The Complex Matter of Online Hotel Choice

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Preprint, to cite:

To appear in: Cornell Hospitality Quarterly
Acknowledgments

The authors would like to thank Matt Hanson in Orbitz International for close collaboration and support for the project, Katy Freeman (University of South Carolina), Christina Lee, Hung Vo, Elisabeth Stiley, and Jennifer Repede (College of Charleston), who worked on data collection, data analysis, and drafting of the original report; and Kevin Smith (Office of Tourism Analysis, College of Charleston) who thoroughly copyedited the manuscript. The first author would like to thank the School of Hotel and Tourism Management of the Hong Kong Polytechnic University for supporting the completion of the manuscript during his sabbatical visit.
ABSTRACT

Hotels that appear near the top of the list of search results or an online travel agency page usually get more attention and hits than those showing up lower on the page, but other factors create exceptions to this rule. This study demonstrates that the complexities of the consumer decision process extends beyond mere page position. Other factors that influence consumers’ attention to options in a list of hotels include the number of options and the presence of images. The study underlined the principle that the position of a hotel in a list and on a web page fold helps determines subjects’ attention. Beyond that, presenting test subjects with a lengthy set of hotel options (20 hotels in this case) seemed to overwhelm the subjects, who tended to reduce their consideration set using different strategies, notably by focusing on price. In addition to creating a more favorable consideration of a hotel, presenting images of the hotels meant that the subjects evaluated more hotels, and reviewed each option more carefully by paying more attention to both the images and the accompanying text. The presence of images not only helped to alleviate the perceived information overload problem, but also induced more hedonic elements in decision making, including encouraging guests to consider a hotel that did not otherwise shine in the text description. As a result, we recommend reducing the number of options on one page, understanding web visitors’ conversion rates through a nonlinear formula of attention, and providing appealing and interesting images when a hotel is inferior in terms of other criteria.
Online channels contributed 52.3 percent of major hotel brand bookings in 2010 (TravelClick 2011), and much of that business was channeled through online travel agencies (OTAs), notably, Expedia, Travelocity, Priceline, and Orbitz. Because OTAs are such an important channel for hotel distribution, the industry should pay close attention to the way hotels are presented on OTA web pages. For a given set of search terms, the OTAs usually display a list of hotels on their search results pages, sorted by popularity, recommendation, price, or brands. Each hotel option is accompanied by one or more pictures, a brief introduction, room rates, and location information. Each hotel has only limited space to persuade and convert the visitors. A deeper understanding of consumers’ hotel evaluation processes is needed. This can help designers improve and customize web interfaces, so as to assist their customers to find what they want and create a smooth and satisfactory overall experience.

There are many interface factors which may influence consumers’ decision making, including color, amount of text, number of options, and the presence of images. A major issue is the number of hotels listed in a given set of search results. When we checked in July 2012, we found a substantial variation in the number of hotels listed on each page by the major OTAs (that is, hotels.com, Expedia, Travelocity, and Orbitz). The range was 26 to 50 hotels on the first results pages, which may be too many for a reasonable choice set. The studies in cognitive psychology and marketing suggest that presenting too many options is harmful to conversion rates and consumer satisfaction (Iyengar, Wells, and Schwartz 2006; Sethi-Iyengar, Huberman, and Jiang 2004), although a handful of researchers contend otherwise (Shah and Wolford 2007) and the relationship between the number of options and the purchase decision is still being
debated (Scheibehenne, Greifeneder, and Todd 2010). There’s little dispute over the idea that images play a critical role in consumers’ decision making. Images create a richer experience, resulting in a more thorough product examination and better product recall (Cyr et al. 2009), and the presence of images on a hotel website can be an important predictor of customers’ attitude towards the hotel (Jeong and Choi 2005). However, studies testing the effects of images have focused either on consumer products, such as jams, life insurance, electronics, or have considered the outcome of decision making, such as number of purchases, conversions rates, attitude, or satisfaction. Few have addressed the process of online decision making (Cyr et al. 2005; Senecal, Kalczynski, and Nantel 2005). As a potential “experience good” (Klein 1998), accommodation purchases are more complex and cognitively demanding than consumer goods (Barsky 1992). We think that choosing a hotel might be significantly different from making a decision about everyday consumer products.

In this study, we examine the process of online hotel decision making by focusing on the attention paid by consumers to the hotels listed on a simulated search page. We are also interested in how the presentation of information affects users’ decision making process. The three key issues we wish to examine are: (1) the allocation of attention to each option given a list of hotels, and the resulting decision making process; (2) the effect of the number of options in the choice sets on the subjects’ attention allocation and decision making; and (3) the effect of the presence of images on these two aspects of decision making.

We first provide an overview of relevant theories on decision making, and then consider the influence of the number of options and use of images on this process. This study uses eye-tracking methodology to determine what attracts users’ attention, and we explain eye tracking
and the mixed-method approach used in this research. Finally, we discuss the findings from a within-subject study and offer recommendations for industry practitioners on how to understand and design more effective web interfaces.

**Review of Previous Studies**

A number of studies have investigated decision making processes in an online environment, and how the number of options and images influence this process. Constructive decision making and cognitive load theories provide a theoretical basis for many studies in this area.

**Online Decision Making**

Decision making theories postulate that human beings are not completely rational in their decision making (Simon 1955). They adapt according to the information they are presented, and they will try to reduce cognitive effort and accept a satisfactory but suboptimal outcome while making a decision, in a process known as “satisficing” (Payne, Bettman, and Johnson 1993). In today’s online environment, where a few keystrokes and mouse clicks can retrieve a huge amount of information, this satisficing strategy is especially relevant (Simon 1956). This is probably one reason that the information on the top and right of a search results page, an area called the “golden triangle” (Hotchkiss, Alston, and Edwards 2005), attracts most users’ attention and that many searchers rarely go beyond the first page of search results or even scroll down the page (Jansen and Spink 2006). However, the attention each result receives is not linear, but is instead affected by the page folds (Pan et al. 2007). That said, making a decision on which hotel to book for the next vacation will be different from deciding which web page to visit on a search engine results page. We expect the hotel decision to be more loaded and hence demand more
involvement. In this study, we will investigate the allocation of attention to the options and the consumer decision making process given a list of hotels.

Number of Options in Decision Making

As we indicated, the size of choice set is an element of cognitive load in a decision making task. One of the advantages of the internet is that it can provide consumers with extensive options. For example, a quick search in mid-July 2012 for hotels in Atlanta on Expedia.com, Travelocity, Orbitz, and hotels.com yields 300 to 500 results, depending on the website. Nevertheless, having many options is a double-edged sword. One set of studies has shown that consumers prefer companies offering a large number of choices over those offering fewer options (Chernev 2003). The more options people have, the more confident and better informed are their choices (Hutchinson 2005). A large number of options also satisfies people’s desire for novelty and increases their sense of self-control and intrinsic motivation (Ariely and Levav 2000; Deci and Ryan 1985; Taylor 1989). However, other studies indicate that having more options to choose from can also be counterproductive, leading to anxiety and depression (Schwartz 2005). Even though having extensive choices initially appeals to consumers, eventually they may feel less satisfied and more frustrated with the process and experience greater regret about the choice they have made (Iyengar and Lepper 2000). Iyengar and Lepper (2000) demonstrated that subjects are more likely to make a purchase when given six options of exotic jams or gourmet chocolates to choose from, rather than 24 or 30. A more recent study suggests an inverted U-shaped relationship between behavioral commitment and number of options (Shah and Wolford 2007). As the number of options increases, consumers tend to buy more until reaching a certain threshold. After that, the conversion rates drop.
A recent meta-analysis on choice overload, drawing on 50 experiments, shows there is insufficient evidence of adverse effects of increased choices (Scheibehenne, Greifeneder, and Todd 2010). Instead, it confirms that when consumers have a well-defined preference prior to choice, they consider it better to have more options.

Picking a hotel online given a list of hotel options is an intrinsically complex and cognitively demanding task that has not yet been experimentally studied. By using eye tracking, we assess the actual allocation of cognitive attention in two situations, first when people face a long list of choices on a webpage (in this case, 20 hotels) or a short list of choices (5 hotels). We are interested in how web visitors respond to having more options, whether they evaluate more or fewer of them, and whether they pay more or less attention to each one.

**Image versus Text Information on the Web**

People use both words and pictures on the web to acquire information with which to make judgments and decisions. Images are considered one of the most effective communication tools. On a typical comparison website, a product is presented with both text and images to allow consumers to examine it in detail. Compared to products where only text information is available, products with both text and images on a web page are associated with shorter search time, better recall of images, and a higher degree of purchase intention (Hong, Thong, and Tam 2004; O’connor 2005). A study specific to tourism websites also finds that product images on the web lead to favorable consumer attitudes towards that product (Jeong and Choi 2005). If a hotel website provides a variety of pictures of the property and features service personnel or guests in the pictures, customers tend to have a more favorable attitude towards the hotel. In one hotel
website assessment study, use of pictures on the site is the most frequently mentioned element of recall (Stringam and Gerdes Jr 2010).

We must note a study on printed ads that found that pictures have no significant impact over text in hotel evaluation, with subjects appearing to evaluate the hotels primarily on the basis of text description, and pictures having little additional impact (Adaval and Wyer Jr 1998). Other researchers have found that text dominates images in terms of the amount of attention given to each. When presenting cartoons consisting of a single image and a relevant caption to subjects, they did not give the picture a full inspection until the caption had been read. People also tended to spend more time looking at the text than the picture part of the print ads (Rayner et al. 2001). Text was used to make judgments and images were only used as confirmatory evidence of selections (Hughes et al. 2003).

Even if text provides the key information, images have a function. Cognitive load theory states that information can be better understood when pictures and text are physically integrated (Chandler and Sweller 1992; Sweller and Chandler 1991). When a textbox is placed as part of the picture to which it refers, the need to mentally integrate text and pictures is reduced, lowering cognitive load. A similar effect is observed when visual and verbal information is presented close to each other rather than spatially separated (Mayer 1989). One study finds that a picture related to text can slow down the time required to read online (Beymer, Orton, and Russell 2007) and another reports shorter online search time using images (Hong et al. 2004). In general, a consensus has not yet been reached on the effect of images on decision making in an online environment, and the question of how the presence of images affects information processing in hotel choices remains open. For this reason, we studied whether users will pay more or less
attention to text when pictures are also presented, how the number of options will affect the processing of text and pictures, and how images affect consumers’ decision making processes.

In reiteration, this paper addresses three main unexplored issues. First, we investigate the allocation of attention to hotel options in a list and the associated decision making process; second, we assess how alternative numbers of options affect hotel evaluations; and third, we examine how the presence of images affects the hotel decision making process.

**Eye-Tracking Methodology on Cognitive Process**

Eye tracking has been used in many studies to investigate people’s attention allocation and cognitive effort. A relatively expensive research method, eye tracking provides direct capture of eye movement in stimulus-based settings (Rayner 1998), since eye movement can indicate where a person’s attention is directed (Just and Carpenter 1976). Eye movements are composed of fixations, which are relatively stable gazes lasting for about 200 to 300 milliseconds each, and saccades, which are rapid eye movements of 3 to 5 degrees of visual angle. These behavioral indicators can provide an objective evaluation of a decision maker’s attention allocation and evaluation process. Compared with conventional methods such as click analysis and questionnaires, the eye-tracking method yields better data validity since the evaluation process can be more accurately captured (Schiessl et al. 2003). Therefore, we can determine the difference in attention across different numbers of options in terms of gaze distribution. For example, one study on used car choices shows that decision makers use pairwise comparisons and the evaluation only happens during those comparisons (Russo and Rosen 1975).
Methodology and Procedure

We recruited subjects through a classified email list in a public university in the southeastern United States. The majority of the eighteen volunteers were faculty or staff members, who were compensated with $30 in cash for a 90-minute test. Testing took place in an eye-tracking lab on the university campus, the cost of which limited the number of subjects. We had to eliminate two cases due to incomplete data, leaving us 16 subjects for analysis. This is not an atypical number for such research (Pan et al. 2007).

We noted that many consumer choice studies have compared a list of six options with a list of 25 or 30 options in this type of trial (Iyengar, Wells, and Schwartz 2006; Sethi-Iyengar, Huberman, and Jiang 2004). Because we saw that the major OTAs presented a range of 26 to 50 hotels on the first results page, we felt that a conservative test was appropriate, in which we compared a list of 5 hotels and a list of 20 as the alternative conditions for the different choice sets. In order to investigate the effects of images and the interaction of images and hotel choice sets, we set up a within-subject 2x2 design. The choice of a within-subject design was due to the high cost on time and money of eye-tracking studies, as every subject must be calibrated on the eye tracker before the actual testing. Thus, many other studies have adopted a within-subject design (Pan et al., 2007).

In the formal testing session, each subject was shown four lists of hotels, each of which was displayed on one mockup web page. The first set featured 5 hotels, two images of each, and a text description; the second set also featured five hotels, but with text description only; the third set comprised 20 hotels, two images of each, and text description; and the fourth set
featured 20 hotels with text description only (Exhibit 1). In the sets with images, each option contained one picture of the interior of a room and one of the hotel exterior. These were randomly picked from a database of actual hotel images on one major OTA site. The pictures were all different in the image sets, but some of the text elements, including price, location, and description, were identical in all sets. Those identical text elements were then randomly matched with each other to avoid any memory spillover factor (when a subject remembers the exact hotel from a previous condition). All hotels in all four sets were sorted by price from high to low. Each subject was asked to pick a hotel room that they would book from each of the four sets. They were given a maximum of an hour to complete the task.

The mixed-method approach that we adopted to capture and investigate the subjects’ information processing (Backlund et al. 2003), combined eye tracking with recordings of the subjects think-aloud, as well as surveys and our own observations. The eye tracker software, GazeTracker, generates a sequential list of fixations for each subject on each web page. In order to accurately analyze the data, we marked “lookzones”, defined as regions of interest (Cambridge Research Systems 2010), for each condition using the GazeTracker software. For the two website groups that included images, each hotel option consisted of two lookzones, one of which encompassed the two images and the other one all of the text. The two images were combined into a single lookzone due to the small amount of space between them.

In addition to eye tracking, the subject was asked to verbalize his or her thoughts, opinions, or feelings while carrying out the task. Since language mediates thoughts, one can decipher the cognitive process during decision making through such verbalization (Ericsson and
Simon 1993). Camtasia Studio, a screen capturing program, was used to capture the subjects’ online activity along with their verbalization and record them into a movie file (Cox 2005). Furthermore, pre- and post-experiment surveys asked about the subjects’ demographic information and their experience of traveling and using the internet.

The analysis had two stages. In stage one, the number and time of fixations produced by GazeTracker were analyzed at each lookzone for the four conditions. In the second stage, two researchers viewed the recorded behavioral movies with embedded eye movement data, combined these with the observational notes and surveys, and coded them on the subjects’ decision making strategies.

Results of the Analysis

In general, the participants were mostly young professionals working in an educational institution who were savvy internet users and travelers and part of the target market for OTAs. The eleven women and five men in the study ranged in age from 23 to 42, and all had used the internet for at least six years. In terms of traveling experience, eleven took one to three pleasure trips a year and eight had taken at least one business trip in the prior twelve months. Thirteen of them identified themselves as experienced travelers, while all considered themselves experienced internet users. All participants used online destination information and all but one reported having booked a flight or hotel online.
Hotel Choices and the Attention Paid to Options

First, we looked at the subjects’ hotel choices. Though a few chose the top or middle ones, most usually picked the cheapest hotels. Thus, the respondents typically chose Hotels 4 and 5 (in the 5-hotel choice sets) and 17 to 20 (in the 20-hotel sets). Coding and tabulation of the subjects’ verbalizations and the movies of their behavior found that the subjects mentioned (in descending order) price, ratings, location, amenities, and description, look, and style as the most salient decision criteria. Once respondents had figured out that the hotels were sorted by price from high to low, they would always scroll down the web page to look at the hotels at the bottom; they might then use other criteria, such as amenities, ratings, or images, to compare and eliminate the options from those low-price hotels at the bottom of the “search results” screen.

Second, we looked at the attention paid to each hotel option. In this study, a hotel was classified as “viewed” if any of a subject’s fixations landed in either its text or image lookzones. Exhibit 2 presents the number of fixations for each of the hotel options under four conditions. The “top of the folds” attracted more attention than the rest of the options on the same folds, that is Hotels 1 and 2 (in all sets), and 11 and 12 and 17 and 18 (in the 20-hotel sets), One can clearly see the three folds in the case of the 20-hotel sets. Thus, the attention paid to each option is not linearly correlated with its rank on the page, but compounded by its position within a single web page fold. The top of the fold always attracts more attention than the bottom, regardless of its rank in the list of options. For example, Hotel 11 attracted more attention than Hotels 14 or 15, even though it was more expensive. Price did have an effect, though, as overall the hotels in the lower ranks in the 20 hotel choice sets attracted more attention due to their lower prices.
The Effects of Choice Size

Our second question asked whether the relative sizes of the two choice sets affected users’ attention and decision making process. Overall, the subjects spent more time selecting hotels among the 20 options, a total of 4,265 seconds on the hotel group with images on average, and 2,110 seconds on the text-only set. By comparison, for the choice set with 5 options, they averaged a total of 2,514 seconds on the hotels with images, and 1,357 seconds on those without. An average of 30.7 fixations on each option of the 20-hotel set with images was reported, compared to 58.3 fixations for the corresponding 5-hotel set; 18.2 fixations were found for each option of the text-only 20-hotel set, compared to 37.0 for the set of 5 (see Exhibit 3). Thus, we see that the subjects spent much longer perusing the larger choice sets, but on average they paid approximately half as much attention to each option within the 20-hotel sets as they did in the 5-hotel sets. Each of the options in the five-hotel set received comparatively more consideration than any of those in the 20-hotel set. For the sets with text descriptions only, the subjects viewed on average 14.8 hotels (74%) of the 20 compared to 4.7 (94%) out of 5 (see Exhibit 4). We conducted a two-way repeated measure ANOVA test to see whether the number of options and the presence of images affected the percentages of hotels viewed, which showed that both had a statistically significant effect ($p<0.05$; Exhibits 4 and 5).

When a subject’s fixations landed in neither the text nor image lookzones of a hotel, we considered that to be a “skip” of attention. We found that only one subject skipped any hotel
options in the five-hotel set with images, and two subjects did so in the five-hotel text-only set. On the other hand, six subjects skipped options in the 20-hotel set with images and 14 did so in the 20-hotel text-only set. Further analysis of these fixations shows that for the 20-hotel sets, the subjects skipped the hotels in the middle the most; options 5-9 were skipped by at least three subjects for text and image set, and in the text-only set, options 5-11 were skipped by at least six subjects. In conclusion, looking at the 20-option sets, the subjects spent less time and less effort on each option, and skipped more options in the middle of the list.

The subjects’ verbalization also confirmed that 20 hotels were considered overwhelming. As one subject said, when encountering 20 hotel options, “there are an awful lot of them...” Respondents applied heuristics to reduce the size of the decision set, mostly based on price. As one subject put it, “my thought process is, when I have this number of hotels in front of me... Let me go down to find hotels in my price range and go from there...” Another stated that “I like to stay under $120 so I go to the bottom of the page. I am looking basically at Hotels 17 to 20. I’ll pick one of those...” Another subject didn’t trust cheap hotels and said that “I’ll just skip the bottom ones.” Alternatively, as one of the others put it, “I would go back to the search engine and add pool or wireless internet to reduce the number of choices I have. Five to 10 is a more manageable number.” These comments confirmed that having 20 hotel options was overwhelming so most consumers adopt price or amenities as a filtering mechanism to reduce the number of choices. Thus, the final consideration set was much smaller than the total amount of choices presented.
The Effects of Images

We also looked at how the presence of images affected users’ attention and decision making. An ANOVA test showed that the subjects viewed significantly more options in the hotel sets containing images ($p<0.05$; Exhibit 5). The interaction between the number of hotel options and the presence of images was also significant at the 0.05 level, indicating that images helped decision makers to evaluate more options in the 20-hotel sets. The subjects viewed on average 18.0 hotels when images were presented, but only 14.8 of the text-only hotels. In conclusion, the additional images increased the percentage of options viewed.

Two possible processes may take place when the hotel options list contains images. On one hand, images contain more information, so the subjects may need to spend more time on each option; on the other hand, they provide an additional layer of information that complements the text and can be processed much faster. If deciding on a hotel requires a set amount of information, the subjects may spend less time on text, therefore reducing the overall evaluation time. However, on the 20-hotel sets, each subject spent an average of 267 seconds on the set with images and 157 seconds on the text-only set. For the five-hotel set, the corresponding times were 132 and 85 seconds. In general, they spent 1.6-1.7 times the amount of time evaluating hotels with images than those with text only. In addition, when looking at images, they also spent more time on the text for the same hotel. Thus, when images were present, the subjects also spent more time and effort reading the text (Exhibit 2). This indicates that the subjects performed a more thorough evaluation of each hotel option when images were included, indicating that they were adapting their decision making to the amount of information provided (Payne, Bettman, and
Johnson 1993). The subjects spent more time and engaged in more extensive evaluation when given more information with images.

The qualitative results showed that the images had various effects on the subjects. First, images were crucial to their decision making, and many of them scrutinized the pictures in order to make their hotel decision. One subject said that “the first thing I am looking at is the photo and the price...” Another expressed her opinions on each hotel based solely on the pictures:

The first one I like because it is kind of modern; looks trendy, clean. Second one, not as good as the first one. The bed and the space. The second one looks a little conventional. The third one is just awful. Looks feminine, teddy bear, polyester, and yucky...

Another subject explained his thought process as follows (he ended up choosing Hotel 11):

Hotel 11: the picture of the room is awesome. It is the style I like. So that means right now I am looking at the styles of the rooms. For me I like modern. It is a cheap price. Customer rating kind of sucks. But it looks cool. Some of these [hotel rooms] I do not like. I am not into elegant design so let's skip them...

In addition, the subjects seemed less confident about their final decision when picking a hotel without having seen any pictures. As one put it, “since I do not have the pictures, I do not know a lot about them so I will probably just go with Hotel 5...” Another commented that there were “no pictures at all. Can you tell the difference between 1 and 5?” Another felt that it was “hard to know what I am looking for without pictures...”
When evaluating hotel options with pictures attached, the subjects also used many subjective words and words expressing feelings. It seems that the use of pictures brought more hedonic elements into the process. One subject commented: “hotel 15 looks appealing, it seems like it has a good view.” Another said that the “pictures keep catching my eyes. I cannot help myself to keep looking at them...” and we already mentioned the subject who said: “the picture of the room is awesome. It is the style I like...” (all emphasis added). However, when the hotel options lacked images, the subjects described the process as “boring” and “disappointing,” commenting that “without pictures it is rotten! It is very difficult to select a hotel without picture...” and “it is kind of boring. I do not like it without pictures...”

We also found that the hotel’s specific features entered more into consideration when images were not present, and the subjects engaged in more extensive evaluation and comparison of various options, instead of relying on intuition and likes or dislikes. When one subject was evaluating a hotel set without images, the process ran as follows:

Hotel 10 I am going to rule out. The price is 195 (dollars) and the rating is 1.5 out of 5. They just completed renovation, which may explain why they have a low rating. The customers may have stayed prior to the renovation but without any pictures, I am going to rule it out...

The absence of pictures even made one subject raise her price range. “I am looking at a higher price range than I was before because I have a lot to look for without pictures. I have to read descriptions to compare that way.”
In conclusion, pictures were not only a crucial decision criterion for these subjects’ online choices, but they helped increase confidence in decision making and served as an alternative to other evaluation heuristics. Even though the text describes important attributes of a hotel, text does not seem to be sufficient on its own. Images make the decision process more tolerable, interesting, and hedonic, and replace other calculations and comparison on other criteria such as price, ratings, or amenities. We found that our subjects were less confident about their decisions if images were not present, and they exited the decision making process earlier.

Conclusions

Looking again at the controversy regarding the number of options in a choice set, this study’s findings lean toward a short list. We found that our subjects evaluated all the options if given five hotel choices. However, they began to use various yardsticks (usually price) to consider fewer options if given 20 hotels with images, and they looked at a lot fewer hotels when given 20 options with only text descriptions. Two factors drew their attention: low price and positioning at the top of the web page folds. Our subjects evaluated the options from top to bottom using a primary ranking criterion, but not in a linear manner. For the 20-hotel set, the ranking on price, compounded by the relative positions of the options on page folds, determined the amount of attention each hotel attracted. Thus, appearing on the top position for a ranking criterion is important; it is also important to appear at the top of a web page fold. In addition, the middle of the list was often ignored in extensive choice sets. This agrees with the finding by Nielsen (2010) who concluded that when web users have to scroll down a page to see it all, they focus more on the information above the page fold, and the last few items get more attention than the ones before them.
We particularly want to call attention to the effects of images on subjects' decision making process. When images were present, the subjects spent more time on the web pages and evaluated more hotels in the large hotel sets. Interestingly, the subjects also spent more time on the text lookzones when images were present than in text-only mode. They felt more confident when presented with images and felt that text-only was boring, causing them to exit the process early. Images are not only a crucial decision criterion but can also make the process more interesting and tolerable, and can even replace calculations and comparisons of other hotel attributes by bringing in more hedonic elements.

**Practical Implications**

This study has demonstrated the importance of a search page’s interface based on our understanding of the decision making processes of online consumers. First, the results indicate that there must be a balance between users’ need for extensive choice and the number of hotel alternatives provided on a search results page. OTAs should be aware that extensive options on a long page are inherently problematic due to the users’ limited attention span. To save their cognitive resources, online users deal with this problem in two ways. First, they ignore many of the options altogether, especially the expensive ones or those in the middle, and, second, they spend less time and effort on each one. OTAs can take steps to offer a small set for consideration, eliminating extra options by adopting primary ranking criteria (Hauser and Wernerfelt 1990). This finding calls into question the efficacy of presenting two to four dozen hits on the first view of a search page, which is what we found when we did a test search on the OTAs. Even though a consumer can re-rank and limit these choices by selecting certain criteria, the searcher still has to determine the limiting criteria and use some more keystrokes. Given users’ purchase history,
OTAs could easily learn about users’ price or amenity preferences and hence limit the number of options initially presented.

Second, the attention paid to hotel options does not correspond to their ranking in a linear fashion, but instead attention is compounded with their position on the page fold. Web designers or information architects should keep this in mind when trying to understand relative conversion rates from each position on a page. A hotel’s position at the top of a page fold, rather than its own attributes, may contribute to a hotel's high conversion rates. Sometimes it is better to be at the top of the second page fold than the bottom of the first one, even if this is a lower overall ranking.

Third, images and text are processed in different ways, and images can substitute for other criteria when a visitor is evaluating hotel options (although it’s not always possible to predict which criteria are replaced). Thus, for hotels which are inferior in terms of certain criteria, providing more experiential information, such as attractive and enjoyable pictures or videos, can speak to consumers’ hedonic evaluation and increase the possibility of selection.

Future Research

In summary, the study has addressed an important, yet largely overlooked topic. Although limited in scale, study findings provided additional insights for hospitality researchers to further investigate the hotel decision making process. Hotel practitioners would also find the results useful for them to plan how to display their hotel’s search results.

A natural extension of this research is to repeat the study with a larger sample size in terms of human subjects and hotel websites. For instance, the rapid development of the Asian hotel industry in recent years, together with the emerging affluent Asian customers, may generate
findings that are different from the Western context. It would be extremely valuable to learn whether culture plays a role in the process of hotel selection. Last, it would be interesting to conduct a longitudinal study to find out if customers’ preferences change after a few years.
References


Exhibit 1. Four Conditions of Hotel Sets

5 Hotels with Images and Text

5 Hotels with Text Only

20 Hotels with Images and Text

20 Hotels with Text Only
Exhibit 2. Total Number of Fixations on Each Option in Four Conditions

5 Hotel Sets

20 Hotel Sets
Exhibit 3. Average Number of Fixations on Each Hotel for Each Subject

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<th></th>
<th>5 Options</th>
<th>20 Options</th>
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<td>18.2</td>
</tr>
</tbody>
</table>
Exhibit 4. Percentage of Options Viewed and Number of Subjects Skipped

- 96%, 1 subject
- 94%, 2 subjects
- 90%, 6 subjects
- 74%, 14 subjects

Legend:
- Blue line: Text Only
- Red line: Text and Image

Graph shows the percentage of options viewed and the number of subjects skipped for different numbers of hotels (5 and 20) for text-only and text-and-image conditions.
Exhibit 5. The Effects of Number of Hotels and Images on Percentage of Viewed Hotel Options*

<table>
<thead>
<tr>
<th></th>
<th>Type III Sum of Squares</th>
<th>d.f.</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Images vs. Text</td>
<td>0.136</td>
<td>1</td>
<td>0.136</td>
<td>5.025</td>
<td>0.041</td>
</tr>
<tr>
<td>Error (Images vs. Text)</td>
<td>0.406</td>
<td>15</td>
<td>0.027</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 vs. 20</td>
<td>0.269</td>
<td>1</td>
<td>0.269</td>
<td>11.691</td>
<td>0.004</td>
</tr>
<tr>
<td>Error (5 vs. 20)</td>
<td>0.345</td>
<td>15</td>
<td>0.023</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Images vs. Text * 5 vs. 20</td>
<td>0.072</td>
<td>1</td>
<td>0.072</td>
<td>5.168</td>
<td>0.038</td>
</tr>
<tr>
<td>Error (Images vs. text * 5 vs. 20)</td>
<td>0.21</td>
<td>15</td>
<td>0.014</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Test shows sphericity of variances is not violated.