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Mere Position Effect in Booking Hotels Online

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Abstract

When travelers book hotels online, they are typically provided with a list of relevant hotels. Although presenting hotels on the screen in a list format seems appropriate for organizing the information, it creates a new (spurious) attribute for them: their position on the list. We tested experimentally whether the hotel's position on the list affects its likelihood of being selected. Results revealed a nonlinear effect of hotel position on the list on choice: hotels that were listed at the top and bottom of the list were more likely to be chosen than those listed in the middle. This study suggests that even trivial web design choices, such as the choice of presenting data in lists, might result in nontrivial consequences on the behavior of prospective customers.

Keywords

hotel choice, online booking, decision making, primacy/recency effect

Introduction

The Internet has become a major channel for travel commerce. A Google Insights travel study found that travelers rely on digital input more than ever before to make decisions, with more than 80% of U.S. travelers planning their vacation online (Ipsos 2013). In 2012, total online travel sales were estimated at $162.4 billion, 39% of which was for hotel reservations (StatisticsBrain 2014). The role of online travel agents (OTAs) in these growing online sales is gaining importance; in 2013, they experienced a 13.6% increase in hotel bookings compared to the previous year (Rudnansky 2013). This growing reliance on the Internet for booking travel services has raised the need for a deeper understanding of the process of online purchasing, which often involves choosing among a variety of alternatives displayed as a list on the computer screen. We contend that the position of the displayed items on the choice list might become an influential attribute in the purchasing decision, even though it has nothing to do with the items' real characteristics. The current article explores whether and how the main spurious characteristic of hotels listed online, that is, their position on the list, affects consumer choice.

Hotel booking is typically considered a high-involvement decision because it occurs infrequently and is a relatively expensive purchase. Thus, people planning their trip tend to expend a good deal of effort on the search for a suitable hotel. The advent of OTAs has eased the physical effort of search and comparison shopping for hotels. Customers no longer have to call or visit the travel agency's offices; instead, they receive a list of relevant hotels on their computer screen. Nevertheless, the mental effort needed for online booking has increased, as the ease of obtaining information has led to a much larger set of alternatives than that received from the traditional travel agencies (Öörni 2003). This new challenge of "choice overload" might lead consumers to develop search and choice strategies based not only on their preferences and the hotel attributes but also on a new factor, the computer interface.

As noted above, OTAs typically present hotels in lists, making the item's positioning one of the most salient attributes as this is the first thing a person is exposed to when the web page is loaded. The hotel's position on the default list is up to the OTA, whose decision is based on different possible factors such as the overriding commission, the relationship that a property has with the OTA's market manager, amount of inventory, and more. Being high on the list can be beneficial in terms of capturing attention in long lists that involve a great deal of screen scrolling (Pan et al. 2007; Pan, Zhang, and Law 2013). However, customers often filter their search (e.g., by price range, location, or number of stars), resulting in a much shorter list with limited OTA control of the order of appearance. In these cases, the mere position of a listed item should not affect the customer's choice unless it informs on

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other essential attributes of that item (as in the case of sites in Google search where position informs on their likelihood to fit a keyword). Indeed, people intuitively reject the possibility of their choice being affected by mere item positioning (Nisbett and Wilson 1977). Yet, in contrast to this intuition, empirical studies have found that mere positioning actually does affect choice (see a recent review by Bar-Hillel 2011).

Studies of mere position effects have focused mainly on "low-involvement" decisions, in which the comparison criteria are unimportant, for example, picking one of several identical items from a supermarket shelf. On the basis of these findings, Christenfeld (1995) suggested that a "substantial number of people have implicit rules for deciding which option to choose *when there is no objective basis* for making a choice" (p. 55, italics added for emphasis). We claim that position effect might be relevant not only for low-involvement decisions but also for effortful choices when an objective basis for decision-making does exist, such as the case of booking hotels online. The main goal of this paper is to evaluate, experimentally, the potential existence and nature of mere position effects in online hotel booking.

The study is based on a controlled experiment simulating the process of booking a hotel online. This process was simulated from the point at which irrelevant hotels have been eliminated from the total set and a "consideration set" has been formed. Consequently, participants in the experiment received a web page with a list of 10 similar hotels. The order of the hotels on the list had been manipulated such that in each of the 10 versions of the web page, each hotel appeared in a different position. The participants were able to first sample the hotels and then choose the hotel of their liking. The results showed a significant U-shaped effect of hotel position on the likelihood of it being chosen: hotels that were positioned at the top of the list and also those positioned at the bottom were more likely to be chosen than those listed in the middle.

The remainder of this article is organized as follows. The next section presents a literature review and theoretical background reviewing the relevant decision processes in the context of online booking, covering the empirical evidence for mere position effects that have been discussed in the psychology literature, and showing the relevance of mere position effects to booking hotels online. In the third section, we describe the details of the experiment and delineate the different methods used in the analysis. The fourth section includes the results, which are discussed in the fifth section. The conclusions and limitations of the research are presented in the last section.

Literature Review and Theoretical Background

Consumer Decision Making in Tourism

Decision making has been discussed in the tourism literature as a key part of the tourist's behavior (Cohen, Prayag, and Moital 2013; Swarbrooke and Horner 2004). A core part of the decision-making studies can be viewed as "choice-set" models focusing on the outputs of the decisions (e.g., Barros, Butler, and Correia 2008; Nicolau and Más 2005). These choice models explore the relationship between the outcome of the decision process, which is the choice, and the explanatory variables, which are typically the attributes of the different alternatives and of the consumers (Smallman and Moore 2010).

In this work, we focus on this process-outcome relation. Specifically we adopt the decision-making process in purchasing tourism services as described by Sirakaya and Woodside (2005). They contended that since the purchase of a tourism service is extensive, complex, and risky, the decision process occurs in stages. This decision is described as a funnel-like process in which consumers eliminate options from the "total set" (composed of all available options) to construct a "consideration set," and then form a smaller "choice set" from which they ultimately choose (Jones and Chen 2011; Sirakaya and Woodside 2005). The rationale for adopting Sirakaya and Woodside's (2005) model is that many OTA websites are designed to follow this exact process: hotel search starts by entering the desired destination and dates of travel, which results in a default list of available hotels ordered by the OTA (i.e., the total set). The search continues by eliminating irrelevant hotels according to criteria such as price range and star rating, resulting in a smaller "consideration set." Some of the hotels in the consideration set are subjected to further examination by clicking on their icon and receiving additional information (we refer to this process later as "sampling"). The outcome of this stage is a smaller "choice set" from which the final decision of which hotel to book is made. This theory has received support from a recent empirical study (Jones and Chen 2011), which found that hotel consideration sets are composed of 10 hotels on average, whereas choice sets average about 4. This funnel-like process helps consumers choose by forming a smaller and more comparable set of alternatives at each stage.

The consideration set contains fewer hotels than the total set. In some attributes, such as star ranking, the hotels can become identical in the consideration set, and in others, such as price and review score, they can still differ, but within a much smaller range than in the total set. The choice set is composed of an even smaller set of hotels that are best suited to the consumer's needs. Although the differences between hotels at this stage can be very small, the final decision depends on the attributes that still vary between them. Nevertheless, at none of the stages does the position of the hotel on the list correlate with any of its real attributes.

Mere Position Effects in Decision Making

When the position of an object is not correlated with its real attributes, there seems to be no reason for choice to be affected by mere position. Nevertheless, there is ample

empirical evidence for mere position effects in different situations. In retail stores, for example, the impact of items' shelf position on consumers' choice decisions has been widely supported. Field experiments have shown that in vertical shelf position, the strongest effect on the probability of being selected is when products are placed at eye or hand level (Campo and Gijsbrechts 2005; Chandon et al. 2009), whereas the impact in horizontal shelf positioning was inconclusive (Drèze, Hoch, and Purk 1994). Shopping online differs from shopping in traditional stores as it requires limited eye movement and simple scrolling across the screen; however, evidence suggests that online shelf position also influences product selection. Breugelmans, Campo, and Gijsbrechts (2007), using a computer-simulated shopping experiment, found that online shelf display affects consumers' shopping decisions in its own way. They found a primacy effect, that is, items on the first screen were more likely to be selected, but the absolute placement of products on a screen was not influential: only their placement relative to focal items seemed to have an impact.

Studies of choice between identical options reveal what seems to be a consistent tendency to choose options located in the middle; examples include choices between grocery items on a supermarket shelf, toilet stalls, and maze routes (Christenfeld 1995); highlighters and seats (Shaw et al. 2000); and even guessing the correct answer's position in multiple-choice questions (Attali and Bar-Hillel 2003). Several explanations have been suggested for this middle-position effect. Attali and Bar-Hillel (2003) suggested that the middle-scale bias reflects a tendency to avoid boundaries, rather than an attraction to the middle option. They showed that in five-choice tests, positions A and E are the least popular, but that position C, the exact middle, is not the most popular. Attali and Bar-Hillel noted that although this "edge aversion" seems to be a general tendency, it "is a phenomenon still in search for an explanation" (Attali and Bar-Hillel 2003, p. 116). Valenzuela and Raghubir (2009) suggested that the edge-aversion tendency may result from consumers' belief about the rules that marketers follow in their physical ordering of products, specifically that sellers place their most popular items in the middle. This tactic seems reasonable because options in the center typically benefit from a disproportionately more prominent gaze cascade compared to the edges of an array (Atalay, Bodur, and Rasolofoarison 2012).

More relevant to the current study is the question of whether the position effect holds for choices between nonidentical options, in which preferences become relevant. Evidence suggests that in such cases, a position effect might still exist, but the exact nature of this effect is not entirely clear. Some studies have documented a preference for middle options, for example, when choosing between a variety of chewing gums or a variety of pretzels (Valenzuela and Raghubir 2009). Other studies have found a tendency to prefer the first option (primacy effect). For example, a study of ballot voting (Koppell and Steen 2004) found that "candidates received a greater proportion of the vote when listed first than when listed in any other position." Miller and Krosnick (1998), who also studied voting, found a similar pattern. The main explanation for these findings relies on the "satisficing principle" (Simon 1957), which suggests that people choosing between different alternatives conserve resources and select the most accessible satisfactory option presented, even if it is not optimal. Primacy effects have also been documented in choosing items from a restaurant menu (Dayan and Bar-Hillel 2011), and in ordering deliveries online (Murphy, Hofacker, and Mizerski 2006). Interestingly, the latter two studies found not only a primacy effect but also preferences for the last item on the list (recency effect). This primacy–recency pattern came as a surprise. Dayan and Bar-Hillel (2011, p. 339) noted: "We cannot offer a satisfying explanation for why menu choices would differ from the many other contexts in which different, usually even opposite, biases were found."

It seems fair to summarize the evidence on choosing between nonidentical options with the acknowledgment that mere position effects indeed seem to influence choice, yet the nature of these effects has yet to be fully understood and might be context-dependent (e.g., type of product, number of alternatives).

The Potential for Mere Position Effects in Online Booking

Choosing a hotel is a relatively complex process: first, the consumer has to choose among multiple options (hotels), each of which includes multiple attributes (e.g., price, location, amenities) that potentially imply effortful tradeoffs. Second, the decision maker faces high uncertainty since hotels are experience goods and thus their quality cannot be ascertained prior to consumption. When complexity increases, people tend to use cognitive "shortcuts" and decision rules that are aimed at simplifying choice (Payne, Bettman, and Johnson 1993). Moreover, people might become quickly depleted by complex situations that involve nontrivial choices, and thus become more vulnerable to irrelevant context effects (Pocheptsova et al. 2009). Those findings suggest that the complexity involved in booking hotels online might facilitate the impact of situational factors on the customer's decisions. As noted above, one of the most salient factors in this situation is the hotel's positioning in a list.

Some evidence for position effects in lists comes from studies of user experience with search engine ranking results pages (SERP). For example, in an eye-tracking study, Pan et al. (2007) gave people 10 different search tasks on a Google web page; they found that subjects viewed the two top-ranked links with the highest frequency and clicked mostly on the first, and that their attention to the other links decreased exponentially as they scrolled down the page. They also ran a "reversed" condition in which they swapped the positions

Table 1. Hotel Order under Each of the 10 Experimental Conditions.

Hotel	Cond. 1	Cond. 2	Cond. 3	Cond. 4	Cond. 5	Cond. 6	Cond. 7	Cond. 8	Cond. 9	Cond. 10
A	1	10	7	4	8	3	9	2	5	6
B	2	9	8	3	1	10	6	5	7	4
C	3	8	9	2	4	7	5	6	1	10
D	4	7	10	1	5	6	2	9	8	3
E	5	6	1	10	9	2	8	3	4	7
F	6	5	2	9	10	1	7	4	3	8
G	7	4	3	8	2	9	10	1	6	5
H	8	3	4	7	6	5	1	10	2	9
I	9	2	5	6	3	8	4	7	10	1
J	10	1	6	5	7	4	3	8	9	2

Note: Cond. = condition.

of the 1st link with the 10th, the 2nd with the 9th and so on. The results in the reversed condition showed that the 1st and 2nd positions still received the most attention (though significantly less than in the normal condition), but more views (and clicks) were given to the three last positions. In a recent study, Pan, Zhang, and Law (2013) analyzed hotel choices among students, as well the number of times they fixated on each item. Since the hotels were sorted from high to low price, most subjects chose the low-priced hotels at the bottom of the list. Interestingly, the fixation pattern showed that attention was not linear; for example, when 20 hotels were presented in the choice set, fixations focused mostly on hotels positioned 1, 2, and 11, 12, 17, and 18 on the list. Pan, Zhang, and Law (2013) concluded that 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. While that study was not designed to assess the effect of mere positioning on choice, as mere position was perfectly correlated with price ranking, it did provide useful insight into the effect of position on attention, suggesting that subjects attend mainly to items at the top and bottom of the page. In the current study, the experimental manipulation and the control for price and other factors enabled identifying the potential existence of a "pure" position effect in online booking.

The rich evidence for position effects, together with the saliency of the hotels' positions in booking websites, implies that choice in this environment might be susceptible to mere positioning effects. The exact nature of the effect, whether favoring the options in the middle or at the beginning of the list, seems less obvious and remained to be tested empirically. Our experiment was designed to do just that.

Method

A very effective way to explore the suggested causal relation between position and hotel choice online is by conducting a controlled experiment. Experimental designs are essential for investigating the impact of selected factors (here the hotel's position in the list) on the change in others (selection of a hotel), while controlling for other factors of potential relevance (e.g., hotel attributes). Thus, the stimulus materials were designed to allow manipulation of the target factor (position on the list) in a reasonably realistic setting. The setting in our case was a simulation of booking accommodations in Tel Aviv via the OTA website Booking.com.

Design Stimuli and Procedure

The experimental screens were designed to replicate a genuine OTA website (in our case, Booking.com) in order to construct reasonable ecological validity (Viswanathan 2005). The screen presented a list of 10 four-star hotels (all hotels and their attributes were real; their data were copied from the real OTA website), with a close range of review scores (7–7.8; the scale ranges from 1 to 10) and prices ($144–$184). We chose to use 10 hotels in the experiment since it is a manageable number that requires very little scrolling down.

The study included 10 experimental conditions. The only difference between these conditions was the hotels' order on the list. As delineated in Table 1, each hotel appeared once in each of the 10 possible positions. Each participant was randomly assigned to one of the 10 conditions by clicking on the link attached to an email they received. The participants were asked to choose a hotel from the website they received for a weekend vacation in Tel Aviv (i.e., the purpose of the trip was leisure travel).

The simulated website included standard features. The header included the OTA "brand" name (Hotels-Israel.com), currency (NIS), and language (Hebrew). The page itself included a standard line: "10 hotels found in Tel Aviv, 10 available, showing 1–10," followed by a menu of the hotels. Each hotel entry included the hotel name, a representative photo, star rating, a short description, price (per night) for a double room including breakfast, and the average review score. Each entry also had a link to a more descriptive web page including photos, text with a detailed description, and hotel location, facilities, and policies. Thus, customers could

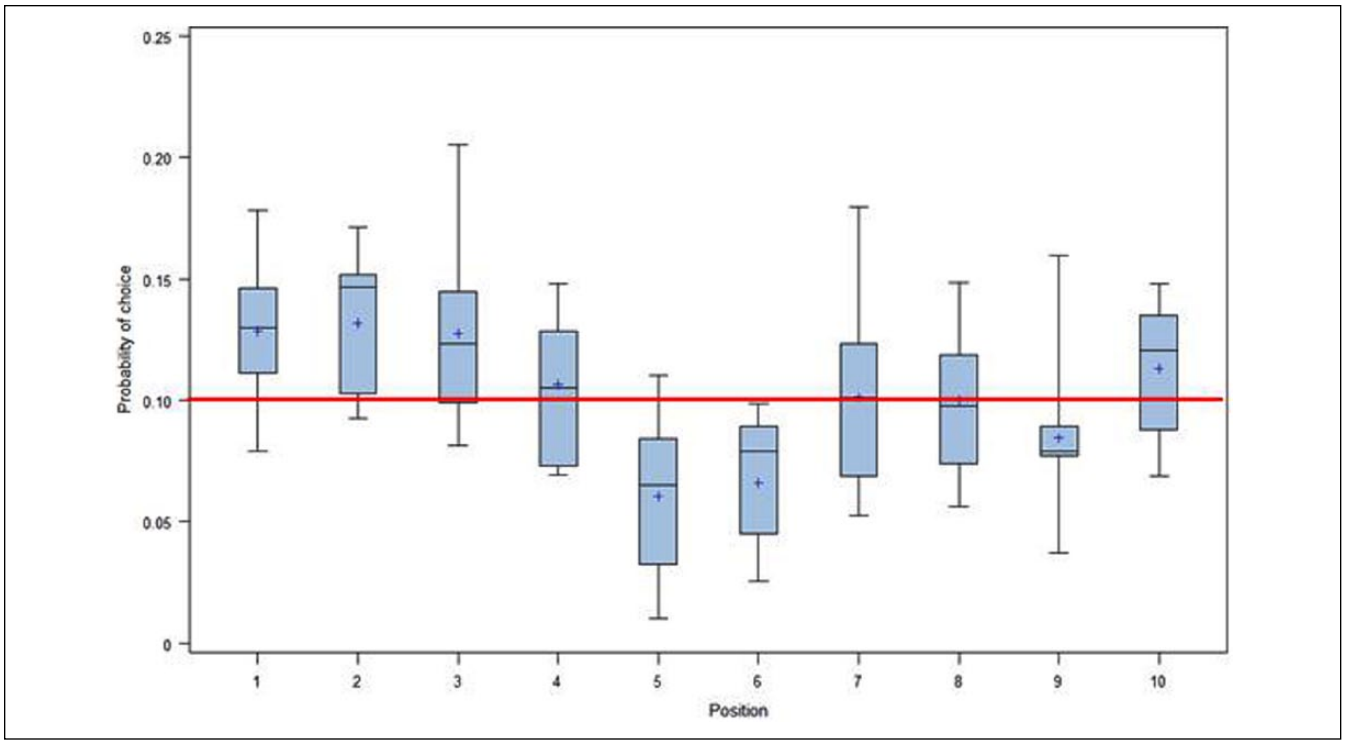

Figure 1. The proportion of choices in each position on the list over the 10 conditions.

sample hotels of interest for more information than that given on the main web page.

Participants were able to sample each hotel once and mark their selected hotel at any point in time. There were no restrictions on the number of sampled hotels nor was it necessary to sample the chosen hotel. Once participants marked their selection, they were presented with another web page asking them for demographic data (age, gender, district of residence).

Participants

The participants were drawn from a custom online panel composed of about 120,000 prescreened respondents in Israel who expressed a willingness to participate in surveys and online experiments. Respondents became "panelists" by completing a profiling questionnaire that included demographics, lifestyle characteristics, and additional variables, providing a basis for future sample formation and participation in different studies. From this panel, we chose a representative sample of the adult Israeli population based on gender, age, and location of residency. Members of the sample, chosen specifically for this study, received an explanation asking them to participate in an online experiment that simulated choosing a hotel for a weekend vacation in Tel Aviv.

For each of the 10 experimental conditions, quotas were determined to ensure that the sampled proportions of participant ages (22 and above), genders, and geographical districts reflected their proportions in the Israeli population. A total of 858 members of the panel participated in the experiment; mean age was 41 years (standard deviation [SD] = 12), and 53% were male. Consistent with the general reliance on the Internet for travel ecommerce, as noted in the introduction, participants in the current study had experience with booking online. On average, the participants had used the Internet 2.33 times (SD = 0.88) in the process of booking a hotel during the 3 years preceding the experiment. Only 1.6% of the people in our sample had not used the Internet for this process.

The Mixed Logit Model

The probability of an individual choosing a specific alternative from a choice set can be estimated using different discrete-choice models. Some researchers studying choices in the tourism industry have used the multinomial logit model (MNL). One example is the work of Luzar et al. (1998), who explored the factors affecting tourists' decision to participate in nature tourism in Louisiana. However, the MNL model imposes two strong restrictions (Train 2003): (1) model coefficients are the same for all individuals, allowing no differences in individuals' preferences; (2) it suffers from the well-known Independence of Irrelevant Alternatives (IIA). The formulation of the mixed logit model alleviates both restrictions; most importantly for our case, it accommodates

Table 2. Estimations of Mixed Logit Models.

	Model 1		Model 2		Model 3	
Variable	Value	SE	Value	SE	Value	SE
Position						
Mean coefficient	–0.054*	0.017	–0.279*	0.054	–0.065*	0.024
SD of coefficient	0.273*	0.039	–	–	0.267*	0.040
Position_sq						
Mean coefficient			0.022*	0.005		
SD of coefficient			–	–		
Price						
Mean coefficient	–0.034*	0.005	–0.032*	0.004	–0.034*	0.005
SD of coefficient	0.063*	0.009	0.058*	0.009	0.062*	0.009
Score						
Mean coefficient	0.958*	0.209	0.837*	0.196	0.963*	0.209
SD of coefficient	–	–	–	–	–	–
ln_tm_or[a]						
Mean coefficient					0.00005	0.00007
SD of coefficient					–0.065	0.024

Note: SE = standard error; SD = standard deviation.
[a]Interaction variable between position and the length of time respondents take to complete the choice experiment.
*Significant at 0.05.

heterogeneity (i.e., differences in preferences) across individuals due to both observed and unobserved individual attributes. This was important in our case since we did not have a clear hypothesis on the preferences of individuals for position effect or price. It is possible that some participants preferred to choose from the top of the list and some from the bottom. As for the price, it is possible that in the case of hotel markets, some individuals can use price as a signal for quality and in this case, the coefficient of price can have a positive sign for some of them. In both cases, the coefficients of position and price variables can logically be positive or negative. The mixed logit model and its underlying theory are well established in the literature (Train 1986). For conciseness, we choose not to present its specifications here.

Results

Figure 1 presents the probability of choosing each position on the hotel list across the experimental conditions. The observed choice proportions for each position were significantly different from 0.1, the rate expected under uniform preferences ($\chi^2[9, N = 856] = 42.22$, $p < 0.0001$). The figure suggests that the choice rates follow a U-shaped trend. Hotels positioned 1st, 2nd, and 3rd on the list were most likely to be picked (likelihood of 12.8%, 13.1%, and 12.7%, respectively); after these, according to the order of likelihood, were the bottom positions, whereas hotels positioned 5th and 6th on the list were the least likely to be picked (6% and 6.6%, respectively).

Interestingly, the participants did not seem to be aware of this position effect. They were asked at the end of the experiment to indicate the factors influencing their choices. The factors that were perceived as most influential were the hotel photos, the price, and the reviews. No one referred to the position of the hotels on the list.

Further Analysis with a Mixed Logit Model

To understand the role of the other hotel attributes (rather than mere position) that may be relevant to choosing hotels, we ran a mixed logit analysis. The mixed logit model describes the likelihood of a hotel being chosen as a function of its attributes, including price, review score, and our main attribute of interest, its position on the list. Whereas the first two attributes, price and review score, are real attributes of the hotel, the latter attribute does not exist outside the screen. It is important to control for price and review scores, two highly relevant variables affecting hotel choice, because although we designed the experiment such that the 10 hotels would be very similar, some differences still existed. The range of prices and review scores were very small but nevertheless might affect choice if people pay attention to relative values more than absolute ones (Bettman, Luce, and Payne 1998).

Table 2 presents the results of three mixed logit models estimating the parameters of hotel position on the list, price, and online review score. The first two models (1 and 2) represent two different approaches to testing for the U-shape effect while controlling for the price and review score. Model 1 allows for heterogeneity of preferences across participants. That is, for some of the participants, the sign of "position" can be negative (which means that the higher the

hotel is on the list, the higher its probability of being chosen), indicating a primacy effect, and for some, positive, indicating a recency effect. The significance of the standard deviation of the 'position' variable implies that preferences differ across participants. The mean and standard deviation are mainly used to provide information on the share of respondents that place a positive value on the "position" and the share that place a negative value. The coefficient of "position" in Model 1 gives an estimated mean of –0.054 and standard deviation of 0.27, such that 58% of the distribution is negative and 42% positive. These results imply that 58% of the participants tend to choose from the top of the list and 42% prefer the bottom. This observation might imply that the U shape observed in Figure 1 stems from heterogeneity in preferences.

In Model 2, we estimated the suggested nonlinearity of the position effect on hotel choice. That is, instead of assuming a random coefficient for position, we used the variables position and position_sq (position squared) to allow for a nonlinear impact of order of appearance on the list. The negative significant coefficient of position and the positive significant coefficient of position_sq revealed a U-shaped impact of hotel position on choice: a hotel has a higher probability of being chosen if it appears at the top or bottom of the list.

Models 1 and 2 confirmed that the effect of hotel position on choice is best described by a U-shaped function, and that this relation is significant when other relevant factors (e.g., price, score) are controlled. The results show that choosing hotels online is indeed affected by their position in the list with a position advantage for the list extremities, where both the first and last positions enjoyed some advantage over positions in the center.

The last model was estimated to test for response latency in online surveys. Malhotra (2008) referred to the possibility that some participants on online panels might be motivated to finish the study as quickly as possible, paying less attention to its content. In our setting, such behavior implies that the length of time participants spent answering might moderate the impact of the hotel's position on choice. Specifically, it raises the concern that some people might have selected the first hotels they saw from the top of the list just to finish the task quickly. Although such behavior cannot explain the U-shaped pattern, we were still interested in testing for any evidence of less engaged participants in our sample. If this were the case, we would expect to see a significant interaction coefficient between the length of time respondents take to complete the choice experiment and hotel position. The insignificant interaction coefficient between length of time and position (in_tm_pos), tested in Model 3, rejected this hypothesis. Thus, we did not find any support for the concern that the position effect might be driven by hasty participants.

The estimated coefficients of the control variables, price and review score, revealed some interesting additional findings. In all of the models, the price coefficient was assumed to be random, allowing it to receive negative and positive signs. Usually in a demand analysis we expect the price to receive a negative sign; that is, the higher the price, the lower the probability of choosing the product. However, the hotel is an experience good, and even though there is a star-rating system, the level of quality is not fully known to the buyer. Thus, in hotel markets, people might use price as a signal of quality (Oh 2003). The mixed logit model allows us to test this possibility by letting the price coefficient be drawn from an independent normal distribution. The mean and standard deviation of the price coefficient in Model 1 provides interesting insight into the role of price in the online hotel markets. The price coefficient with mean 0.034 and standard deviation of 0.063 indicates that for 70% of the population, the sign is negative, as might be expected, but for 30% the sign is positive. This preference for higher price is reasonable for people who may interpret price as an indicator of hotel quality (Oh 2003).

The coefficient of the score variable was assumed to be fixed since there is no reason to suspect that some people would prefer hotels with low-score reviews ceteris paribus. As expected, the coefficient was positive and highly significant in all models in accordance with previous studies (Yacouel and Fleischer 2012). An important insight from this result was that although the range of the review score was designed to be very small in our study (the range of the review scores for Tel Aviv hotels in Booking.com was 4.8-9.2, whereas the range in our experiment was 7-7.8), people still seem very sensitive to the relative differences in it.

We also estimated other models that included additional hotel attributes such as pool, Internet, parking, hotel familiarity, and experience with booking online, but none were significant. For conciseness, we chose not to present them here.

Sampling as Mediator in the Choice Process

We use the term *sampling* to describe the stage preceding the choice of hotel, when the customers go over the list and decide to click on the link to receive further information about a hotel (this is described in detail at the end of the Methods section above). About 80% of the respondents first sampled the hotel that they eventually chose. This observation supports the hypothesized funnel-like process: people seem to decide first which hotels to examine in depth from the consideration set. This "sampling" helps them form the choice set from which they make their final choice. A direct implication of this suggested intermediacy of sampling is that the observed primacy and recency effects might have influenced the final choice through the decision of which hotels to sample. In other words, the position on the list might influence which hotels will be included in the choice set, and this inclusion increases the likelihood of their eventually being chosen.

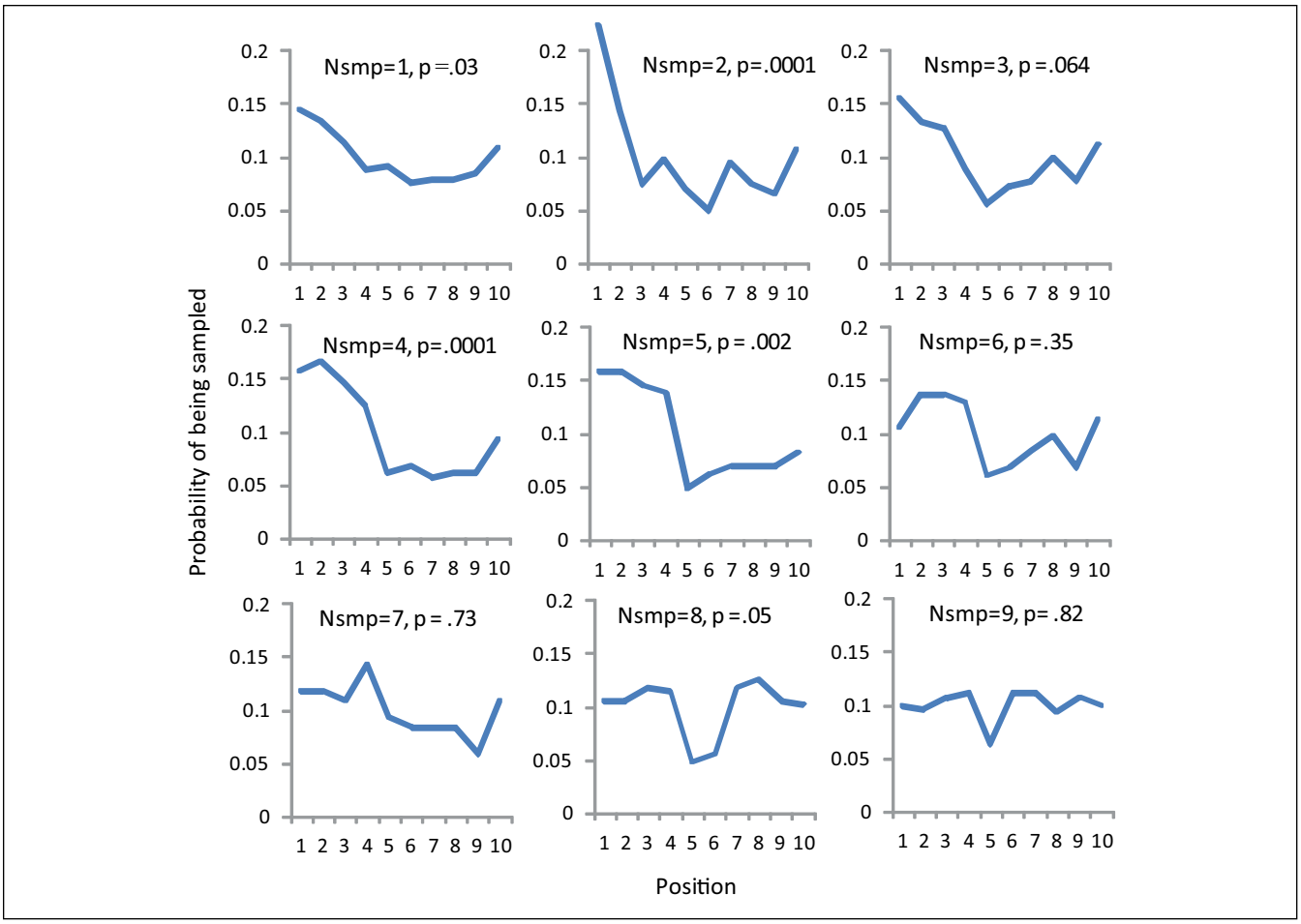

Figure 2. The probabilities of each hotel's position being sampled for each sample size.
Note: N_{smp} refers to the sample size, that is, the number of sampled hotels; *p* is the probability value of the χ^2 test for the difference of the probability of each position to be sampled per sample size from a uniform distribution under that size.

The participants sampled an average of 3.63 (SD = 3.4) hotels for further information, consistent with previous studies (Jones and Chen 2011). Figure 2 presents the likelihood of each position on the list being sampled, that is, being included in the choice set. It shows nine graphs, one for each sample size (sample size refers to the number of hotels that were sampled for more information), except for people who sampled all 10 hotels (124 subjects). Strikingly, for all sample sizes in the figure, the probability of hotels being sampled as a function of their position is described by a nonlinear U-shaped function.

As indicated by the *p* values in Figure 2, the observed probabilities for most sample sizes were significantly different from those expected under uniform distribution (except for the distributions for sample sizes 6, 7, and 9, which were insignificant). Hotels positioned in the middle of the list were least likely to be sampled for more information. This turned out to be detrimental for these hotels, as exclusion of hotels from the choice set (i.e., not sampling them) decreased their likelihood of being chosen from 21% to 3.5% in our study.

Discussion

The results of our experimental study show that hotel position on a web page significantly influences the choice of hotel, even though it has nothing to do with the hotel's attributes or the consumer's preferences for them. This effect is likely to be subliminal since when participants were asked to describe why they chose the hotel, none of them mentioned the position of the hotel on the list. Interestingly, the effect is not linear: hotels located at the top, but also at the bottom, of the list were more likely to be chosen than hotels positioned in the middle. The primacy effect, by which hotels at the top of the list have an advantage, may not come as much of a surprise. One explanation for the advantage of the top options involves the satisficing principle (Simon 1957). People seem to be satisfied with a good-enough option rather than searching for the optimal one, so the sooner they encounter a good-enough option, the more likely they are to choose it. Another possibility is that some people might naively overgeneralize the role of position from situations in which position is

meaningful (e.g., the case of websites listed in Google search). Such a tendency would also imply a preference for options that are positioned at the top of the list.

However, none of these assertions can explain the nonmonotonic effect of an advantage for hotels positioned at the end of the list over those positioned in the middle. Only two studies have found a similar primacy–recency pattern, both in the context of choosing food items from a restaurant menu (Dayan and Bar-Hillel 2011; Murphy, Hofacker, and Mizerski 2006). Those studies did not explain the surprising recency advantage, though Murphy, Hofacker, and Mizerski (2006) speculated that the last items might be more available in one's memory following a top-to-bottom scan of the menu. In the current context of online booking, the relative advantage of the last position is even more surprising considering the complexity of this procedure. Since the study mainly aimed to evaluate whether there is any position effect on online booking, it was not designed to evaluate potential explanations for the observed primacy–recency pattern. However, two potential explanations do seem to garner support from our analysis of the data.

Position Effect and the Primacy–Recency Phenomenon

The first suggested explanation for the primacy–recency phenomenon relates to differences in personality types. This explanation is motivated by our mixed logit analysis, which showed that 58% of the customers had a negative position coefficient (tendency to choose the top items), whereas the remaining 42% had a positive coefficient (tendency to prefer the last items). This observation suggests that 58% of the people in our sample were satisficers, who searched through the hotels according to order of appearance, and once they found a "good enough" option they chose it, thereby creating a primacy effect. The recency effect might have been created by the other 42% of the customers acting more like "optimizers," that is, searching until they find the optimal option, or continuing their search until they reach the end of the list. In this case, it is easier to choose from the hotels that were viewed last.

An alternative explanation is motivated by our analysis of the sampling pattern. While we are not familiar with any other study showing a position effect on the likelihood of sampling an option for further information, we believe that this effect is potentially important. The U-shape effect of position on sampling, as shown in Figure 2, suggests that customers who are scanning the list place special emphasis on the first and last items, potentially because it gives a psychological feeling of having covered all options, even when middle options are neglected (this observation seems consistent with Neilsen's [2010] and Pan, Zhang, and Law's [2013] observation of increased attention to last items in web-page viewing). As a result, the choice set has a lower probability of containing hotels that appeared in the middle and thus a lower likelihood of their being chosen. Of course, while the data suggest supporting evidence for both explanations, they remain speculative, and further research is needed to test them.

The primacy–recency effect found herein may be reminiscent of the vast psychology literature on "serial-position" effects, in which items are presented one at a time, and subjects are asked to recall which items they have seen. This stream of research has shown a consistent primacy–recency effect attributed to memory recall (e.g., Glanzer and Cunitz 1966). However, those studies focused on "temporal position" (the sequence of presentation over time) rather than "spatial position" (i.e., their position in a list), as in our case, and on effects of memory processes, rather than choice processes, and are thus less relevant to the current context of hotel choice.

In the context of current scientific knowledge on position effects, the present study seems at first glance to be yet another contribution to the mixed results that have been documented in this literature (Bar-Hillel 2011). As noted in the introduction, some studies have documented preferences for middle options, others have documented primacy effects, and the current (and two other) studies document both primacy and recency effects. However, one core difference between our study and previous ones is that, to our knowledge, ours is the first to examine a potential position effect on a high-involvement, relatively expensive decision—booking hotels online. As such, it is the first study to highlight the relevance of position effects in high-involvement choices. Although the studies on position effects differ in many dimensions, we have noted an interesting pattern: most studies documenting a middle bias seem to focus on horizontal presentations (e.g., products on a shelf), whereas most studies (including the current one) documenting primacy effects, recency effects, or both focus on vertical presentations (e.g., a restaurant menu). One implication of this idea is that order effects might also be expected with similar OTA sites such as online flight booking. Further research can confirm or reject this hypothesis.

Conclusions

The findings of the current study suggest that online hotel booking is sensitive to mere position effects. Hotels listed at the top and bottom of a list were more likely to be chosen than those listed in the middle. Although the hotel's position in the list was only a "virtual" attribute that had no importance outside the web page, it affected customers' choice. An interesting implication of this observation, beyond the ones already discussed, is that position on lists might be just one of many spurious attributes that web design dictates. The current findings suggest that even trivial web-design choices, like the choice of presenting data in lists, might result in nontrivial consequences on the behavior of prospective customers.

Another implication of our findings to web designers of tourist products is that agents like Trip Advisor who aim to give a fair chance to competing brands might need to counterbalance, or randomize, their ordering on lists. Randomization is likely to be more effective because to counterbalance ordering, one needs to consider various searches that create various lists, and the popularity of searches might also vary. Of course, OTAs such as Booking.com and Expedia that are aware of these effects might also exploit them to promote their preferred brands. Positioning the preferred brands at the top as they do presently seems intuitive. Far less intuitive is the insight that if the preferred brand cannot be placed at the top of the list, it is better to position it at the bottom than in the middle.

Other interesting avenues for future studies could involve verifying the relevance of position effects in contexts other than hotel choice, such as the online booking of airlines. In most OTAs, the choice between airlines is organized in lists, suggesting that such web services might also be exposed to mere position effects. The generality of position effects across businesses may encourage travel suppliers to consider optimization of their location on the lists, similar to firms that optimize payments for sponsored links as part of their search-engine optimization (Paraskevas et al. 2011).

Finally, position effects may apply not only to choice between services but also to choice between different service properties (e.g., room type). They might also affect the impact of online reviews on prospective customers, as such reviews are also typically presented in lists. Future studies should seek to verify these suggestions and further clarify their boundaries.

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References

Atalay, Selin A., Onur H. Bodur, and Dina Rasolofoarison. (2012). "Shining in the Center: Central Gaze Cascade Effect on Product Choice." *Journal of Consumer Research*, 39 (4): 848-66.

Attali, Yigal, and Maya Bar-Hillel. (2003). "Guess Where: The Position of Correct Answers in Multiple-Choice Test Items as a Psychometric Variable." *Journal of Educational Measurement*, 40 (2): 109-28.

Bar-Hillel, Maya. (2011). *Location, Location, Location: Position Effects in Choice Among Simultaneously Presented Options* (Discussion Paper Series No. dp580). The Center for the Study of Rationality, Hebrew University, Jerusalem. http://ideas.repec.org/p/huj/dispap/dp580.html.

Barros, Carlos P., Richard Butler, and Antónia Correia. (2008). "Heterogeneity in Destination Choice: Tourism in Africa." *Journal of Travel Research*, 47 (2): 235-46.

Bettman, James R., Mary Frances Luce, and John W. Payne. (1998). "Constructive Consumer Choice Processes." *Journal of Consumer Research*, 25 (3): 187-217.

Breugelmans, Els, Katia Campo, and Els Gijsbrechts. (2007). "Shelf Sequence and Proximity Effects on Online Grocery Choices." *Marketing Letters*, 18 (1-2): 117-33.

Campo, Katia, and Els Gijsbrechts. (2005). "Retail Assortment, Shelf and Stockout Management: Issues, Interplay and Future Challenges." *Applied Stochastic Models in Business and Industry*, 21 (3): 383-92.

Chandon, Pierre, Wesley J. Hutchinson, Eric T. Bradlow, and Scott H. Young. (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 (6): 1-17.

Christenfeld, Nicholas. (1995). "Choices from Identical Options." *Psychological Science*, 6 (1): 50-5.

Cohen, Steven A., Girish Prayag, and Miguel Moital. (2013). "Consumer Behaviour in Tourism: Concepts, Influences and Opportunities." *Current Issues in Tourism*, doi:10.1080/13683500.2013.850064.

Dayan, Eran, and Maya Bar-Hillel. (2011). "Nudge to Nobesity II: Menu Positions Influence Food Orders." *Judgment and Decision Making*, 6 (4): 333-42.

Drèze, Xavier, Stephen J. Hoch, and Mary E. Purk. (1994). "Shelf Management and Space Elasticity." *Journal of Retailing*, 70 (4): 301-26.

Glanzer, Murray, and Anita R. Cunitz. (1966). "Two Storage Mechanisms in Free Recall." *Journal of Verbal Learning and Verbal Behavior*, 5 (4): 351-60.

Ipsos. (2013). Ipsos-na.com. https://ipsos-na.com/knowledge-ideas/media-content-technology/presentations/?q=the-2013-traveler.

Jones, Peter, and Meng-Mei Chen. (2011). "Factors Determining Hotel Selection: Online Behaviour by Leisure Travellers." *Tourism and Hospitality Research*, 11 (1): 83-95.

Koppell, Jonathan G. S., and Jennifer A. Steen. (2004). "The Effects of Ballot Position on Election Outcomes." *Journal of Politics*, 66 (1): 267-81.

Luzar, Jane E., Assane Diagne, Christopher Ecgan, and Brenda R. Henning. (1998). "Profiling the Nature-Based Tourist: A Multinomial Logit Approach." *Journal of Travel Research*, 37 (1): 48-55.

Malhotra, Neil. (2008). "Completion Time and Response Order Effects in Web Surveys." *Public Opinion Quarterly*, 72 (5): 914-34.

Miller, Joanne M., and Jon A. Krosnick. (1998). "The Impact of Candidate Name Order on Election Outcomes." *Public Opinion Quarterly*, 62 (3): 291-330.

Murphy, Jamie, Charles Hofacker, and Richard Mizerski. (2006). "Primacy and Recency Effects on Clicking Behavior." *Journal of Computer-Mediated Communication*, 11 (2): 522-35.

Neilsen, Jakob. (2010). "Scrolling and Attention." Useit.com. http://www.useit.com/alertbox/scrolling-attention.html (accessed June 20, 2014).

Nicolau, Juan L., and Francisco J. Más. (2005). "Stochastic Modelling: A Three-Stage Tourist Choice Process." *Annals of Tourism Research*, 32 (1): 49-69.

Nisbett, Richard E., and Timothy D. Wilson. (1977). "Telling More Than We Can Know: Verbal Reports on Mental Processes." *Psychological Review*, 84 (3): 231-59.

Oh, Haemoon. (2003). "Price Fairness and Its Asymmetric Effects on Overall Price, Quality, and Value Judgments: The Case of an Upscale Hotel." *Tourism Management*, 24 (4): 387-99.

Öörni, Anssi. (2003). "Consumer Search in Electronic Markets: An Experimental Analysis of Travel Services." *European Journal of Information Systems*, 12 (1): 30-40.

Pan, Bing, Helene Hembrooke, Thorsten Joachims, Lori Lorigo, Geri Gay, and Laura Granka. (2007). "In Google We Trust: Users' Decisions on Rank, Position, and Relevance." *Journal of Computer-Mediated Communication*, 12 (3): 801-23.

Pan, Bing, Lixuan Zhang, and Rob Law. (2013). "The Complex Matter of Online Hotel Choice." *Cornell Hospitality Quarterly*, 54 (1): 74-83.

Paraskevas, Alexandros, Ioannis Katsogridakis, Rob Law, and Dimitrios Buhalis. (2011). "Search Engine Marketing: Transforming Search Engines into Hotel Distribution Channels." *Cornell Hospitality Quarterly*, 52 (2): 200-8.

Payne, John W., James R. Bettman, and Eric J. Johnson. (1993). *The Adaptive Decision Maker*. Cambridge, UK: Cambridge University Press.

Pocheptsova, Anastasiya, On Amir, Ravi Dhar, and Roy F. Baumeister. (2009). "Deciding without Resources: Resource Depletion and Choice in Context." *Journal of Marketing Research*, 46 (3): 344-55.

Rudnansky, Ryan. (2013). "Online Hotel Bookings up Big over Last Year." Travelpulse.com. http://www.travelpulse.com/news/hotels-and-resorts/report-online-hotel-bookings-up-big-over-last-year.html.

Shaw, Jerry I., Jon E. Bergen, Chad A. Brown, and Maureen E. Gallagher. (2000). "Centrality Preferences in Choices among Similar Options." *Journal of General Psychology*, 127 (2): 157-64.

Simon, Herbert A. (1957). *Models of Man: Social and Rational; Mathematical Essays on Rational Human Behavior in Society Setting*. New York: John Wiley.

Sirakaya, Ercan, and Arch G. Woodside. (2005). "Building and Testing Theories of Decision Making by Travellers." *Tourism Management*, 26 (6): 815-32.

Smallman, Clive, and Kevin Moore. (2010). "Process Studies of Tourists' Decision-Making." *Annals of Tourism Research*, 37 (2): 397-422.

Statisticsbrain. (2014). "Internet Travel Hotel Booking Statistics." http://www.statisticbrain.com/internet-travel-hotel-booking-statistics/ (accessed June 20, 2014).

Swarbrooke, John, and Susan Horner. (2004). *Consumer Behavior in Tourism*. Burlington, MA: Butterworth-Heinemann.

Train, Kenneth. (1986). *Qualitative Choice Analysis*. Cambridge, MA: MIT Press.

Train, Kenneth. (2003). *Discrete Choice Methods with Simulation*. Cambridge, UK: Cambridge University Press.

Valenzuela, Ana, and Priya Raghubir. (2009). "Position-Based Beliefs: The Center-Stage Effect." *Journal of Consumer Psychology*, 19 (2): 185-96.

Viswanathan, Madhu. (2005). *Measurement Error and Research Design*. Thousand Oaks, CA: Sage.

Yacouel, Nira, and Aliza Fleischer. (2012). "The Role of Cybermediaries in Reputation Building and Price Premiums in the Online Hotel Market." *Journal of Travel Research*, 51 (2): 219-26.

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