be able to derive more satisfaction from her choice, as this could lower her fear that the assortment presented by the retailer lacks the ideal options for her. Of course, the logic could also be the exact opposite: that singling out a product from a very attractive assortment is harder than singling out one from an unattractive assortment, that a choice from an attractive assortment would thus elevate anticipated regret, leading to lower choice satisfaction in the end. The authors are drawn to the former reasoning, however, and hence expect assortment attractiveness to have a positive influence on choice satisfaction.

H3: Assortment attractiveness has a positive influence on choice satisfaction

Degree of attention at the POP as a potential determinant. Attention can play an important role in in-store decision-making and is, according to Davenport and Beck (2002), possibly the scarcest resource in today's business. And, "much of what retailers do seeks to attract attention (…)" (Puccinelli et al., 2009, p. 20). Brick-and-mortar retailers often face considerable cost pressure. Although this problem is evergreen, the rise in price transparency due to new technologies and online competition makes it worse. This cost pressure often leads to thinly staffed shop floors and consumers who are on their own in finding the right product, even in categories such as DIY retail where consumers were formerly used to having shop assistants. This increases the importance of visual merchandising at the POP, to aid the consumer in making the right choice and to generate satisfaction afterwards. Measuring attention means measuring which information the consumer visually perceives. Whereas Bettman et al. (1998) note that "which information is selected for processing can have a major impact on choice" (p. 193), this paper studies whether the information selected for processing also has an impact on satisfaction with the choice. The rationale for the link between attention and choice satisfaction is that more attention equals more information-intake and that a better-informed shopper might be more satisfied with her choice. It is, of course, also possible that later steps in the decision-making process overshadow differences in attention in their effects on choice satisfaction.

A higher degree of attention to products and information material could lead to higher levels of satisfaction with the product choice because more visual attention to these elements of visual merchandising at the POP should make the shopper feel better informed, and hence more confident of having chosen the right item. These two groups of visual stimuli are focused on "selling" the products and pointing out how valuable they are. More attention to them should hence lead to a more confident decision and higher derived satisfaction from the choice.

H4a: More attention to products has a positive influence on choice satisfaction
H4b: More attention to general information material has a positive influence on choice satisfaction

The authors expect a different relationship regarding attention to price information that shoppers find on price tags on demo products and product packages. Whereas the aforementioned stimuli transport the value generation part of the potential purchase, price information rather transports the value capturing part.

Price information is ubiquitous in purchase situations (Lichtenstein et al., 1993). The role of price can be twofold: it indicates the cost that will be incurred when making a purchase. But the price is also often an indicator of quality (Bornemann and Homburg, 2011). Which role of price dominates is generally hard to assess (Suri and Monroe, 2003). In this context, more attention to price information at the POP could have a negative effect on choice satisfaction levels. Although all price information is potentially relevant information for every shopper when making a choice (Chandon et al., 2009), a higher degree of attention to price information provided at the POP might indicate a stronger orientation of a shopper towards the role of price as a cost to be incurred, rather than towards its role as a quality indicator. Why? More attention in this study means more fixations, in this case on price labels. The authors believe a shopper looking for quality cues in prices will not look at price labels as frequently as a price-sensitive shopper trying to find a low-priced, but still quality-sufficient product. Hence, shoppers who focus strongly on price information during the choice process could be less satisfied with their choice, as the framing condition of the choice appears to be negative ("I have to forgo money") rather than positive ("I will receive a great screwdriver").

H_{4c}: More attention to price information has a significant negative influence on choice satisfaction

3. EXPERIMENT

3.1 Design

The study took place in two stores of a partnering retailer. It was a 2x2 between-subjects study. However, none of the treatments was drawn upon for the research model of this paper, hence the presentation of the hypotheses as associations.

The retailer clusters its stores into three groups according to their size. One of the stores was a medium-sized store and the other a large-sized one. The number of SKUs carried in certain categories varies with store size. In the example category the medium-sized store carries 16 SKUs and the large store 22 SKUs. The control variable "assortment size" was included to capture that difference. To tackle a research question for a different paper on a different analysis level (not on the "participant" level, but the "participant x SKU" level), the shelf setup in the stores was varied experimentally. One was the retailer's standard shelf setup, the other a test setup that changed the vertical placement of the products on the shelf. To control for that, a second control variable "placement of SKUs on shelf" was added to the model. The authors are aware of the potential issues regarding measurement validation when pooling experimental data, as pointed out by Voss and Parasuraman (2003). In this case, the experimental treatments have no direct influence on the model of this paper.

3.2 Sample

Of the 117 consumers participating in the experiment, 60 percent were male and 40 percent female. The participants were between 20 and 69 years old, with an average age of 43 years. For the experiment, the authors recruited consumers in the store of the partnering

retailer with an interest in cordless screwdrivers and an intention to purchase one in the coming 12 months, to take the experimental purchase as close to a real decision process as possible. Participants were asked whether they were willing to take part in the experiment, and if yes, to come back a week later for the study. They received an EUR 30 voucher from the retailer for participating. They were "normal" end consumers and not professional users (e.g., craftsmen); the partnering retailer does not target professionals, but home-users. The assortment in the example category is a case in point: It does not include screwdrivers that would typically be considered fit for professional use, but ones that are rather intended for home use. Participants were randomly assigned to their groups; the four groups were about the same size.

3.3 Product category

The authors chose the utilitarian high-involvement product category cordless screwdrivers for the experiment, because they considered a product choice in this category to evoke involvement in many shoppers. Cordless screwdrivers are typically not bought habitually, are relatively expensive, and can be compared across many different attributes. Shoppers thus go through a quite extensive decision-making process when making buying decisions in such a product category, due to the personal relevance of the product decision (Zaichkowsky, 1985). The setup of the shelves tested in the experiment was as follows: On the top half are the demo products, so that consumers can closely inspect and test the handheld devices. On the bottom are the corresponding product cartons containing the screwdrivers that can actually be bought. A shopper finds lots of in-depth information about the specifications of each product on the demo products, the product packages, and the product cards. The general information material put on information boards and customer stoppers at the shelf highlight important attributes of a screwdriver (power levels, charging times, characteristics of different battery types, and so on).

3.4 Process

Before the eye-tracking experiment took place, an interviewer welcomed the participants at the store entrance and familiarized them with the eye-tracking device. The retailer in whose stores the experiments took place in offers a wide range of visual merchandising material at its POPs to help customers make a product choice. No shop assistants interacted with the participants during the experiment. The participants were instructed to go into the store to the cordless screwdriver shelf, choose their preferred item, and take it to the cashier – just as they would do in a real purchase situation. They did not really purchase the product – a limitation of this study, but one that other landmark studies of the field underlie, too (e.g., Chandon et al., 2009; Russo and Leclerc, 1994). After the experiment, the interviewer performed a post-choice interview to learn about participants' experience in the experiment and about socio-demographic data.

3.5 Measurement of dependent and independent variables

Data on the dependent variable and several independent variables stem from the post-store survey. Choice satisfaction, assortment attractiveness, and perceived search costs were measured as reflective constructs. The items are provided in the appendix. The scale for choice satisfaction was based on scale #22 in Hausknecht's overview of measurement scales in consumer satisfaction (Hausknecht, 1990, p. 8), specifically on items b, c, and e. The first and second items to measure search costs were adapted from de Vries - van Ketel (2005, p.

82), asking for time and contemplation effort. The authors added a third item, asking for difficulties in finding the ideal product given personal requirements, out of methodological considerations. A five-item scale was used to measure assortment attractiveness. The first and second items were taken from de Vries - van Ketel (2005, p. 83), who in turn took item one from Simonson (1999). These items asked if the assortment was perceived as "attractive" and "inviting." The other three items were constructed to ask participants whether they found the assortment "convincing" and "appealing" and if it left "no wishes unfulfilled" regarding screwdriver choice. The authors measured anticipated regret with a single item, an adequate approach for concrete attributes (Rossiter, 2002).

The authors measured the degree of attention towards products, information material, and price information with a modern eye-tracking device, and used total fixation counts to indicate intensity of visual attention (more fixation counts equaling higher visual attention). Eye tracking is widely accepted as a way to measure visual attention, as eye movements are closely tied to visual information intake (Wedel and Pieters, 2006). There is broad consensus in the literature that eye tracking leverages a host of the characteristics of human visual information acquisition (Duchowski, 2007; Rayner, 1998; Wedel and Pieters, 2006, 2008b).

Eye-tracking studies conducted in the real world at the POP and not in a lab are still very rare, which is due mainly to technical reasons (Wedel and Pieters, 2008a). The latest generation of eye-tracking devices, however, has made a lot of progress in terms of precision of the data collected and of unobtrusiveness for the study participants (Day, 2010). The eye-tracking data were acquired in collaboration with a market research agency using a modern, head-mounted eye-tracking device: the "Mobile Eye" from Applied Science Laboratories. "Eye Vision" data processing software was used to decode the eye-tracking data. The device allows study participants to move freely in the store, which enabled us to conduct the study in real stores, providing a very realistic setting for the study participants. The device was calibrated for each participant prior to the experiment. Moreover, only participants were recruited for the study that wore no thick eyeglasses, contact lenses or lots of eye make-up, because these three things are known to lower the reliability of eye-tracking measurements.

4. RESULTS

4.1 Methodology and measurement

To test the hypothesis presented above, the authors apply a covariance-based structural equation modeling (SEM) approach. They calculated the model with MPLUS using the maximum likelihood (ML) estimator that "generally performs best" (Iacobucci, 2010, p. 95). Although a basic assumption behind the ML estimator is having a large sample, ML is a very robust estimator also in a smaller sample context.

The sample size is n=117, which is north of the threshold proposed by Iacobucci (2010), who states in her suggestions regarding the use of SEM: "Shoot for sample sizes of at least 50" (p. 95). Bagozzi and Yi (2012) recommend that "one should endeavor to achieve a sample size above 100, preferably above 200" (p. 29).

Items measured by the post-experimental survey, from which data on the variables choice satisfaction, assortment attractiveness, search costs, and anticipated regret stem, were retrieved using seven-point Likert-type scales, where 1 = "strongly disagree," and 7 = "strongly agree."

As mentioned in the previous part, the authors measured the endogenous variable, choice satisfaction, at the latent level with three items. They also measured two exogenous variables at the latent level: Assortment attractiveness by five items, search costs by three items. All these variables were measured reflectively. This is often preferable in the social

sciences, where frequently variance in the constructs causes variance in the items and not vice-versa. The authors believe this is also true in the case of their variables and hence opted for reflective measurement. In addition, reflective measurement has an advantage over formative measurement in that it does not confound measurement and prediction error (Bagozzi, 2007; Iacobucci, 2010). The items can be found in the appendix. Statistics on indicator reliability and convergent validity, as well as the Fornell-Larcker-Criterion on discriminant validity, are presented in Table 1 (Appendix).

      Some suggest a cut-off value for an item's reliability measure (IR) of at least .4 (Hulland, 1999, p. 198), which all but one of the model's items exceeds. The relatively low value of SC3 suggests one needs to apply some caution in interpreting the results. On the other hand, as Bagozzi and Yi (1988) point out, for individual item reliabilities "it is not possible to suggest even loose rules-of-thumb as to adequate sizes" (p. 80).

      For AVE (average variance extracted) as a measure for convergence validity, the usual cutoff value is .5. If AVE is below .5, "the variance due to measurement error is larger than the variance captured by the construct" (Fornell and Larcker, 1981, p. 46). All AVE values are above .5. All values of Cronbach's alpha exceed the commonly used cut-off value of .7 (Nunnally, 1978).

      Finally, all the constructs also fulfill the Fornell-Larcker criterion on discriminant validity, as their AVE values are consistently larger than the squared correlations between the constructs (Fornell and Larcker, 1981).

      The authors measured anticipated regret and the visual attention variables directly. They asked for anticipated regret directly, in effect measuring it with a single item, because in their view anticipated regret is a concrete variable for which this one-item measurement approach has advantages over multiple-item measurement: According to Rossiter (2002), measurement of concrete attributes by multi-item scales does not "help to reduce 'random error' (…). Rather, it is a validity problem. This loss of validity is untenable and cannot be offset by appealing to a high alpha" (p. 313).

      The variables concerning visual attention are no latent constructs in the model, either, as they are based directly on data generated by the state-of-the-art eye-tracking device. The authors tried to rule out the typical distractors of eye-tracking measurements (thick glasses, contact lenses, and heavy eye make-up) and thoroughly calibrated the device for each participant. Wedel and Pieters (2008a) note that "eye movements are tightly coupled with visual attention" (p. 126) and point to "reassuring findings on (their) predictive validity" (p. 127). Hence, one may assume the data have captured visual attention reasonably well. However, one cannot completely rule out that wearing the device per se could make participants more conscious of where they look. The authors have used total fixation count data as measures for the degree of visual attention.

    Table 2 (Appendix) presents the means of the variables. Please note the different scale levels of the eye-tracking data.

    Table 3 (Appendix) contains the zero-order correlations between all the variables in the model.

4.2 Model fit

      Various fit statistics imply that the model fits the data acceptably well and that there is no sufficient ground for falsification. The chi-square test statistics of exact fit are 194.69, df 141, p = .002. In a smaller sample context, the test of exact fit underlies a tendency to produce too large test values, too small p values, and that in turn leads to a tendency of "overrejection" (Herzog and Boomsma, 2009). Many researchers assume that a model is reasonably fitted if the fit statistic divided by the degrees of freedom does not exceed a value

of 3.0 (Iacobucci, 2010; Kline, 2004). In this case the value is 1.38, indicating that once corrected for sample size, the model passes the test of exact fit. Every model is merely a (simplified) approximation of reality and will always be wrong to some degree, so it is advisable to consider additional incremental test statistics to gauge, so to speak, the "degree of wrongness" of the model (Box, 1979).

One such statistic is the noncentrality-based fit statistic RMSEA, which lies between 0 (perfect fit) and 1 (worst fit). Browne and Cudeck (1992) suggest that a value less than .05 indicates a close fit, and a value between .05 and .08 reasonable fit. Hu and Bentler (1999) recommend a cut-off value of .06. Here, RMSEA is .057, which appears acceptable, especially because this test-statistic also underlies an upward bias in the smaller-sample context. The .90 confidence interval is between .036 and .076; the probability that RMSEA is below 0.05 is .270.

Another statistic worth considering is CFI, an incremental fit statistic that compares the fit of the model to the baseline model. Hu and Bentler (1999) recommend a value close to .95 or larger for CFI. In the present model, CFI is .914, falling slightly short of the recommended cut-off value.

A final type of test statistic often applied is SRMR, a residual-based index. Here, Hu and Bentler (1999) indicate that a value close to .08 or smaller would relate to acceptable model fit. In this case, SRMR is .091.

In sum, the model passes the test of exact fit once it is corrected for the sample size bias. Its RMSEA statistic lies close to or within recommended levels (depending on whose recommendation you follow), and CFI and SRMR values fall slightly short of the recom-mended cut-off values. All in all, the authors believe a comprehensive view of these various test statistics provides no sufficient reason to dismiss the model, but reminds us to interpret the parameter estimates with a bit of caution.

4.3 Parameter estimates: Presentation and discussion

This section presents the parameter estimates from the model estimation to test the hypotheses proposed above and, for conciseness, discusses their implications for research and practice in the same section. Figure 2 (Appendix) provides an overview of the results.

Consistent with H_1, shoppers with higher levels of anticipated regret experience lower choice satisfaction. The hypothesis can be upheld due to a significant negative parameter estimate (-.30, p<.01). This is not very surprising, as the hypothesis itself could be regarded as almost tautological. Still, it is confirmed, and this study lends further support to the notion that anticipated regret dampens choice satisfaction levels.

H_2 proposed that higher perceived search costs have a significant negative effect on choice satisfaction. A significant negative parameter estimate (-.60, p<.01) supports this hypothesis. The construct search costs measures how costly the search process to arrive at the choice was for the shopper. The findings support those of Lynch Jr and Ariely (2000) and Yamauchi (2010) who showed that a reduction in search costs can elevate satisfaction derived from a choice and also supports the principle of "conservation of energy" pointed out by Anderson (2003). Note that search costs are highly influential in the context of a high-involvement product choice. One could imagine that their influence might be even greater in a low-involvement product choice setting, where shoppers place less importance on the individual product choice. In the example category, retailers should design the POP in a way that makes the shopping process and navigation in the store as easy and straightforward for their customers as possible, for instance through clear signage, smart planograms, and clean shelf-setups.

H_3 pertains to the positive connection between assortment attractiveness and choice satisfaction. The data (parameter estimate .08, p > .05) do not support it. Seemingly, choice satisfaction does not depend significantly on the overall perception of attractiveness of the assortment from which the choice is made. It seems that it was only the chosen option that counted, with no further view on the unchosen options. A more nuanced interpretation could also be appropriate: As Taylor (1997) reports, the impact of the unchosen options is at its lowest when the choice meets the expectations of the shopper, and at its highest if expectations are not met. Therefore, a potential explanation for the results could be that the chosen products met shoppers' expectations in the experiment. That could in turn diminish the impact of the attractiveness of the assortment as a whole. Unfortunately, one can only speculate on this, as no measures on the expectations the participants held before the experiment are available that could be used as a reference point.

The central contribution of the paper is the test of the role of attention in explaining choice satisfaction. Three sub-hypotheses were proposed on the relation between the degree of attention at the POP and choice satisfaction, depending on what the attention was paid to. In essence, the authors found that the role of visual attention is very small and that it falls short of the role that either search costs or anticipated regret play. H_{4a} stated that a higher degree of attention towards products leads to higher satisfaction levels with a choice. This hypothesis can only partly be upheld: More attention to product packages does lead to higher satisfaction levels (.26, p<.05). The more fixations a shopper makes on product packages, the more satisfied she is afterwards with the choice. More attention to product packages should go hand in hand with more information intake, and hence a better-informed choice that the shopper will trust to be right. However, more attention to unpacked demo products (-.08, p>.05) and to product cards at the shelf (.04, p>.05) do not seem to be important determinants of choice satisfaction.

H_{4b} proposed that more attention towards information material at the POP leads to higher choice satisfaction. The data do not support this hypothesis: Neither more attention to information boards atop the shelves (.03, p>.05), nor more attention to a large rectangular customer stopper mounted in the middle of the shelf (a "maxi stopper," in the retailer's jargon) (-.06, p>.05) had any influence on participants' choice satisfaction. Perhaps the information provided on product packages helps shoppers to make a choice and trust in it, whereas the information provided through the other means mentioned does not. Attention to the information boards and to customer stoppers that presented more general information on the category (such as what types of batteries exist, how much power a screwdriver needs for fitting screws in different materials, and the like) was not significant, either. It could be that participants were already well educated regarding the product category and hence did not derive much additional value from the general information on the category as a whole, as presented in the general information material. In a time when many consumers acquire information before visiting the POP (e.g. through the Internet), the payoff of sales material at the POP might be shrinking. For DIY-retailers, it appears useful to present the products in a way that the shopper can easily access the product packages, for they evidently provide shoppers with the most helpful information to make their choices, but at least in this study the role of the other means of visual merchandising in the store were negligible with regard to choice satisfaction levels.

Different from what was proposed in H_{4c}, the degree of attention to price information has no significant relationship with choice satisfaction. Attention neither to price tags on the demo products (-.17, p>0.05) nor to price tags on the product packages (-.08, p>.05) significantly determine satisfaction levels. It was pointed out before that the role of price information is twofold: it signals the costs to be incurred in the transaction, but it can also be an indicator of quality. It is usually hard to assess which aspect dominates, and it seems that

the present results are a case in point. However, one needs to exercise special caution when interpreting the parameter estimate on the role of price in this study. It was mentioned that participants did not purchase the chosen products, which surely alters the way some participants pay attention to prices.

4.4 Conclusion

Overall, the full model explains a relatively large proportion of the variance in choice satisfaction. A model with only the eye-tracking measures as IVs, however, only explains a very small fraction of that variance, whereas a model with all the non-eye-tracking measures as IVs explains almost as much as the full model. It is important to remind readers of a qualification: The eye-tracking variables were measured on different scales than the other variables (see Table 2 in the Appendix), so the low levels of association between the eye-tracking data and the dependent variable could also partly reflect the fact that it is easier to obtain higher levels of association between variables measured on the same scale.

Nonetheless, given how little the eye-tracking data contribute, it looks like attention measures in this context are not such important determinants of choice satisfaction, after all. The influence of the degree of attention at the POP is modest, as only one sub-type of attention (that towards product packages) has a significant (positive) impact on satisfaction levels. Instead, search costs (negative) and anticipated regret (also negative) have shown to be highly influential determinants of choice satisfaction.

What can be learnt from that? From a research perspective, there are two main contributions: Firstly, that visual attention is a rather unimportant determinant of choice satisfaction. Attention is an early step in the decision-making process. It appears to be clearly overshadowed by later steps in that process in determining choice satisfaction. This finding indicates that researchers can neglect attention-measures when studying choice satisfaction. Secondly, that data from two different sources (experiment and survey, in this case) can be combined in a model and lead to meaningful results (the interpretation of which has to be careful, though).

For retail practice, the results suggest that practitioners should never loose sight of the fact that many shoppers appear to value a POP that makes it easy to complete a shopping trip, e.g. through clear signage, intuitive planograms, and clean shelf-design. This does not stand in contrast to the trend that brick-and-mortar retailers try to inspire emotions through their POPs to set themselves apart from increasing online competition. On the contrary, this insight should rather be seen as a secondary condition of POP optimization: it will make sense for many retailers to focus on increasing the emotional aspects of shopping through their POP design, as long as they do not overburden the shopper or overcomplicate the store. Retailers should strive to set up a POP that makes choosing and shopping easy, for instance by offering relevant information at the shelf that helps customers orientate themselves quickly and effortlessly. However, they should not add too many visual "bells and whistles" – and the customers might be more satisfied with their choices.

5. LIMITATIONS AND NEED FOR FURTHER RESEARCH

As with every study in the social sciences, this study is context specific. Furthermore, it is rather specialized: although the authors trust that the DIY context and the example product category were good choices for this research project, this is still a rather special field of retailing. They hence want to caution readers that the results of this study should not be applied universally. Overall, however, there is no inkling as to why the study results should not be as widely applicable as any other similar study.

As was pointed out at the beginning of the paper, there are different types of satisfaction. Readers have to bear in mind that the study deals with just one type of consumer satisfaction: satisfaction with the choice of a product. It does not touch, for instance, the satisfaction stemming from using or consuming a product.

The findings highlight the influence of perceived search costs on choice satisfaction in a high-involvement product choice. It could be interesting to check whether the role of search costs is even more prominent in a low-involvement product choice task. The authors also believe further research on potentially moderating factors such as shopping convenience, time constraints or out-of-stock situations could provide valuable insights on choice satisfaction. In addition, further research highlighting the determinants of anticipated regret could prove relevant.

Future research could test potential determinants of choice satisfaction beyond those incorporated in this model, and could expand the definition of choice satisfaction to include multiple-category decision making rather than single-category decision making (Russell et al., 1999).

However, applying the eye-tracking methodology in satisfaction research appears not to be a too fruitful path to follow. Given the high costs and effort that conducting a field eye-tracking study requires, the authors would rather discourage further research with the methodology in the choice satisfaction realm and would suggest to prioritize studying other independent variables, instead.

REFERENCES

Anderson, C.J., 2003. The psychology of doing nothing: Forms of decision avoidance result from reason and emotion. Psychological Bulletin 129 (1), 139-166.

Anderson, E.W., Fornell, C., Lehmann, D.R., 1994. Customer Satisfaction, Market Share, and Profitability: Findings From Sweden. Journal of Marketing 58 (3), 53.

Bagozzi, R.P., 2007. On the meaning of formative measurement and how it differs from reflective measurement: Commentary on Howell, Breivik, and Wilcox. Psychological Methods 12 (2), 229-237.

Bagozzi, R.P., Yi, Y., 2012. Specification, evaluation, and interpretation of structural equation models. Journal of the Academy of Marketing Science 40 (1), 8-34.

Bagozzi, R.P., Yi, Y., 1988. On the Evaluation of Structural Equation Models. Journal of the Academy of Marketing Science 16 (1), 74.

Bell, D.E., 1982. Regret in Decision Making under Uncertainty. Operations Research 30 (5), 961.

Bettman, J.R., Luce, M.F., Payne, J.W., 1998. Constructive Consumer Choice Processes. Journal of Consumer Research 25 (3), 187-217.

Bornemann, T., Homburg, C., 2011. Psychological Distance and the Dual Role of Price. Journal of Consumer Research 38 (3), 490-504.

Box, G.E.P., 1979. Some Problems of Statistics and Everyday Life. Journal of the American Statistical Association 74, 1-4.

Browne, M.W., Cudeck, R., 1992. Alternative Ways of Assessing Model Fit. Sociological Methods & Research 21 (2), 230.

Chandon, P., Hutchinson, J.W., Bradlow, E.T., Young, S.H., 2009. Does In-Store Marketing Work? Effects of the Number and Position of Shelf Facings on Brand Attention and Evaluation at the Point of Purchase. Journal of Marketing 73 (November), 1-17.

Davenport, T. H. & Beck, J. C. 2002. Attention Economy: Understanding the New Currency of Business, Boston, Harvard Business School Press.

Day, R.-F., 2010. Examining the validity of the Needleman–Wunsch algorithm in identifying decision strategy with eye-movement data. Decision Support Systems 49 (4), 396-403.

de Vries - van Ketel, E., 2005. How Assortment Variety Affects Assortment Attractiveness: A Consumer Perspective, Erasmus Research Institute of Management (ERIM). Erasmus University Rotterdam, Rotterdam.

Dröge, C., Mackoy, R.D., 1995. Postconsumption Competition: The Effects of Choice and Non-Choice Alternatives on Satisfaction Formation. Advances in Consumer Research 22 (1), 532-536.

Duchowski, A., 2007. Diversity and Types of Eye Tracking Applications. Springer, London.

Fitzsimons, G.J., Greenleaf, E.A., Lehmann, D.R., 1997. Decision and Consumption Satisfaction: Implications for Channel Relations, in: Columbia Business School, C.U. (Ed.).

Fornell, C., Larcker, D.F., 1981. Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. Journal of Marketing Research XVIII (February 1981), 39-50.

Griffin, J.G., Broniarczyk, S.M., 2010. The Slippery Slope: The Impact of Feature Alignability on Search and Satisfaction. Journal of Marketing Research (JMR) 47 (2), 323-334.

Häusel, H.-G., 2010. Brain View. Haufe, Munich.

Hausknecht, D.R., 1990. Measurement Scales in Consumer Satisfaction/Dissatisfaction. Journal of Consumer Satisfaction/Dissatisfaction and Complaining Behavior 3 (1990), 1-11.

Heitmann, M., Lehmann, D.R., Herrmann, A., 2007. Choice Goal Attainment and Decision and Consumption Satisfaction. Journal of Marketing Research (JMR) 44 (2), 234-250.

Herzog, W., Boomsma, A., 2009. Small-Sample Robust Estimators of Noncentrality-Based and Incremental Model Fit. Structural Equation Modeling 16 (1), 1-27.

Hu, L.Ä., Bentler, P.M., 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal 6 (1), 1-55.

Hulland, J., 1999. Use of partial least squares (PLS) in strategic management research: A review of four recent studies. Strategic Management Journal 20 (2), 195.

Iacobucci, D., 2010. Structural equations modeling: Fit Indices, sample size, and advanced topics. Journal of Consumer Psychology 20 (1), 90-98.

Kline, R.B., 2004. Principles and practice of structural equations modeling. Guildford, New York.

Lichtenstein, D.R., Ridgway, N.M., Netemeyer, R.G., 1993. Price Perceptions and Consumer Shopping Behavior: A Field Study. Journal of Marketing Research (JMR) 30 (2), 234-245.

Lynch Jr, J.G., Ariely, D., 2000. Wine Online: Search Costs Affect Competition on Price, Quality, and Distribution. Marketing Science 19 (1), 83.

Nunnally, J.C., 1978. Psychometric Theory. McGraw-Hill, New York.

Oliver, R.L., 1980. A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions. Journal of Marketing Research (JMR) 17 (4), 460-469.

Oliver, R.L., Linda, G., 1981. Effect of Satisfaction and its Antecedents on Consumer Preference and Intention. Advances in Consumer Research 8 (1), 88-93.

Payne, J.W., 1982. Contingent decision behavior. Psychological Bulletin 92 (2), 382-402.

Payne, J.W., Bettman, J.R., Johnson, E.J., 1993. The Adaptive Decision Maker. Cambridge University Press, New York.

Puccinelli, N. M., Goodstein, R. C., Grewal, D., Price, R., Raghubir, P. & Stewart, D. 2009. Customer Experience Management in Retailing: Understanding the Buying Process. Journal of Retailing, 85**,** 15-30.

Rayner, K., 1998. Eye Movements in reading and information processing. Psychological Bulletin 124 (3), 342-422.

Rossiter, J.R., 2002. The C-OAR-SE procedure for scale development in marketing. International Journal of Research in Marketing 19 (4), 305-335.

Russell, G.J., Ratneshwar, S., Shocker, A.D., Bell, D., Bodapati, A., Degeratu, A., Hildebrandt, L., Kim, N., Ramaswami, S., Shankar, V.H., 1999. Multiple-Category Decision-Making: Review and Synthesis. Marketing Letters 10 (3), 319-332.

Russo, E.J., Leclerc, F., 1994. An eye-fixation analysis of choice processes for consumer nondurables. Journal of Consumer Research 21 (September), 274-290.

Shankar, V., Inman, J.J., Mantrala, M., Kelley, E., Rizley, R., 2011. Innovations in Shopper Marketing: Current Insights and Future Research Issues. Journal of Retailing 87, Supplement 1 (0), S29-S42.

Simonson, I., 1999. The effect of product assortment on buyer preferences. Journal of Retailing 73 (3), 347-370.

Suri, R., Monroe, K.B., 2003. The Effects of Time Constraints on Consumers' Judgments of Prices and Products. Journal of Consumer Research 30 (1), 92-104.

Taylor, K., 1997. A Regret Theory Approach to Assessing Consumer Satisfaction. Marketing Letters 8 (2), 229-238.

Tversky, A., Kahneman, D., 1981. The framing of decisions and the pyschology of choice. Science 211, 453-458.

Voss, G.B., Parasuraman, A., 2003. Conducting Measurement Validation with Experimental Data: Cautions and Recommendations. Marketing Letters 14 (1), 59-73.

Wedel, M., Pieters, R., 2006. Eye-Tracking for Visual Marketing Foundations and Trends in Marketing, pp. 231-320.

Wedel, M., Pieters, R., 2008a. A review of eye-tracking research in marketing, in: Malhotra, N.K. (Ed.), Review of Marketing Research. M.E. Sharpe, New York, pp. 123-147.

Wedel, M., Pieters, R., 2008b. Visual Marketing – From Attention to Action. Psychology Press, New York.

Yamauchi, C., 2010. The availability of child care centers, perceived search costs and parental life satisfaction. Review of Economics of the Household 8 (2), 231-253.

Zaichkowsky, J. L. 1985. Measuring the Involvement Construct. Journal of Consumer Research, 12**,** 341-52.

Zeelenberg, M., 1999. Anticipated Regret, Expected Feedback and Behavioral Decision Making. Journal of Behavioral Decision Making 12 (2), 93-106.

APPENDIX

Items

Choice satisfaction
CS_1 I am convinced I made the right choice
CS_2 I would make the same choice again anytime, also in a real purchasing situation
CS_3 In sum, I am satisfied with the outcome of my choice

Anticipated regret
While choosing a cordless screwdriver I anticipated regretting my decision afterwards

Search costs
SC_1 I have quickly found a suitable cordless screwdriver (reversed)
SC_2 I have found a suitable cordless screwdriver without much contemplation (reversed)
SC_3 In choosing a cordless screwdriver, I had difficulty finding one that best met my requirements

Assortment attractiveness
AA_1 All in all, the cordless screwdriver assortment in this DIY store is attractive
AA_2 On the whole, the cordless screwdriver assortment appears inviting to me
AA_3 The cordless screwdriver assortment in this DIY store seems convincing to me
AA_4 The cordless screwdriver assortment was appealing
AA_5 The assortment of cordless screwdrivers in this DIY store leaves no wishes unfulfilled

Table 1 - Indicator reliability (IR), construct validity (Cα & AVE) and discriminant validity (Fornell-Larcker-Criterion) of reflective constructs

Choice satisfaction (CS)		
Item	Text	IR
CS_1	I am convinced I made the right choice	0.68
CS_2	I would make the same choice again anytime, also in a real purchasing situation	0.46
CS_3	In sum, I am satisfied with the outcome of my choice	0.61
Cα	AVE	Fornell-Larcker-Criterion
0.78	0.56	0.56 > 0.16 (R^2 with AA); 0.52 > 0.48 (R^2 with SC)

Search costs (SC)		
Item	Text	IR
SC_1	I have quickly found a suitable cordless screwdriver (reversed)	0,87
SC_2	I have found a suitable cordless screwdriver without much contemplation (reversed)	0,52
SC_3	In choosing a cordless screwdriver, I had difficulty finding one that best met my requirements	0,22
Cα	AVE	Fornell-Larcker-Criterion
0.73	0.52	0.52 > 0.17 (R^2 with AA); 0.52 > 0.48 (R^2 with CS)

Assortment attractiveness (AA)		
Item	Text	IR
AA_1	All in all, the cordless screwdriver assortment in this DIY store is attractive	0,51
AA_2	On the whole, the cordless screwdriver assortment appears inviting to me	0,49
AA_3	The cordless screwdriver assortment in this DIY store seems convincing to me	0,69
AA_4	The cordless screwdriver assortment was appealing	0,62
AA_5	The assortment of cordless screwdrivers in this DIY store leaves no wishes unfulfilled	0,50
Cα	AVE	Fornell-Larcker-Criterion
0.87	0.60	0.60 > 0.17 (R^2 with SC); 0.52 > 0.16 (R^2 with CS)

Table 2 - Variable Means

Means of items		
Choice satisfaction	CS_1	4.6
	CS_2	4.4
	CS_3	4.7
Anticipated regret		1.6
Perceived search costs	SC_1	1.9
	SC_2	2.3
	SC_3	2.1
Assortment attractiveness	AA_1	4.3
	AA_2	3.9
	AA_3	4.1
	AA_4	3.6
	AA_5	4.2
Attention to products	Fixation count demo products	369.8
	Fixation count product cards	239.9
	Fixation count product packages	256.1
Attention to information material	Fixation count information boards	25.1
	Fixation count customer stoppers	27.7
Attention to price information	Fixation count price tag product	85.5
	Fixation count price tag package	35.6
Assortment size		0.0
Placement of SKUs on shelf		0.0

Table 3 - Correlations of variables

	CS_1	CS_2	CS_3	Antici-pated regret	SC_1	SC_2	SC_3	AA_1	AA_2	AA_3	AA_4	AA_5	Fixation count demo products	Fixation count product cards	Fixation count product packages	Fixation count informa-tion boards	Fixation count customer stoppers	Fixation count price tag product	Fixation count price tag package	Assort-ment size	Place-ment of SKUS on shelf
Choice satisfaction CS_1	1.00																				
CS_2	.56	1.00																			
CS_3	.64	.53	1.00																		
Anticipated regret	-.44	-.32	-.42	1.00																	
Perceived search costs SC_1	-.59	-.41	-.40	.36	1.00																
SC_2	-.47	-.22	-.26	.26	.67	1.00															
SC_3	-.30	-.30	-.18	.38	.43	.34	1.00														
Assortment attractiveness AA_1	.32	.34	.34	-.28	-.34	-.30	-.34	1.00													
AA_2	.22	.20	.28	-.22	-.33	-.25	-.39	.46	1.00												
AA_3	.20	.33	.28	-.24	-.24	-.24	-.41	.59	.62	1.00											
AA_4	.30	.31	.28	-.34	-.30	-.27	-.37	.58	.59	.64	1.00										
AA_5	.20	.24	.20	-.16	-.20	-.18	-.25	.60	.54	.71	.64	1.00									
Attention to products Fixation count demo products	-.20	-.18	-.26	.14	.24	.23	-.02	-.09	-.02	.04	-.10	.00	1.00								
Fixation count product cards	-.20	-.06	-.06	.18	.06	.14	-.01	-.02	-.03	.01	-.08	.11	.49	1.00							
Fixation count product packages	-.05	.07	.03	-.01	.24	.13	.04	.07	-.11	.06	-.03	.02	.19	.24	1.00						
Attention to information material Fixation count information boards	-.05	-.07	-.01	.13	.00	.09	-.09	-.02	.03	.00	-.04	.08	.17	.45	.08	1.00					
Fixation count customer stoppers	-.07	-.11	-.06	.16	.06	-.02	.04	-.05	-.02	-.06	.03	.07	-.06	.32	.15	.16	1.00				
Attention to price information Fixation count price tag product	-.20	-.15	-.05	.07	.06	.13	-.03	-.12	-.05	-.01	-.10	.00	.51	.76	.24	.34	.23	1.00			
Fixation count price tag package	-.03	-.02	-.02	.04	.08	.09	.06	0.00	-.05	.00	-.01	.04	-.03	.21	.61	.05	.26	.22	1.00		
Assortment size	-.02	-.02	-.03	-.15	-.01	.10	-.12	-.03	.00	-.07	-.07	-.02	.17	.05	.20	.00	-.16	.02	.08	1.00	
Placement of SKUs on shelf	-.02	.05	.18	.01	-.06	.01	.05	.16	.05	.03	.03	.02	-.12	.26	.09	.18	.32	.06	.09	.01	1.00

Figure 1
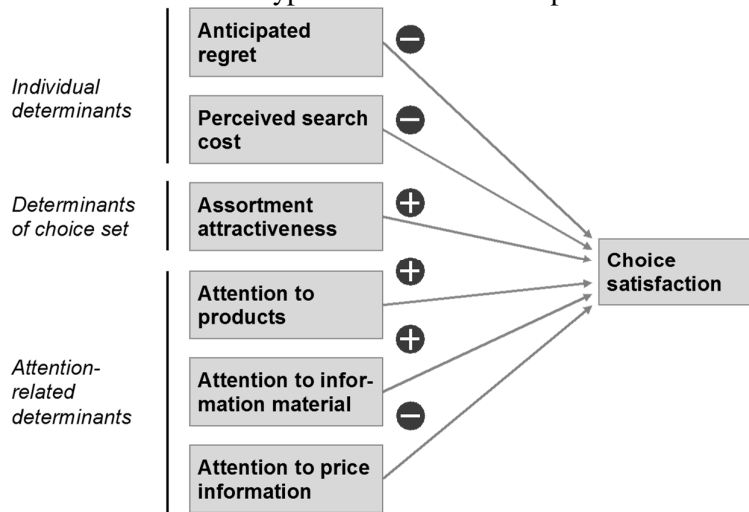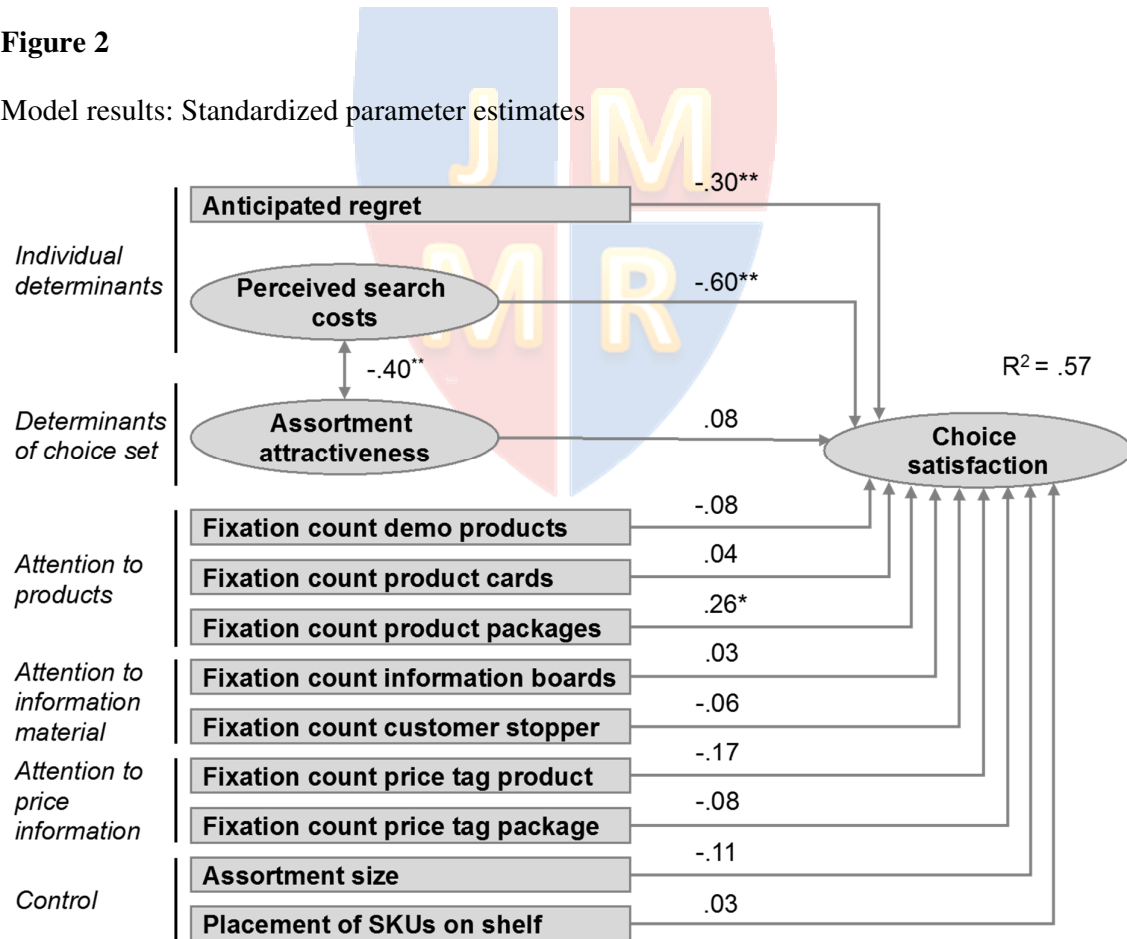Model overview and hypothesized relationships

Figure 2

Model results: Standardized parameter estimates

* Significant at 5% level
** Significant at 1% level