

Near or Far? The Effect of Latest Booking Time on Hotel Booking Intention: Based on Eye-tracking Experiments

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ABSTRACT. Online travel agencies (OTAs) depends on marketing clues to reduce the consumer uncertainty perceptions of online travel-related products. The latest booking time (LBT) provided by the consumer has a significant impact on purchasing decisions. This study aims to explore the effect of LBT on consumer visual attention and booking intention along with the moderation effect of online comment valence (OCV). Since eye movement is bound up with the transfer of visual attention, eye-tracking is used to record visual attention of consumer. Our research used a 3 (LBT: near vs. medium vs. far) × 3 (OCV: high vs. medium vs. low) design to conduct the experiments. The main findings showed the following:(1) LBT can obviously increase the visual attention to the whole advertisements and improve the booking intention;(2) OCV moderates the effect of LBT on both visual attention to the whole advertisements and booking intention. Only when OCV are medium and high, LBT can obviously improve attention to the whole advertisements and increase consumers' booking intention. The experiment results show that OTAs can improve the advertising effectiveness by adding LBT label, but LBT have no effect with low-level OCV.

KEYWORDS: Latest Booking Time, Online Comment Valence, Eye Tracking, Booking Intention, Online Travel Agencies

1. Introduction

With the development of online travel agencies (OTAs) since mid-1990s [1], the popularity of Internet and smart phones, the main channel of tourism business has shifted from offline to online. In 2010, online channels took up 52.3 percent of primary hotel brand bookings, and much of that was carried out via OTAs [2].

Information is of great significance in the process of consumers' purchasing decisions [3]. Especially in the network environment, in addition to product characteristic information such as price, type and brand, consumers tend to take other people's opinions and behaviors into consideration when making purchasing decisions [4]. With the limitation of online trading, consumers cannot accurately assess the quality of the service content [5], so in the process of online trading, the

social interactions play a particularly significant role, and have become an important quality index for consumers in decision support [6].

As typical service-oriented products [7], consumers are incrementally depending on Internet as an information source when seeking hospitality products. Online hotel booking behavior of consumers is complex, which is influenced by many factors [8]. Nowadays, OTAs provides increasingly information sources for consumers to refer, which reduce consumers' perceived uncertainty of hotel service quality [5], meanwhile, increases the difficulty of consumer information processing [9]. It is thus of great benefit and significance for enterprises to understand the decision-making process of consumers when they book online hotels. And how to provide consumers with more valuable information and manage and utilize it effectively is a top priority.

The marketing clues used by online hotels include brand, price, consumer review content, online comment valence, online comment quantity, official platform recommendation, etc., and have been fully explored [7]. Latest Booking Time (LBT) is a new marketing signal for online hotels in the past two years, however, little research has focused on this. In the marketing field, the design of unique information is the key to attract consumers, so whether LBT is effective, under what conditions is more effective, has not been explored.

Therefore, in recognition of this omission in existing hotel studies, we focused on a new type of social interaction in hotel OTAs, namely, the effect of LBT on consumer visual attention and hotel booking intention, and considered the moderating effect of Online Comment Valence (OCV). In the following sections, firstly, we propose the literature review and research hypotheses. Secondly, the research methods and experimental process are described. Thirdly, the experimental results are analyzed and discussed. Finally, we discuss the recommendations for future research and the limitations of the research.

2. Literature Review and Hypotheses

2.1 Online Social Interactions and Hotel Booking

Professional OTAs has become an important channel for hotel booking [10]. A Google Insights travel research found that more than 80 percent of Americans tourists make travel plans online, tourists rely more than ever on digital input to make decisions [11]. The increasing reliance on OTAs to book travel services makes it necessary to have a deeper understanding of the online buying process [12]. Consumers are exposed to higher-perceived risks when purchasing experiential service products in such an E-commerce environment. They particularly need more information, which shows a a more significant impact [13], to support their decision-making process [14].

In the social sciences, and especially in marketing, people always hold a belief that others' influence our behavior [15,16]. Previous studies have distinguished two

different types of Social Interactions, namely opinion-based or preference-based Social Interactions, and action-based or behavior-based Social Interactions [6]. The former is often referred to as e-WOM information, and is displayed in the form of comment valence. The latter type is usually promoted through popularity information. Under uncertain conditions, individuals facing the same decision can observe behavioral information of other consumers facing the same decision before them, and this behavior-based social interaction is presented in the early days by popularity information (for example, in the form of display of sales rankings or absolute sales data). LBT on the OTAs platform directly presents us with action-based or behavior-based social interaction.

2.2 The Effect of LBT on Visual Attention and Booking Intention

In action-based or behavior-based Social Interactions, popularity and scarcity of product are two aspects that influence consumers' visual attention and booking intention. In E-commerce environment, professional OTAs platform often attaches statements or visual icons to products in order to notify product popularity and scarcity [17]. As a new kind of action-based or behavior-based marketing signal, the LBT contains multiple meanings. For example, "someone booked the hotel nine minutes ago", the signal of the consumption behavior of others is an indication of hotel popularity, and also conveys the availability of the hotel [18].

Previous studies have shown that product popularity(e.g. "92 people booked this property in the last 48 hours", "164 others viewing this property right now") indicates the product quality or services. If a product has been frequently purchased, consumers will often consider it as "high-quality product" because its quality has been examined by peers [20]. Based on the herding effect, consumers will be more willing to follow others' purchasing behavior [21,22,26,27]. Product scarcity (including "only 4 deals left", "deal of the day") represents either higher demand or limited supply [23], which constrains consumers' ability to process information and think rationally [24]. A higher sellout risk for a product [25] can lead to consumers' automatic responses and urge consumers to book earlier [19].

Therefore, we hypothesized the following statement:

H1: LBT have a significant effect on attention to OTA advertisements.

H2: LBT have a significant effect on the booking intention.

2.3 The Moderating Effect of OCV

Additionally, online reviews have been widely used as product signals [19]. The impact of online reviews has also attracted extensive attention and research. Numerous studies in the past have demonstrated the impact of online consumer comments and ratings on decisions of purchasing process, which represent the basic drivers of hotel choices [7,19,28,29,30,31]. Positive review valence will positively influence consumers' attitude towards hotels and lead to higher booking intentions

[32-35]. But as Nock puts it, actions have "greater social and scientific value" than words [36]. What people do is more important than what they say, and their actions are ultimately considered a more accurate measure of what they really think and feel. In general, observable behavior is considered to be a more reliable signaling mechanism [37]. Meanwhile, if the opinion-based comment valence is positive, it provides evidence for the reliability of prior consumer purchasing behavior. On the contrary, if the e-WOM of a product is too negative, consumers will distrust the prior consumer purchasing behavior.

Therefore, we hypothesized the following statement:

H3: OCV moderates the relationship between LBT and attention to OTA advertisements.

H4: OCV moderates the relationship between LBT and booking intention.

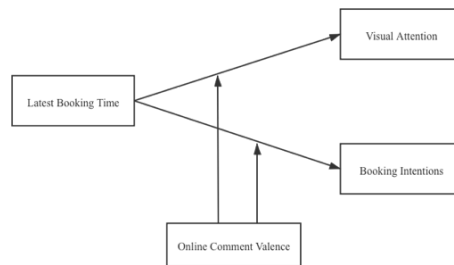


Figure. 1 Research model

3. Methodology

3.1 Research Design

Current design of OTAs, such as ctrip.com or fliggy.com, always provide overabundance of alternatives and information about each alternative, which can reduce uncertainty about selecting and which option will be a good decision. Thus, LBT and OCV become an important source of information that can reduce initial uncertainty and simplify or facilitate the prioritization of alternatives for Internet users.

To test the influence of LBT and OCV on consumers' visual attention and booking intention, we conducted a full factorial between subjects design 3 (LBT: near vs. medium vs. far) x 3 (OCV: high vs. medium vs. low) in a decision-controlled setting where participants were asked to score intention to book in each fictitious hotel picture of OTA site designed for the purpose of the experiment.

Table 1 Groups for different manipulation conditions

Group	LBT	OCV	Picture Number	Fictitious Name of Hotel
1	Near	High	1-1	Yijing
2	Near	Medium	1-2	Yaju
3	Near	Low	1-3	Jiasheng
4	Medium	High	2-1	Xiwan
5	Medium	Medium	2-2	Jiaban
6	Medium	Low	2-3	Qingting
7	Far	High	3-1	Huayun
8	Far	Medium	3-2	Yuqi
9	Far	Low	3-3	Lexuan

To guarantee the quality of experiment materials, A total of 16 fictitious stimulus, including 9 targets and 7 fillers, were used in this study, which were generated from an OTA site *ctrip.com*. Because the scenario-based experimental design was employed, a number of information including the name, four pictures of hotel, online comment valence, the latest booking time and booking button, were reserved.

Firstly, in order to control for the influence of brand and price, fictitious brands for each hotel were set, and the label of price was replaced by the booking button. Before experiment, participants were required to read a description about Suppose you plan to book a hotel with an average price (CNY 300-400) within your budget. Four hotel pictures are inclusive of bedroom, bathroom, lobby and exterior, which were selected from real hotel whose price is between CNY 300 and CNY400 from OTA site. Other confounding variables were deleted in targets but kept in fillers.

Furthermore, in order to determine the level of the moderating variable, we used Python to crawl the online comment valence and the LBT of hotel of China's top 10 most visited cities on *ctrip.com*. Finally, we take the quartile as the low level, the median as the medium level, and the three quarters as the high level.

At last, we employ the ABBA balance method to avoid the position effect and learning effect [38,39], the online comment valence and the LBT were presented to the subjects in a left and right position in each target. At same time, two fillers were inserted at the start and the end of the sequence to avoid primacy effect and others were inserted the sequence by random, which keep all information and confounding variables in order to prevent participants from guessing the purpose of the experiment [40].

3.2 Participants and Procedure

Participants (N=59) were a convenience sample of undergraduate college and graduate students at a university in southwestern China in exchange for 50 CNY to participate in this experiment. And all invitations were sent via QQ as well as

campus BBS one week before the experiment. After excluded 10 participants from the analyses because of poor gaze data, we keep a useable sample of 49 participants for further analysis. The rejection rate was 16.95%, which was acceptable for some failures when calibrating to the equipment. Participants ranged in age from 18 to 25 years (28.9% men) with normal or corrected to normal vision, and no significant differences among demographic variables were apparent, which met the requirement of experimental design.

Our main experiment was conducted in the Consumer Behavior Lab, which equipped with desktop-mounted EyeLink 1000 plus system. To start, all potential participants were asked to read a brief introduction to the experiment process and complete an informed consent document to participation. Then, guiding participants into the lab, the researcher conducted a calibration of the eye tracking, by adjusting participants' positions such as participants grip height and chair positions. The following step is eye-movement tracking. The participants were first lead to an instruction page that explained the experimental scenario: Suppose you plan to book a hotel with an average price (CNY 300-400) within your budget, under this request, you browse hotel information at OTAs and plan to making a desicion. After you score the booking intention, the website will automatically jump to the next hotel. To avoid time pressure participants can watch the advertisements for as long as they wanted [41]. Then they were asked to completed the second part of the questionnaire.

3.3 Measurement Scales

During the experiment, the Eyelink system records the subjects' visual data and purchase options. Visual data were collected by eye-tracker directly. Each of the choice sets was considered as area of interest (AOI) [42]. Considering that consumers will watch different contents of the whole OTA ads, the whole OTA ads is used as an AOI for analysis. We expended the surface sizes of all AOIs to 120% of the original area, to keep a small AOI margin and balance the ratio of true and false positive fixations [43], due to possible noise in the eye-tracking data, the possibility of peripheral attention [44], variations in calibration, and variations in weight gaze samples. Visual data were used as indicators to examine the physiological response of consumers to different OTA ads, which can be detected and parameterized automatically by the eye-tracker directly. We choose the first fixation duration, which are the most commonly used measures of attention in the eye-tracking. Purchase options was measured using 1-item in eye-tracking system, rated in a seven-point Likert scale (1 = not likely to book and 7 = likely to book).

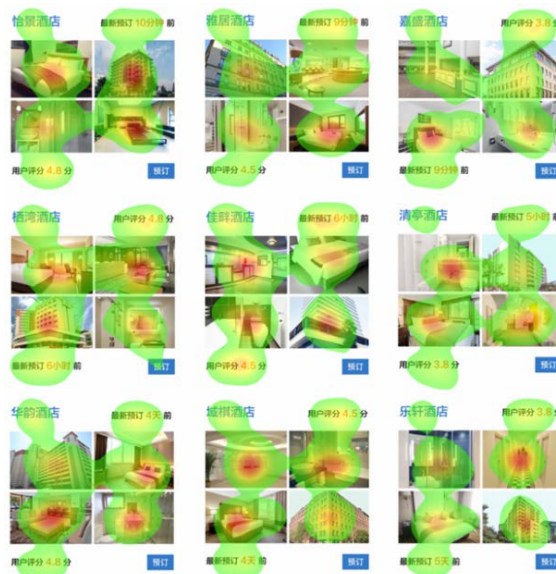
After they had browsed all the page, they were asked to complete a questionnaire including demographic information, traveling experience and internet using experience, consumer susceptibility to interpersonal influence. Then, as a manipulation check, the participants were asked to review nine OTA ads in a booklet and meanwhile complete a two-item, seven-point semantic differential scale measuring their perception of OCV and LBT.

4. Data Analysis And Results

4.1 Manipulation Checks

To check whether the manipulation of LBT and OCV were successful or not, two items evaluated with a 7-point visual LBT and OCV scale. The consequences are represented in followings. Firstly, as the LBT, the value for high-level (Mean = 6.38, SD = 0.996) was markedly greater than for medium-level (Mean = 4.82, SD = 1.170) and low-level (Mean = 2.87, SD = 1.253); the value for medium-level (Mean = 4.82, SD = 1.170) was markedly greater than for low-level (Mean = 2.87, SD = 1.253, $F(2, 501) = 406.914$, $p = 0.000 < 0.001$). As for OCV, the value for high-level (Mean = 5.89, SD = 0.944) was markedly greater than for medium-level (Mean = 4.83, SD = 0.902) and low-level (Mean = 2.89, SD = 1.356); the mean score for medium-level (Mean = 4.83, SD = 0.902) was markedly greater than for low-level (Mean = 2.89, SD = 1.356, $F(2, 501) = 329.259$, $p = 0.000 < 0.001$). The manipulation was successful.

4.2 Heat Map Analysis



Note: Red is for the highest level of fixation; yellow for medium; and green for low.

Figure. 2 Heat map results ($n = 49$)

Prior to the eye-tracking quantitative data analysis, we used a visual heat map to represent participants' visual attention to hotel information on the OTA advertisement. Heat map is an useful instrument for visualizing eye movement data, which can show visual attention by displaying the gaze position and durations of each area within the stimulus. Heat maps for 9 targets are presented in Fig. 2.

Heat maps results showed that participants paid more attention to the pictures including the bedroom, bathroom, lobby and outside of hotel in the ads; as well as the textual label of LBT and OCV. And moreover, the effects of the level of LBT and OCV on the research participants' visual attention regarding each stimulus could be shown from the heat map results.

4.3 Descriptive Statistics

In this sector, 10 participants were excluded from the analyses because of the extreme values, leaving the eye movement for a sample of 49 participants were determined to be usable and included in the following analyses. Booking intention(BI) of the participants were measured by questionnaire, and visual attention to the whole advertisement areas of 441 ads was measured by the average of first fixation duration (FFD). The following table show the arithmetic mean (Mean) and the standard deviation (SD) in parenthesis.

Table 2 Descriptive statistics (n = 49)

OCV	High		Medium		Low	
	First Fixation Duration	Booking Intentions	First Fixation Duration	Booking Intentions	First Fixation Duration	Booking Intentions
LBT						
Near	262.00(97.206)	4.45(1.595)	255.18(95.339)	5.12(1.235)	268.37(80.510)	4.02(1.614)
Medium	218.88(84.464)	5.27(1.287)	206.08(94.545)	4.49(1.474)	257.80(94.584)	4.41(1.593)
Far	245.35(82.488)	4.43(1.429)	247.33(91.674)	4.49(1.21)	253.27(90.085)	3.82(1.603)

4.4 Hypothesis Testing

The method of multivariate analysis of variance was used to examine the main effect of LBT and moderating effect of OCV. Table 3 summarizes the results of the main effect and moderating effect of the MANOVA test, including F-value and significance level.

First of all, tested the main effects of LBT on the FFD of whole advertisement and BI. Particularly, LBT had a main effect on the FFD ($F(2, 501) = 5.386$, $p = 0.001 < 0.05$) and BI ($F(2, 501) = 3.976$, $p = 0.019 < 0.05$). Therefore, H1,H2 was supported.

In the second place, analyzed the moderation effect of OCV between LBT and FFD. The results showed obvious interactions effect between OCV and LBT on the FFD ($F(4, 501) = 1.700$, $p = 0.011 < 0.05$). Further analysis indicated that, when OCV of hotel were high, LBT had main effect on the FFD ($F(2, 501) = 2.972$, $p =$

0.054 < 0.1); when OCV of hotel were medium, LBT had main effect on the FFD ($F(2, 501) = 3.869, p = 0.023 < 0.05$). Hence, H3 was supported.

Finally examined the moderation effect of OCV between LBT and BI. The results showed significant interactions effect between OCV and LBT on the BI ($F(4, 501) = 3.221, p = 0.000 < 0.005$). Furthermore, when OCV of hotel were high, LBT had an obvious main effect on BI ($F(2, 501) = 5.364, p = 0.006 < 0.05$); when OCV of hotel were medium, LBT had main effect on BI ($F(2, 501) = 3.800, p = 0.025 < 0.05$). Hence, H4 was confirmed.

Table 3 Results of multivariate analysis of variance

variables	FFD		BI		LBT	FFD		BI	
	F	P	F	P		OCV	F	P	F
LBT	5.386	0.005**	3.976	0.019**	High	2.972	0.054*	5.364	0.006**
OCV	2.725	0.067*	9.904	0.000***	Medium	3.869	0.023**	3.800	0.025**
LBT×OCV	1.700	0.011**	3.221	0.000**	Low	0.375	0.688	1.723	0.182

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.001$

5. Discussion and Conclusion

According to previous eye movement research, the main purpose of this study is to promote understanding about how LBT effects on consumers' visual attention and booking intention along with the moderating effects of OCV.

Theoretically we have found the following two. First of all, LBT can obviously increase the visual attention to the whole advertisements and improve the booking intention. Furthermore, OCV moderates the effect of the LBT on both visual attention to the whole advertisements and booking intention. Only when OCV are high and medium, LBT can obviously improve the overall attention to the whole advertisements and raises consumers' booking intention.

Practically, this study also provides some practical guidance. When a hotel chooses the LBT label as recommendation information, its OCV needs to be considered. It can be used only when OCV of the hotel was a medium or high.

6. Limitations and Future Research

This research presents some limitations. Starting with the sample, we only take students into account. In the future we can research how other social groups view the LBT label of OTA. In addition, another limitation is with regard to the platform types. This research only considered the online travel agency platform, thus future study on whether these findings could be applied to another e-commerce platforms is recommended.

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