



**Only One Left!**

A cross-cultural study on the effect of stock scarcity on impulse buying behavior

P. van Haren

SNR: 2013417, ANR: 521921

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Tilburg School of Humanities and Digital Sciences

Tilburg University, Tilburg

Supervisor: Dr. J. Verhoeven

Second reader: Dr. R. Koolen

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## Preface

I proudly present to you my thesis “*Only One Left!*”, which I wrote during the period of February until July 2022. These last few months have been challenging but after all I was one of the lucky ones to get selected for my number one topic: exclusivity in online communication. Throughout the writing process I learned interesting aspects about marketing communication tactics that several businesses apply in order to compete. The fact that ‘real’ businesses use these kinds of practices made the topic tangible in a certain way, which I found pleasant. Besides the theoretical knowledge I gained by writing this research, I learned my passion in online marketing. This insight is highly valuable for my future career and already helped me getting accepted for an online marketing traineeship.

I was not the only one in my thesis circle with a passion for online marketing. My two supervisors Dr. Peter Broeder and Dr. Joost Verhoeven, as well as my thesis buddy Steffie Wellens shared my enthusiasm in this field, which made discussions extremely fun, challenging and interesting. I am grateful for their valuable guidance, and our meetings which helped to stay on track of the writing process. Of course, my family and friends have been supportive and thinking along throughout the process which I would like to thank them for. My dad even assisted me in the challenging data collection process in India, which has been hugely helpful.

Altogether, I enjoyed the finalization of my master program Business Communication and Digital Media by writing this thesis project, and I hope you enjoy reading it.

Pleun van Haren

Tilburg, June 2022

### Abstract

In today's e-commerce environment, one of the widely used marketing strategies includes scarcity tactics, in which a deal is limitedly available. Marketers display limited stock messages aiming for increased purchases. As people evaluate scarce items as more valuable, it may seem a powerful method to boost sales. However, the effectiveness of scarcity messages is questionable due to the fact that consumers may cope differently with uncertainty caused by such cues. Accordingly, the present study investigated scarcity promotions in a cross-cultural context, as cultural background is a crucial factor in determining online consumer behavior. Uncertainty avoidance was incorporated as an indicator for cultural background in the model. In addition, competitive arousal was included as a mediator in this model, as scarcity cues may affect perceived rivalry leading people to behave more impulsively. To investigate the model, a digital experiment was conducted ( $N = 244$ ) in which Dutch ( $n = 130$ ) and Indian consumers ( $n = 114$ ) participated. The respondents were presented with either a stock scarcity message or no stock scarcity message, followed by several questions. Both cultural groups were identified based on their uncertainty avoidance levels, for which Indians turned out to be more strongly avoidant. As reported by the results, stock scarcity did not directly affect impulse buying among the total sample. Nonetheless, the indirect effect was found to be significant, meaning that limited scarcity messages increased consumer's perceived competitive arousal which further led to higher levels of impulse buying behavior. Additionally, one's cultural background did not impact the relationship between stock scarcity and impulse buying. However, only for individuals scoring high on uncertainty avoidance, stock scarcity effectively increased impulse buying.

*Keywords:* stock scarcity, limited stock, competitive arousal, ethnic culture, uncertainty avoidance, impulse buying

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### **Only One Left!**

Online environments are easy to control for retailers, which enables organizations to modify consumer decision-making in various ways. By implementing scarcity principles, in which a deal is limitedly available (Harikrishnan et al., 2021), companies aim to persuade consumers by creating desirability for scarce offers (Chen et al., 2020). In today's digital world, scarcity methods are becoming increasingly common to apply within businesses (Desai, 2019).

The effectiveness of scarcity promotion may be rooted in Cialdini's principles of persuasion (2001), which argue that consumers evaluate scarce products as more valuable. Consequently, scarcity promotion evokes feelings of urgency, as consumers fear missing out on a deal (Manggarani et al., 2022). Other studies found that due to scarcity messages, people experience competitive arousal which leads to impulse buying behavior (Wu et al., 2021; Shi et al., 2020).

In competitive contexts, the desire for achieving certain objectives may be intensified (Nichols, 2012). In an online environment where competition is globalized, the aspiration to obtain scarce products or services may be even greater. Guo et al. (2017) provide strong evidence that in online shopping contexts, both limited quantity and limited time messages enhances consumers' perceived competitive arousal which consequently leads to impulse buying. This might be explained by the underlying factors that induce competitive arousal, namely perceived rivalry, and time pressure (Ku et al., 2005). Furthermore, particularly limited quantity promotion (i.e., stock scarcity) may lead to a sense of uncertainty among consumers (Wu et al., 2021) for which impulse buying may seem a solution to reduce uncertainty to miss out on the deal.

Despite compelling evidence of the benefits of scarcity promotion from the retailer's perspective (e.g., Guo et al.), its effectiveness may be dependent on how consumers react to uncertainty created by such messages. Cultural background influences how consumers cope with uncertainty, which is often referred to as uncertainty avoidance (Broeder & Nguyen, 2020). The importance of investigating cultural differences in online consumer behavior has been stressed by several researchers (e.g., Cakanlar & Nguyen, 2019). Especially since almost half of online purchases are carried out impulsively (Chan et al., 2017), scholars emphasize that much knowledge still can be gained on online impulse buying in a cross-cultural setting (Wu et al., 2021). As culture-related discrepancies are expected to play a crucial role in explaining the effectiveness of scarcity promotion (Wu et al., 2021), the present research will add to this gap.

Lastly, much literature on scarcity marketing focuses on its benefits on tangible, material goods, such as clothing (Roy & Sharma, 2015), and laptops (Aggarwal et al., 2011). Nevertheless, despite the increasing use of scarcity in the hospitality industry, the current state of literature on scarcity appeals concentrates limitedly on these kinds of experiential services (Huang et al., 2020). As the intangible character of purchasing experiential services increases perceived risk, scarcity messages may impact consumer behavior differently compared to buying physical products (Huang et al., 2020).

Given the information above, the present study will add to the knowledge of the effectiveness of scarcity appeals in influencing consumer impulse buying in the online booking context. Therefore, the following research question will be addressed:

**RQ:** *“What is the effect of stock scarcity on consumers’ impulse buying behavior in an online booking context, and to what extent does this differ across cultures?”*

## Theoretical Framework

### 1.1 Impulse Buying and Scarcity

The most widely used operationalization of impulse buying has been defined by Rook & Gardner (1993) as a sudden and unplanned purchase characterized by fast decision-making and a subjective bias to acquire the product. In a meta-study, this definition was adapted and defined as impulse buying behavior being carried out spontaneously, lacking consideration of costs or consequences, and being motivated by hedonic temptation to seek instant gratification through consumption (Leong et al., 2018). Impulse buying is dependent on both internal psychological factors as well as external stimuli (Li et al., 2021). For instance, internal factors affecting impulse buying have been found to be consumer's mood and impulsive traits (Marder et al., 2019; Chen & Wang, 2016). External factors include marketing strategies such as scarcity principles (Zhao et al., 2021).

Scarcity refers to the gap between limited resources and limitless desires (Shi et al., 2020). Scarcity messages are created by the retailer, by framing promotional messages not based on what consumers could gain, but what they could lose when not acting upon the deal (Cialdini, 2001). This strategy is often referred to as scarcity marketing, in which marketers try to constrain customer decision journeys (Hamilton et al., 2019). The majority of existing literature divides scarcity marketing into two types, namely limited time scarcity (LTS) and limited quantity scarcity (LQS) (Chen et al., 2020). LTS messages indicate that the promotion is solely available for a certain period of time, whereas LQS messages point out that there exists a quantity limit (Aggarwal et al., 2011). As proposed by Gierl et al. (2008), LQS could be further divided into supply framed LQS on the one hand, and demand framed LQS on the other hand.

In practice, supply framed LQS is often applied as limited editions, in which rare and new products give consumers the opportunity to differentiate from the crowd (Chae et al., 2020). An example for supply framed LQS is the limited-edition Adidas Yeezy sneakers, a collaboration between the German sportswear brand Adidas and the American rapper Kanye West. Moreover, demand framed LQS is often carried out as limited stock, which implies that due to the popularity of the item or opportunity, only a limited amount is available for purchase. Consequently, consumers feel a higher urgency to purchase in order to ensure the availability (Manggarani et al., 2022). An example of demand framed LQS is implemented by Amazon.com, by displaying there are “only 2 items left in stock”. Huang et al. (2020) compared both demand vs supply framed scarcity types in an online restaurant booking context and found that demand framed promotion (e.g., “already booked 15 times today!”) was found to be the most effective scarcity tool to elicit higher purchase intentions among consumers. Furthermore, Won & Shapiro (2021) found that specifically for hotel offers with a demand framed limited stock message (i.e., “only 4 rooms available”) participants had a higher fear of loss than without such a message. Therefore, the present study will be aimed at this scarcity type. From now on, this will be referred to as stock scarcity.

Previous research mainly concentrates on the effects of scarcity promotion for material products, such as clothing or food. However, the different forms of intangible experiences or services that are sold online are expanding and purchasing services may be perceived riskier (Huang et al., 2020). Hence, this research will focus on whether scarcity appeals are effective in intangible, experiential services, in particular for booking a hotel room online.

## 1.2 Effectiveness of Scarcity Promotion

The effectiveness of scarcity cues may be rooted in Cialdini's principles (2001), stating that items and opportunities being limitedly available or scarce are generally perceived as more valuable. Following the literature review of Shi et al. (2020), scarcity promotion is able to arouse consumers' impulse buying behavior. Moreover, Wu et al. (2021) recently reinvestigated this relationship and found that due to scarcity messages, people become aroused easily which leads to impulse buying behavior. However, this study concentrated on the promotion of coupons for milk tea that consumers could redeem in an offline bar, which seems to be a taste-dependent drink. Additionally, both quantity and time were manipulated in their experiment which could have been influencing the results. Particularly the relationship between limited quantity scarcity and impulsive, unplanned buying could be explained through reactance theory (Chan et al., 2017). This theory states that consumers desire freedom of choice, and as soon as this freedom is threatened by external factors, people will engage in negative aversive behavior to restore the lost freedom (Chan et al., 2017). For instance, when there is only a few in stock from a certain item, it causes reactance for consumers, leading to them being more impulsive to own the item (Gupta & Gentry, 2019).

Besides the fact that e-commerce websites make extensive use of scarcity principles, consumers may be questioning the credibility of such messages. For instance, Ryanair often displays the number of available seats when booking a flight. Yet after booking, specific seats can be selected for which almost the entire airplane appears to be empty. This may lead to the consumer evaluating the scarcity message as unbelievable. Moreover, Aguirre-Rodriguez (2013) found that specifically demand related scarcity appeals may lead to lower perceived credibility of

the advertisement. Stock scarcity messages may even lead to consumers perceiving the strategy as a marketer's attempt to mislead shoppers about inventory in order to increase sales (Won & Shapiro, 2021). To conclude, message credibility is a crucial element of consumer reaction to a persuasive message in order to ensure the effectiveness of the scarcity promotion (Appelman & Sundar, 2016).

However, Teubner and Graul (2020) discussed that even though scholars argue that some consumers possibly evaluate scarcity messages as uncredible, in practice they are still a powerful tool to drive consumer behavior. In their research, they specifically stress the positive effects of scarcity messages on booking intentions, explained by higher perceived urgency (i.e., get it before it's gone) and value (i.e., it must be good) of the scarce offer (Teubner & Graul, 2020). In conclusion, the majority of research on scarcity has found evidence of its effectiveness on online consumer behavior. Therefore, the following hypothesis will be examined:

**H1:** Stock scarcity leads to more impulse buying behavior compared to no stock scarcity.

### **1.3 Competitive Arousal**

As explained, besides external triggers such as scarcity messages, impulse buying behavior can be influenced by internal factors as well. A meta-study broadened these concepts by identifying affective stimuli (i.e., consumer's emotional states) being a part of internal determinants (Zhao et al., 2021). Consumer competitive arousal was found to be an important affective factor in explaining impulse buying due to scarcity messages (Wu et al., 2021). A commonly used definition of consumer competitive arousal has been shaped by Nichols (2012) as "feelings and thoughts regarding the competitive nature of a purchase situation, and the belief

that one would need to compete with other buyers to achieve a goal in a particular buying situation” (p. 193). Simply put, competitive arousal is the arousal one feels in a competitive environment or situation (Guo et al., 2018). Furthermore, it is an emotional state which differs per person in terms of intensity and is situation dependent (Nichols, 2012).

The consumer competitive arousal model proposes two factors that trigger competitive arousal: perceived rivalry and time pressure (Ku et al., 2005). These sub-constructs were confirmed by Wu et al. (2021) in a more recent study. They linked the two underpinnings to respectively limited quantity scarcity as limited time scarcity and found that both scarcity types led to impulse purchase in an online shopping environment, mediated by competitive arousal (Wu et al., 2021). This might be explained by the central role that emotions play in impulsive decision making (Yi & Jai, 2020). Moreover, Song et al., (2021) compared both scarcity types in an online travel market and found that particularly limited quantity scarcity messages led to higher levels of anticipated consumer competition and more purchase intention. In line with this, Guo et al. (2018) stated that stock scarcity messages are perceived to complicate getting hold of products, which alters competitive arousal and eventually enhances impulse buying. This might be due to the desire to ‘win’ over others, which competitive individuals perceive when facing scarce products (Gupta & Gentry, 2019). This may further lead to an increased urgency to buy (Gupta & Gentry, 2019), which relates to impulse buying (Moser et al., 2019). Given the findings above, there is compelling evidence of the interplay between stock scarcity and competitive arousal and its effects on (impulse) purchase intention.

Nonetheless, other scholars found evidence that competitive arousal due to stock scarcity may lead to aggressive behavior among Indonesian consumers (Manggarani et al., 2022). They clarified this finding by explaining that a consumer perceives another consumer as intimidating

when a product is scarce, and to mitigate the chance that the rival obtains the desired product, the consumer behaves aggressively (Manggarani et al., 2022). However, their study focused on tangible products, namely leadership books, which is substantially different from an intangible experiential service and therefore the results may be not generalizable to all products. Moreover, Biraglia et al. (2021) examined the negative emotional consequences of stock scarcity promotion as well and argued that, due to consumer anger, the consumers who ‘lost’ obtaining the limitedly available product may switch earlier to competitor brands.

Taken together, the existing literature on competitive arousal contains some contradicting evidence. However, the majority of prior work points out that due to stock scarcity, consumers perceive higher levels of competitive arousal and consequently have higher (impulse) purchase intentions (Song et al., 2021). For this reason, the following has been hypothesized:

**H2:** Perceived competitive arousal mediates the relationship between stock scarcity and impulse buying behavior.

**H2a:** Stock scarcity leads to higher levels of perceived competitive arousal compared to no stock scarcity.

**H2b:** Consumers with higher levels of perceived competitive arousal will have higher levels of impulse buying behavior compared to those with lower levels of perceived competitive arousal.

#### **1.4 Cultural Background**

As a part of individual differences in online behavior, one’s cultural background plays a substantial role (Peña-García et al., 2020). That is, distinct cultures behave differently in online contexts (Timokhina et al., 2018). Specifically, several studies have shown that cultural

orientation can predict differences in terms of purchase intention (Rosillo-Díaz et al., 2019) and impulse buying (Chen et al., 2021). However, prior literature on scarcity and impulse buying mainly focuses on one cultural group instead of comparing cultures to one another. For instance, Wu et al. (2021) investigated the relationship between scarcity promotion and online impulse buying within Chinese consumers. However, they suggested further investigating this relationship across multiple cultures, as they expected culture-related discrepancies play a crucial role in explaining the effects of scarcity promotion on impulsive buying behavior (Wu et al., 2021).

As scarcity messages induce feelings of uncertainty for future product availability (Cremer & Loebbecke, 2021), and cultures cope differently with uncertainty, the concept of uncertainty avoidance was used as a culture indicator to predict consumers' online intentions (Broeder & Nguyen, 2020). Uncertainty avoidance was defined by De Mooij and Hofstede (2010) as "the extent to which people feel threatened by uncertainty and ambiguity and try to avoid these situations" (p. 89). In cultures with high levels of uncertainty avoidance, people value rules and formality in order to structure their lives (Hofstede, 2010). These cultures view uncertainty as threatening. Besides, they react to change with stress, anxiety and decreased perceptions of control (Lawrie et al., 2020). On the other hand, cultures with low levels of uncertainty avoidance tend to be more accepting of ambiguity, feel more comfortable in new situations and are more risk-tolerant (Hofstede, 2010).

Interestingly, most literature suggests that uncertainty avoidance is negatively related to cognitive impulse buying tendency, such that individuals in low uncertainty avoidance cultures tend to make more impulse purchases, based on lack of deliberation for instance (Ali & Sudan, 2018). People in low uncertainty avoidance cultures tend to be more risk-taking and prone to

novelty which are both related to impulse buying (Sharma et al., 2010). In line with these findings, Sohaib et al. (2019) showed that purchase intention is higher for people in low uncertainty avoidance cultures.

However, when a scarcity cue is introduced, the situation changes. Due to the uncertainty a scarcity message induces (Wu et al., 2021), impulsively purchasing the scarce deal may solve the fear of losing the deal. Aligned with this, scholars found evidence that almost-out-of-stock messages lead consumers to not defer the actual purchase because they fear uncertainty (i.e., future unavailability), causing them to buy the scarce item immediately (Cremer & Loebbecke, 2021). If put this way, higher levels of uncertainty avoidance may strengthen the effects of a stock scarcity cue on impulse buying, as impulse buying is a manner of avoiding uncertainty caused by a scarcity message. Besides, people in high uncertainty avoidance cultures dislike ambiguity and stress, causing them to comply with persuasive messages (Ditta-Apichai & Kattiyapornpong, 2019). Therefore, stronger avoidant cultures are expected to make more impulsive purchases when facing stock scarcity cues.

Notwithstanding that various researchers characterize cultural background by identifying countries or nationalities (e.g., Hofstede, 2001), this approach has been criticized continually. As ethnic cultural identification includes cultural change over time (Chun et al., 2021) and self-categorization (Broeder, 2022), this approach is currently used by several scholars instead of national identification (e.g., Broeder, 2022) and therefore incorporated in the present study as well. More precisely, there were conflicting results when investigating uncertainty avoidance in ethnic cultures compared to national cultures of Hofstede (2001) in a cross-cultural analysis of Broeder (2022). In this study, Asian ethnic cultures scored higher than the Dutch ethnic culture on uncertainty avoidance (Broeder, 2022). In contrast, Hofstede (2001) indicated Asian national

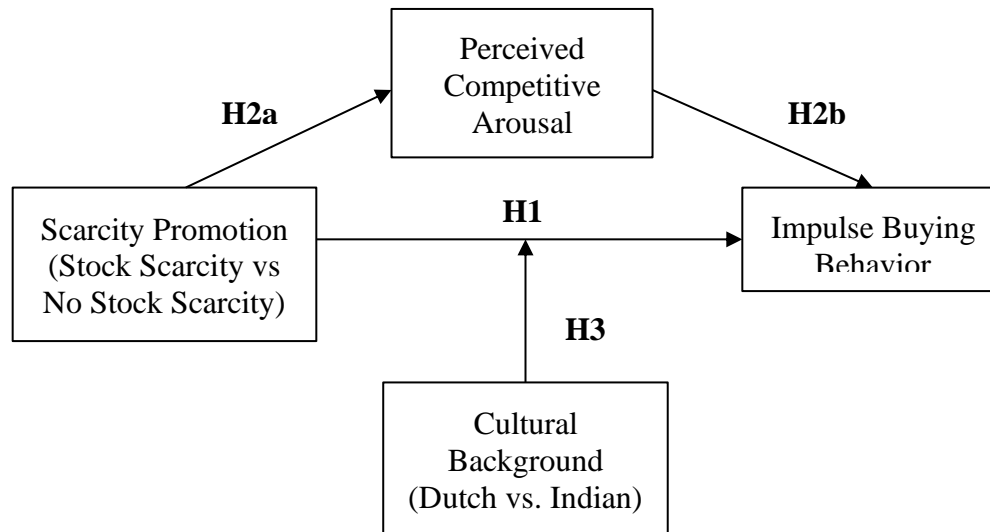
cultures scored substantially lower than the Dutch national culture. Based on these contradicting uncertainty avoidance scores, the present research will compare the Dutch ethnic culture with the Indian ethnic culture, which is expected to score higher on uncertainty avoidance.

There has been some previous cross-cultural research between The Netherlands and India, that suggested people with an Indian cultural background attached more importance towards norms compared to the Dutch (Poortinga & De Ridder, 2019) which has been linked to higher levels of uncertainty avoidance and tendency to reduce risks (Babič et al., 2018). With impulse buying as a mechanism to reduce risks to lose the scarce deal, stronger avoidant cultures may make more impulsive purchases compared to less avoidant cultures.

Given the above, it is expected that people with an Indian ethnic background avoid uncertainty more than people with a Dutch ethnic background. Consequently, the following hypothesis was formulated:

**H3:** Cultural background moderates the effect between scarcity promotion and online impulse buying behavior, such that the positive effect of stock scarcity on impulse buying is stronger for cultures with high levels of uncertainty avoidance (Indian), compared to cultures with low levels of uncertainty avoidance (Dutch).

In Figure 1, the conceptual framework of all hypotheses is presented. As the model shows, scarcity promotion was treated as independent variable, impulse buying behavior as the dependent variable, perceived competitive arousal as the mediator and cultural background as moderator.

**Figure 1***Conceptual model*

## Methodology

### 2.1 Design

For this study, a digital scenario experiment was conducted with a 2 (scarcity promotion: stock scarcity message vs no stock scarcity message) x 2 (cultural background: Dutch vs Indian) factorial between-subjects design. Stock scarcity was treated as the independent variable, impulse buying behavior as the dependent variable, perceived competitive arousal as the mediator and cultural background as the moderator.

### 2.2 Stimuli

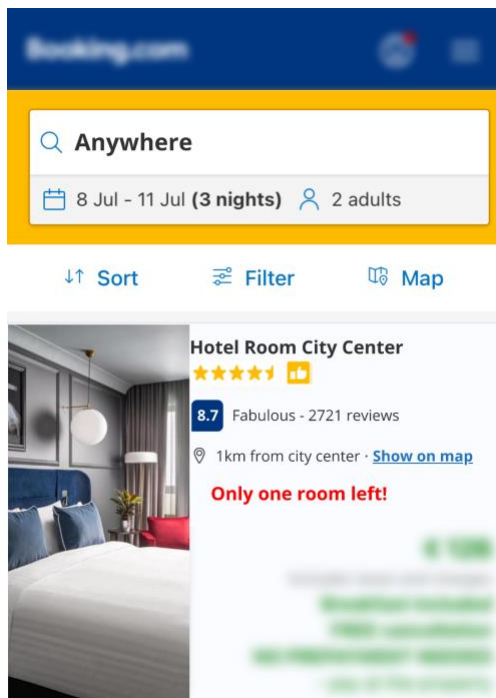
The present study included two different stimuli representing an online booking website, one with and one without a stock scarcity promotion (stock scarcity vs no stock scarcity).

Besides the manipulation of the stimuli, all other factors (e.g., photo, location, rating etc.) remained stable. A short pilot was run to examine whether these stimuli validated the purpose of this research for which details can be found in Appendix A. The stimulus material was designed in cooperation with Wellens (2022), which is why there may be some overlapping parts.

Given the results of the pilot test it was decided that the manipulated image indicated the stock scarcity message “Only one room left!” in red (Figure 2), whereas the control image indicated the non-limited stock message “Enough rooms available” in black (Figure 3). The colors were chosen differently according to the real website, which displays limited-stock messages in red. Black was chosen for the control condition (non-limited stock), as this color was found to be more neutral compared to red or another color according to the pilot test.

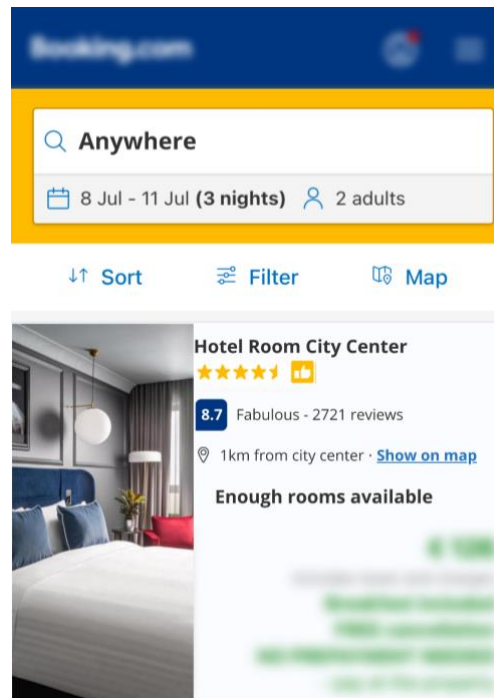
**Figure 2**

*Stock scarcity promotion*



**Figure 3**

*No stock scarcity promotion*



**Background.** The mobile website of travel agency Booking.com was used as the background for the stimuli, as by January 2022 this was the most used e-commerce travel agency worldwide (Statista, 2022) and is often used by both Indian and Dutch people. Most original elements of the website were included in the background in order to ensure credibility of the images. For example, the typical blue/yellow Booking.com colors and the search options were included within the stimuli even as the number of nights and guests. However, some of the original elements of the advertisements were adapted, such that the number of ratings, reviews, scores, and location were realistic and based on the results of the pilot study (Appendix A). Importantly, there was chosen for a 3-night stay in the summer of 2022 at any random given place (i.e., “Anywhere”), such that certain destination preferences did not influence the responses of the participants. Additionally, the original hotel names were adapted to generic names (i.e., “Hotel Room City Center”), to avoid biases due to hotel recognition and chain preference. The hotel room price was completely blurred from the advertisement to ensure that personal budget and cross-cultural hotel price differences did not play a role in the decision making. Eventually, all possible distracting elements were blurred such that the respondent could focus on the key elements of the stimuli.

**Product.** The final stimuli included advertisements of a standard, neutral and universal looking hotel according to the pilot test. This ‘product’ was chosen as scholars indicated that previous literature only provides limited information on scarcity advertising in experiential services such as online booking platforms (Huang et al., 2020).

**Context Information.** The two offers were different in terms of scarcity messages. The manipulated advertisement included the somewhat enlarged red message “Only 1 room left!”, which was almost identical as on the original Booking.com website. The control condition

included the black message “Enough rooms available”, which was added to give some contextual information in the most neutral possible way, without having a stock scarcity promotion.

### 2.3 Participants

In total, 421 participants started the questionnaire of which a number of 295 respondents finalized the survey. Among the participants that completed the questionnaire, 147 identified themselves with an Indian cultural background and 143 with a Dutch cultural background. The participants ( $n = 5$ ) with another cultural ethnicity were excluded from the dataset. Furthermore, participants ( $n = 45$ ) that failed the manipulation check questions were removed from the data. Finally, there was a check for outliers/straight liners for which one respondent was removed from the dataset. Taking this together, the final sample consisted of 244 respondents with a mean age of 30 ( $SD = 10.86$ ), of which 114 with an Indian cultural background and 130 with a Dutch cultural background. The number of men ( $n = 123$ ) and women ( $n = 121$ ) was almost evenly distributed. The Indian cultural group consisted of more men ( $n = 66$ ) than women ( $n = 48$ ), whereas the Dutch group consisted of more women ( $n = 73$ ) than men ( $n = 57$ ). The mean age in the Indian group was 29 ( $SD = 6.27$ ) and 30 ( $SD = 13.67$ ) in the Dutch group. The participants varied in terms of educational level, for which the majority of the Indian ( $n = 103$ ) as well as the Dutch group ( $n = 69$ ) indicated University as their highest level of completed education. An overview of the distribution of condition, gender, and cultural background was given in Table 1.

**Table 1***Distribution of gender, cultural group, and condition (N = 244)*

		Condition		
		Non-limited stock	Limited stock	Total
Indian	Male	23	43	66
	Female	25	23	48
	Other	0	0	0
	Total	48	66	114
Dutch	Male	34	23	57
	Female	33	40	73
	Other	0	0	0
	Total	67	63	130
Total	Male	57	66	123
	Female	58	63	121
	Other	0	0	0
	Total	115	129	244

## 2.4 Instrumentation

For the measurement of this research, a questionnaire was sent to several Dutch and Indian individuals via convenience and snowball sampling. In the introductory text of the survey there was a note of anonymity, voluntary participation and a consent check. The start of the questionnaire included some demographic questions to gain background information of the respondents. Accordingly, the stimulus material was shown, which represented an image of a well-known online booking website. The respondent was asked to look closely at the offer and imagine looking for a room at that moment. Thereafter, stimuli-related questions were presented which could be answered through a 5-point Likert scale. In Appendix B, the questionnaire can be found. An additional pilot study was held in order to test the survey, for which the most striking findings can be found in Appendix C.

**Demographics.** There were seven demographic questions in the questionnaire to gain information about the participants' gender, age, and educational level. To gain insights into cross-cultural differences, cultural demographic questions were added to the questionnaire which were adapted from Broeder et al. (2012). For this, there was added an additional question regarding the participants' most used language at home.

**Impulse Buying Behavior.** For the measurement of the dependent variable, impulse buying behavior, the scale of Szymkowiak et al. (2021) was used, which was created to measure the urge to impulsively book a hotel room. The scale included three items (e.g., "I experience a sudden desire to book a room in this hotel.") for which answers could be given on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). One of the items was

slightly adapted in the wording for more clarity. The measure showed sufficient reliability ( $\alpha = .82$ ).

**Perceived Competitive Arousal.** The mediating variable, perceived competitive arousal, was measured with the adapted competitive arousal scale of Nichols (2012), which consisted of six items (e.g., “Trying to book this hotel room feels like a competition.”). On a 5-point Likert scale, answers could be given, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). The scale had good internal consistency ( $\alpha = .90$ ).

**Cultural Background.** As suggested by McSweeney (2002), culture is not bound by country borders, which is why national identification of cultural background is considered not to be a valid measure by several researchers. For instance, this criticism was addressed by Broeder (2022), who argued that the identification of culture via nationality (i.e., “What is your nationality?”) is rather objective and passport based. Furthermore, it leaves out the crucial aspect of cultural change over time (Chun et al., 2021). Lastly, national identification of culture does not take into account the self-categorization of the individual, which reaches the core of the cultural matter according to Broeder (2022). Therefore, Broeder (2022) tested to what extent the uncertainty avoidance scores in ethnic cultures were distinct to Hofstede’s (2022) national uncertainty avoidance indexes and found remarkable differences. Given these outcomes, the operationalization of Broeder (2022) has been used which distinguishes cultural groups as the ethnic self-identification of individuals (i.e., “To what ethnic group do you belong?”).

**Uncertainty Avoidance.** As an indicator for cultural background, the existing uncertainty avoidance scale of Jung and Kellaris (2004) was used. The scale consisted of seven items, for which an example item was “I prefer structured situations to unstructured situations.” with a 5-

point Likert scale from 1 (“strongly disagree”) to 5 (“strongly agree”). The uncertainty avoidance scale showed a good internal consistency ( $\alpha = .80$ ).

**Manipulation Check.** Based on the scale of Dilissen (2022), the perceived scarcity of the limited stock offer was measured. Dilissen (2022) created a combination of the scarcity scale of Gupta and Gentry (2019) and Wentink (2019). However, the items were adapted to an online hotel booking context (e.g., “This offer intentionally limits product scarcity.”). An additional item was added to measure whether respondents identified the stock scarcity (i.e., “This offer is quantity-restricted.”), which was adapted from Wang & Min (2020). The final scale contained seven items that could be measured on a 5-point Likert scale from 1 (“strongly disagree”) to 5 (“strongly agree”). The scale had good internal consistency ( $\alpha = .88$ ). Furthermore, a few control statements were added in order to investigate the respondents’ general opinions on the offer, online booking etcetera. One of the examples was “I am familiar with booking hotel rooms online”. Lastly, two statements were included to check whether participants noticed the manipulation of the advertisement. The reason for this was to avoid response biases. An example for this was “I think the advertisement showed the message “Only 1 room left!”” which could be answered with ‘Yes’ or ‘No’.

## 2.5 Procedure

The digital survey tool Qualtrics was used to design, distribute and analyze the questionnaire. By spreading an anonymous survey link among both Indian and Dutch respondents via personal networks, social media platforms such as WhatsApp, Facebook and LinkedIn, the survey could be filled in easily. The responses only were recorded when the respondent agreed to participate. After giving consent, the participant was guided towards the demographic questions for gaining

some background knowledge. Thereafter, the respondent was randomly presented with either a limited stock message or a non-limited stock message. The respondent was asked to closely inspect the offer before answering the questions. Throughout the questionnaire, the image of the offer was visible, such that the participant could review it when necessary. The first stimulus-related question asked whether the participant would be likely to book the room. Furthermore, the structure of the survey included respectively the scales of impulse buying, perceived scarcity, and uncertainty avoidance. The construct questions were followed by control questions, in order to understand whether the participants experienced the offer as realistic for instance. Lastly, there were manipulation check questions, to investigate whether the respondent correctly identified the stock scarcity message. There was a thank you message at the ending of the survey, and the researcher's email address was added in case of questions. The average response time of the survey was 5 minutes.

## Results

### 3.1 Manipulation Check

For checking the manipulation, two items were added in the questionnaire. The first question was "The offer showed the message "Only one room left!"". The second one was "The offer showed the message "Enough rooms available"". These questions could be answered with either 'Yes' or 'No'. Participants who wrongly indicated that they saw a limited time offer, or wrongly indicated that they did not, were removed from the dataset ( $n = 45$ ). Among these removals there were a few cases that filled in both of the manipulation check questions with a 'Yes'.

A factorial ANOVA was used to investigate whether the participants indeed experienced more scarcity due to the limited stock message. For this analysis, cultural ethnicity (Dutch vs Indian) and scarcity condition (stock scarcity message vs no stock scarcity message) were treated as independent variables, whereas perceived product scarcity was treated as the dependent one. According to the results, there was a significant main effect of scarcity condition,  $F(1, 240) = 102.27, p < .001, \eta^2 = .02$ , indicating a small effect. People who were exposed to the stock scarcity message ( $M = 3.43, SE = .06$ ) experienced more scarcity compared to people who were exposed to the non-limited stock message ( $M = 2.49, SE = .07$ ). Despite this difference being only small, the manipulation worked as intended.

Furthermore, the questionnaire included some questions for gaining information about the opinions and background knowledge of the participants. As Table 2 shows, in general respondents found the offer moderately realistic, while the limited stock offer was found to be significantly less realistic, compared to the offer with no stock scarcity message ( $t(241.11) = -2.68, p < .05$ ). The mean difference ( $-.34$ ) could be generalized to the population (95% BCa CI [ $-.60, -.07$ ]), describing a large effect,  $d = .99$ . To conclude, the stock scarcity offer was viewed as less realistic than the non-limited stock offer.

## Table 2

*Means and standard deviations expressed as M (SD) of control statements per condition*

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Condition

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	No stock scarcity <i>n</i> = 115	Stock scarcity <i>n</i> = 129	Total <i>N</i> = 244
I think the offer was realistic.	3.38 (.89)	3.05 (1.07)	3.20 (1.00)**
I am familiar with booking hotel rooms online.	4.20 (.81)	3.98 (.94)	4.09 (.88)
I like the hotel room that I saw.	3.71 (.67)	3.72 (.80)	3.72 (.74)
The hotel room that I saw is of good quality.	3.77 (.67)	3.78 (.71)	3.77 (.69)
I am familiar with using Booking.com.	4.09 (.87)	3.99 (1.02)	4.04 (.95)

\*\* =  $p < .05$  (2-tailed).

In Table 3, the means of the control statements were compared between the two cultural groups. First, the Dutch participants found the offer significantly more realistic than the Indian participants ( $t(222.64) = 4.67, p < .05$ ). The mean difference (.58) could be generalized to the population (95% BCa CI [.34, .81]), describing a very large effect,  $d = .96$ . Secondly, the Dutch respondents were more familiar with booking hotel rooms online compared to the Indian group ( $t(198.51) = 3.62, p < .05$ ). Here, the mean difference (.41) could be generalized to the population (95% BCa CI [.20, .62]), expressing a large effect,  $d = .86$ . Lastly, the Dutch participants were more experienced with using Booking.com ( $t(194.74) = 3.96, p < .05$ ). In this case, the mean difference (.48) could be generalized to the population (95% BCa CI [.24, .70]), representing a large effect,  $d = .92$ .

**Table 3***Means and standard deviations expressed as M (SD) of control statements per culture*

	Cultural background		
	Indian	Dutch	Total
	<i>n</i> = 114	<i>n</i> = 130	<i>N</i> = 244
I think the offer was realistic.	2.89 (1.04)	3.48 (.88)	3.20 (1.00)**
I am familiar with booking hotel rooms online.	3.87 (1.00)	4.28 (.71)	4.09 (.88)**
I like the hotel room that I saw.	3.77 (.79)	3.67 (.70)	3.72 (.74)
The hotel room that I saw is of good quality.	3.75 (.76)	3.79 (.62)	3.77 (.69)
I am familiar with using Booking.com.	3.78 (1.10)	4.26 (.74)	4.04 (.95)**

\*\* =  $p < .05$  (2-tailed).

### 3.2 Preliminary Analyses

In Table 4, the descriptive statistics of the main variables can be found per condition. As this table shows, perceived scarcity was found to be significantly higher in the stock scarcity condition ( $t(242) = 10.24, p < .05$ ). Here, the mean difference (.99) could be generalized to the population (95% BCa CI [.80, 1.18]), describing a medium to large effect,  $d = .75$ . Additionally, competitive arousal was significantly higher in the stock scarcity condition compared to the condition without the stock scarcity message ( $t(240.73) = 6.07, p < .05$ ). For this, the mean difference (.67) could be generalized to the population (95% BCa CI [.45, .90]), indicating a large

effect,  $d = .86$ . Impulse buying and uncertainty avoidance did not differ significantly between the two conditions. Altogether, stock scarcity did not influence impulse buying, which leads the first hypothesis H1 to be rejected.

**Table 4**

*Means and standard deviations expressed as M (SD) of main constructs per condition*

	Condition		
	No stock scarcity <i>n</i> = 115	Stock scarcity <i>n</i> = 129	Total <i>N</i> = 244
Impulse buying	2.65 (.86)	2.77 (.94)	2.71 (.91)
Perceived scarcity	2.44 (.80)	3.42 (.71)	2.96 (.90)**
Competitive arousal	2.19 (.78)	2.86 (.94)	2.54 (.92)**
Uncertainty avoidance	3.25 (.62)	3.29 (.71)	3.27 (.66)

\*\* =  $p < .05$  (2-tailed).

Additionally, Table 5 shows the descriptive statistics of the main variables per cultural background. According to the results, participants with an Indian cultural background scored significantly higher on perceived scarcity ( $t(241.82) = -2.23, p < .05$ ). The mean difference (-.25) could be generalized to the population (95% BCa CI [-.48, -.04]), describing a large effect,  $d = .89$ . Additionally, competitive arousal was significantly higher for the Indian culture ( $t(242) = -$

3.62,  $p < .05$ ). For this, the mean difference (-.42) could be generalized to the population (95% BCa CI [-.65, -.19]), defining a large effect,  $d = .90$ . Lastly, as expected, uncertainty avoidance was significantly higher for Indians ( $t(242) = -3.16$ ,  $p < .05$ ). Here, the mean difference (-.26) could be generalized to the population (95% BCa CI [-.43, -.10]), indicating a medium to large effect,  $d = .65$ . Therefore, Indians were found to be more avoidant of uncertainty ( $M = 3.41$ ,  $SD = .71$ ) compared to Dutch respondents ( $M = 3.15$ ,  $SD = .59$ ), as the scale was measured on a 5-point Likert scale ranging from 1 = tolerant to 5 = strongly avoidant. However, participants with an Indian cultural background only did not significantly score higher on impulse buying than the Dutch.

**Table 5**

*Means and standard deviations expressed as M (SD) of main constructs per culture*

	Cultural background		
	Indian	Dutch	Total
	$n = 114$	$n = 130$	$N = 244$
Impulse buying	2.78 (.97)	2.66 (.84)	2.71 (.91)
Perceived scarcity	3.09 (.81)	2.84 (.95)	2.96 (.90)**
Competitive arousal	2.77 (.95)	2.35 (.86)	2.54 (.92)**
Uncertainty avoidance	3.41 (.71)	3.15 (.59)	3.27 (.66)**

\*\* =  $p < .05$  (2-tailed).

Finally, Table 6 shows the Pearson correlations among the main variables. As can be seen in the table, there were four significant correlations between the constructs. First, a significant positive correlation emerged between impulse buying and perceived scarcity ( $r(242) = .28, p < .001$ ). Furthermore, a significant positive correlation between impulse buying and competitive arousal was found ( $r(242) = .32, p < .001$ ). Accordingly, no correlation ( $r(242) = .08, p = .20$ ) between impulse buying and uncertainty avoidance was found. There existed a significant positive correlation between perceived scarcity and competitive arousal ( $r(242) = .67, p < .001$ ). Thus, perceived scarcity and competitive arousal were associated with more impulse buying. Nonetheless, no correlation was found between perceived scarcity and uncertainty avoidance ( $r(242) = .10, p = .12$ ). Lastly, a significant positive correlation between competitive arousal and uncertainty avoidance was found ( $r(242) = .29, p < .001$ ). As all significant correlations were below .80, there was no reason for concern with regard to multicollinearity.

**Table 6**

*Pearson correlations*

	1	2	3
Impulse buying	-		
Perceived scarcity	.28**	-	
Competitive arousal	.32**	.67**	-
Uncertainty avoidance	.08	.10	.29**

\*\* =  $p < .05$  (2-tailed).

### 3.3 Hypothesis Testing

#### 3.3.1 Mediation Analysis

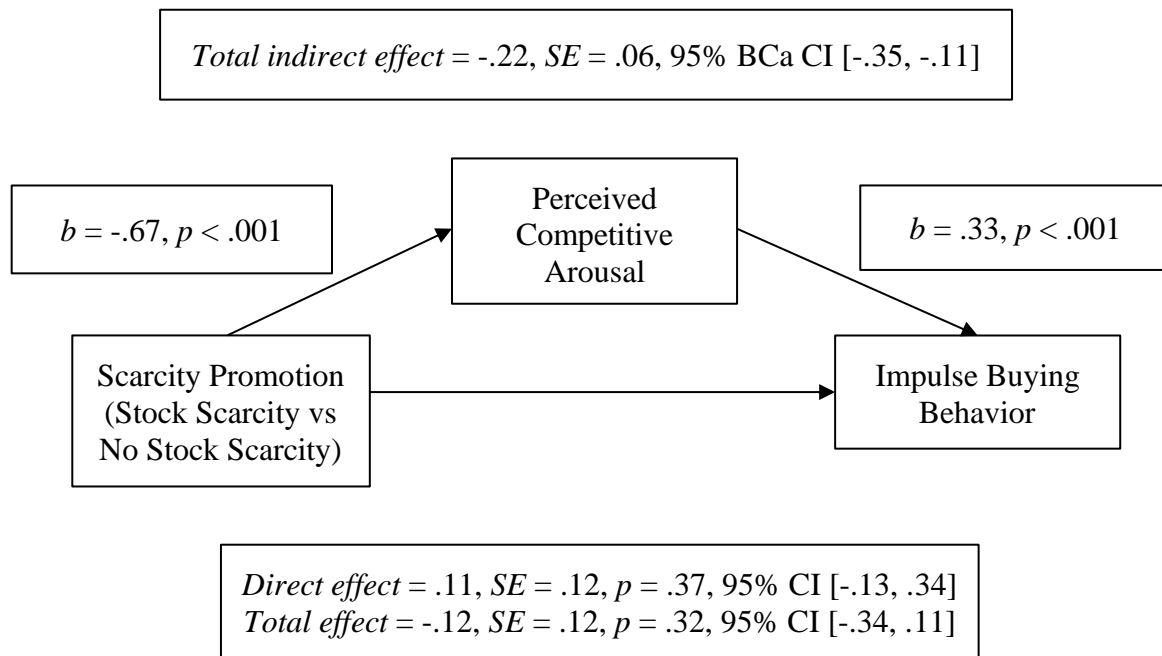
To investigate whether the relationship between scarcity and impulse buying behavior could be explained by perceived competitive arousal, a mediation analysis was executed. Before starting the analysis, the different assumptions were tested. Most assumptions were met without any problems (i.e., influential cases, outliers, multicollinearity, homoscedasticity, homogeneity of variance, linearity). Regarding the assumption of normality, the Shapiro-Wilk test was significant for the control condition ( $p < .05$ ). However, the histogram of standardized residuals showed that there were approximately normally distributed errors. Additionally, the normal P-P plot of standardized residuals showed points that were close to the line. Therefore, there were no signs of great concern regarding the assumption of normality. Besides, there was some attention with regard to the independent errors as the value was  $< 1$  (Durbin-Watson value = .50). Since this value still was between 0 and 4, there were no major concerns regarding the independence of errors in the dataset. The assumption of homogeneity of variance and linearity were met as the scatterplot of standardized predicted values showed that all data points were randomly placed, and no clear pattern could be seen.

Using Hayes' PROCESS macro tool (model 4) a bootstrapped mediation analysis was performed. In this analysis, scarcity promotion (limited stock vs non-limited stock) was the independent variable, impulse buying behavior was the dependent variable, and perceived competitive arousal was treated as the mediator. There was an improvement over the null-model when using perceived competitive arousal as a mediator in the relationship between scarcity and impulse buying behavior ( $r^2 = .13$ ,  $F(1, 242) = 36.05$ ,  $p < .001$ ). According to the output, there

was found no total effect between scarcity and impulse buying behavior ( $b = -.12$ ,  $SE = .12$ ,  $p = .32$ ). Besides, no direct effect between scarcity and impulse buying behavior was found ( $b = .11$ ,  $SE = .12$ ,  $p = .37$ ). As already found in the preliminary analyses, the first hypothesis H1 was not supported. Nonetheless, a significant negative total indirect effect was found between scarcity and impulse buying behavior via perceived competitive arousal ( $b = -.22$ ,  $SE = .06$ ,  $p < .001$ ). Furthermore, there was a significant negative direct effect of scarcity promotion on perceived competitive arousal ( $b = -.67$ ,  $SE = .11$ ,  $p < .001$ ): bearing in mind that the limited stock condition was coded as 1 and the non-limited stock condition as 2, this means that a scarcity cue *increased* perceived arousal. Moreover, a significant positive direct effect of perceived competitive arousal on impulse buying behavior was found ( $b = .33$ ,  $SE = .06$ ,  $p < .001$ ), meaning that competitive arousal led to more impulse buying. In conclusion, the interpretation of the mediation analysis led to H2 and its sub-hypotheses H2a and H2b being supported. The first hypothesis H1 was not supported.

## Figure 5

*Conceptual model mediation analysis*



### 3.3.2 Moderation Analysis

An independent sample *t*-test was performed to gain insights into cultural differences in uncertainty avoidance. For this test, cultural background was treated as the independent variable, whereas uncertainty avoidance was treated as the dependent variable. The mean score of uncertainty avoidance in the entire sample was 3.27 ( $SD = .66$ ). Furthermore, people with an Indian cultural background scored significantly higher on uncertainty avoidance ( $M = 3.41, SD = .71$ ) than people with a Dutch background ( $M = 3.15, SD = .59$ ). The mean difference of .26 ( $SE = .08$ ) between the cultural groups was significant according to the independent sample *t*-test,  $t(242) = -3.16, p < .05$ . Therefore, the results could be generalized to the population (95% BCa CI [-.43, -.11]) indicating a medium to large effect ( $d = .65$ ).

With regard to the assumptions, most were met (i.e., influential cases, outliers, multicollinearity, homoscedasticity, homogeneity of variance and linearity). However, the

normality assumption was not completely met as the Shapiro-Wilk test was significant ( $p < .05$ ) in the control condition. However, inspecting the plots did not call for major concern. Furthermore, the Durbin-Watson test value was low (Durbin-Watson value = .17), which resulted in the assumption of independence of errors not being met. However, there was no sufficient reasoning for concern as the value was still between 0 and 4. After the assumption testing, the moderation analysis using the PROCESS tool (model 1) was executed to test the third hypothesis H3.

Scarcity was used as the independent variable, impulse buying as the dependent one and ethnic culture as the moderating variable. Table 7 shows that there were no main effects between stock scarcity and impulse buying ( $b = -.10$ , 95% BCa CI [-.33, .12],  $SE = .12$ ,  $t = -.89$ ,  $p = .38$ ). Furthermore, no main effects between ethnic culture and impulse buying were shown ( $b = .11$ , 95% BCa CI [-.12, .34],  $SE = .12$ ,  $t = .96$ ,  $p = .34$ ). Lastly, the interaction effect was not significant ( $b = .15$ , 95% BCa CI [-.33, .62],  $SE = .23$ ,  $t = .64$ ,  $p = .52$ ). To conclude, ethnic culture did not moderate the relationship between stock scarcity and impulse buying. Consequently, the third hypothesis H3 was not supported.

**Table 7**

*Moderation analysis (ethnic culture)*

	<i>b</i> (95% BCa CI)	<i>SE</i>	<i>t</i>	<i>p</i>
Constant	2.72 [2.60, 2.83]	.06	46.56	< .001**
Scarcity condition	-.10 [-.33, .12]	.12	-.89	.38

Ethnic culture	.11 [-.12, .34]	.12	.96	.34
Scarcity condition x Ethnic culture	.15 [-.33, .62]	.23	.64	.52

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\*\* =  $p < .05$  (2-tailed).

### 3.4 Additional Analyses

Even though both cultures differed significantly in their uncertainty avoidance levels, the difference between those cultures was not that large. However, the differences in uncertainty avoidance between individuals were expected to be larger. To explore whether individual uncertainty avoidance levels affected the relationship between stock scarcity and impulse buying, there was conducted an additional moderation analysis using Hayes' PROCESS tool. In this additional model, individual uncertainty avoidance was treated as the moderator, stock scarcity as the independent variable and impulse buying as the dependent one.

The results of the analysis can be found in Table 8, which shows that there were no main effects of scarcity promotion on impulse buying ( $b = -.11$ , 95% BCa CI [.34, -.34],  $SE = .12$ ,  $t = -.96$ ,  $p = .34$ ), nor of uncertainty avoidance on impulse buying ( $b = .14$ , 95% BCa CI [-.03, .31],  $SE = .09$ ,  $t = 1.60$ ,  $p = .11$ ). Nonetheless, here the moderation analysis was significant ( $b = -.41$ , 95% BCa CI [-.75, -.07],  $SE = .17$ ,  $t = -2.35$ ,  $p < .05$ ), indicating that the effect of stock scarcity on impulse buying is impacted by individual uncertainty avoidance levels.

### Table 8

*Moderation analysis (individual uncertainty avoidance)*

	<i>b</i> (95% BCa CI)	<i>SE</i>	<i>t</i>	<i>p</i>
Constant	2.71 [2.59, 2.82]	.06	47.17	< .001**
Scarcity condition	-.11 [-.34, .12]	.12	-.96	.34
Uncertainty avoidance	.14 [-.03, .31]	.09	1.60	.11
Scarcity condition x Uncertainty avoidance	-.41 [-.75, -.07]	.17	-2.35	< .05**

\*\* =  $p < .05$  (2-tailed).

To further interpret this significant moderating effect of individual uncertainty avoidance, the simple slopes were analyzed. For this, the output showed the results of three models with different levels of uncertainty avoidance, namely low uncertainty avoidance, average uncertainty avoidance and high uncertainty avoidance.

When the level of uncertainty avoidance was low, there was no relationship between stock scarcity and impulse buying ( $b = .16$ , 95% CI [-.16, .48]  $SE = .16$ ,  $t = .99$ ,  $p = .32$ ). At the average degree of uncertainty avoidance, there was no relationship between stock scarcity and impulse buying as well ( $b = -.11$ , 95% CI [-.34, .12],  $SE = .12$ ,  $t = -.96$ ,  $p = .34$ ). Nevertheless, when uncertainty avoidance was high, stock scarcity explained an increase of .38 in impulse buying compared to no stock scarcity ( $b = -.38$ , 95% CI [-.70, -.06],  $SE = .16$ ,  $t = -2.34$ ,  $p < .05$ ). For uncertainty avoidance levels higher than 3.63 on average, stock scarcity and impulse buying were significantly related,  $b = -.26$ , 95% CI [-.52, .00],  $SE = .13$ ,  $t = -1.97$ ,  $p = .05$ . These results clarify that the relationship between stock scarcity and impulse buying only emerges in respondents with *high* levels of uncertainty avoidance.

## Discussion & Conclusion

### 4.1 Findings and Theoretical Implications

As prior studies demonstrated contradictory results on the effectiveness of scarcity promotions, the present study addressed the research question: “*What is the effect of stock scarcity on consumers’ impulse buying behavior in an online booking context, and to what extent does this differ across cultures?*”. In the following section, the contributions are discussed.

The explaining role of competitive arousal in the relationship between stock scarcity and impulse buying highlighted the importance of the underlying psychological triggers for impulse buying behavior which was in accordance with the findings of Song et al. (2021) and Wu et al. (2021). According to the stimulus-organism-response (S-O-R) model proposed by Mehrabian and Russel (1974), environmental stimuli may affect the internal affective and cognitive states of an individual, which leads to certain behavior. The current research contributes to the S-O-R model, as the external stimulus (i.e., stock scarcity cue) indeed leads to an affective response (i.e., perceived competitive arousal), which eventually leads to a behavioral response (i.e., impulse buying). This finding stresses the importance of affective, internal emotional states in online marketing strategies which is in line with Zhao et al. (2021).

Since there was no direct relationship between stock scarcity and impulse buying, there might have been other ongoing processes that have not been identified within the scope of this research. Teubner and Graul (2020) highlighted that many consumers currently perceive scarcity messages as misleading, because they think retailers randomly place low availability numbers in their advertisements. Therefore, cue credibility and consumer skepticism might be forces that hamper the effectiveness of scarcity cues on impulse buying (Chou, 2019). This process might be

fueled by persuasion knowledge activation, which has been linked to lower perceived credibility and lower behavioral intentions (Aguirre-Rodriguez, 2013). Persuasion knowledge was firstly introduced by Friestad and Wright (1994), who defined this concept as the learned consumer knowledge about the persuasive attempt by a marketing agent (i.e., salesperson or advertisement). Accordingly, persuasion knowledge activation creates coping behavior so that consumers can cope with the persuasion attempt (Evans & Park, 2015). As many e-commerce platforms currently make use of scarcity principles, skeptical consumers might have learned over time that these cues may be artificially created persuasion attempts. As a consequence, scarcity cues might be less effective.

Another perspective that may clarify the non-significant direct relationship between stock scarcity and impulse buying could be related to cue blindness. As Portnoy and Marchionini (2010) stated, frequent exposure to banners (i.e., advertisements) may lead to habituation (i.e., you become used to it) and banner blindness. This process might be somewhat similar for repeated exposure of stock scarcity cues, as many different online webshops incorporate such messages nowadays. This may cause experienced consumers to ignore scarcity messages.

Since scholars highlighted the importance of cross-cultural research in the relationship between scarcity and impulse buying (Wu et al., 2021), the current research aimed to examine cultural differences. Despite both cultural groups having distinct uncertainty avoidance levels, no cultural effect was proven. Therefore, the simple conclusion that scarcity principles were more effective in one culture compared to another could not be taken. This might have been caused by the fact that uncertainty avoidance differences within groups were too large, and differences between groups too small. However, when investigating individual differences in uncertainty avoidance, people with high levels of this trait were more susceptible to act upon the persuasive

attempt caused by a scarcity message. As these individuals aim to reduce risk and ambiguity (Lawrie et al., 2020), the warning scarcity cue might have been causing stress. By immediately (i.e., more impulsively) booking the room, ambiguity could be restored and uncertainty to miss out was avoided. These findings were consistent with findings of Cakanlar & Nguyen (2019), who found significant evidence that uncertainty avoidance may affect impulse buying.

Therefore, the argument for incorporating uncertainty avoidance as a moderator was more valuable than cultural background, as individual differences clarify the effectiveness of scarcity cues more than cultural differences do. In conclusion, the stock scarcity promotion increased impulse buying for only a selective group of consumers (i.e., those who scored high on uncertainty avoidance).

Furthermore, since the Hofstede uncertainty avoidance indexes (2022) for respectively Indian national culture and Dutch national culture were 40 and 53, the present study showed contrasting evidence. That is, the Indian ethnic culture scored higher on uncertainty avoidance compared to the Dutch ethnic culture. This is in line with findings of Broeder (2022) who observed that Asian ethnic cultures scored higher than the Dutch ethnic culture on uncertainty avoidance. Thus, this research builds upon Broeder (2022), stating that ethnic cultural scores on uncertainty avoidance differ substantially from the Hofstede (2022) national scores. This might be clarified by ethnic culture identification including self-categorization (Broeder, 2022) which is not bound by national borders (McSweeney, 2002) and takes into account cultural change over time (Chun et al., 2021). This study therefore emphasizes the importance of looking into cultures beyond nationalities or country borders and suggests that Hofstede's (2022) cultural indexes might be re-evaluated when conducting cross-cultural research.

Lastly, although stock scarcity promotion was mostly investigated and found successful for tangible products, given the results its effects on experiential services appeared to be successful via the explaining factor competitive arousal. As prior research highlighted the importance of further investigation of scarcity appeals on intangible, experiential services such as travel and tourism offers (Huang et al., 2020), this study contributed to this knowledge gap. As these effects were explained through the explaining factor of competitive arousal, this might have been caused by the riskier character of experiential services compared to tangible products. Moreover, the risky character online booking context may have caused the strong uncertainty avoidant individuals to be more susceptible to the stock scarcity message. Notably, the present research investigated scarcity cues in an online booking context, in which the presence of actual scarcity may be debatable. Although these promotional messages are proven to enhance competitive arousal, there are often many alternative hotel rooms available. This stresses again the psychological process which scarcity cues induce as proposed by Ku et al. (2005), even without the presence of ‘real’ scarcity.

#### **4.2 Practical Implications**

The findings of the present study have several practical implications. As the relationship between stock scarcity and impulse buying is explained by competitive arousal, practitioners should seek ways to maximize one’s competitive arousal in scarcity conditions, but solely with truthful information. For example, besides the limited availability of the room they could add a message displaying how many other people are watching the deal simultaneously (i.e., “8 others are looking at this deal right now”), which is a strategy applied by several companies already. By doing this, people may perceive higher levels of competitive arousal as the number of

competitors become clearly visible. This way, feelings of competition may be enlarged and may have greater benefits on impulse buying. However, too many different scarcity cues at once may be perceived as less credible, so other ideas might be evaluated in order to increase scarcity and competitive arousal. For instance, hotels could make use of influencers or previous guests to convey the scarcity message instead of just displaying the message “only X rooms left”. Nazlan et al. (2018) found that scarcity messages provided by a waiter in a restaurant cause people to pay more for the scarce item, due to the vividness of the personal message (compared to a written message). This effect might be probable for the online hospitality sector as well, for which influencers or prior guests could function as the personal messenger. Altogether, stock scarcity is a tool that retailers can use to induce competitive arousal leading to boost sales by impulse buying behavior. However, to ensure credibility a retailer should only present true discounts and accurate room availability rates, instead of manipulating it for the sake of profit.

As the stock scarcity cue was only influential for individuals that scored high on uncertainty avoidance, marketers should seek ways to target people that score high on this trait. Susceptibility factors may be of influence in the levels of uncertainty avoidance, even as environmental factors. For example, when an individual experienced something bad recently, one may be less risk-taking and thus more likely to rely on scarcity cues (as a way to reduce risks). Segmentation on uncertainty avoidance levels might be challenging, but marketers could seek for ways to temporarily increase uncertainty avoidance. From this point of view, uncertainty avoidance could be seen as a state rather than a trait. To accomplish this temporary increase in uncertainty, retailers should use their communicative power by emphasizing what consumers miss out on when they do not act upon the deal. For instance, by pointing out that ‘this is the last available date to book this room in July’. This information may be helpful for consumers to

make deliberate decisions, and scarcity cues could function as a service rather than a marketing tool as long as they are truthful.

From the environmental perspective, it is worth discussing that scarcity tactics may be less beneficial for the world around us. As such practices make traveling seem cheaper, more interesting and it was proven that people book more impulsively due to competitive arousal caused by scarcity cues (Teubner and Graul, 2020), consumers might over-buy or overconsume. Particularly in an online traveling context, it might be that due to scarcity appeals, people decide to travel more, resulting in more air pollution. In the modern world, air pollution appears to be an increasing traveling constraint for certain consumers (Xue & Gao, 2021), which is why scarcity practices may decrease their effectiveness over time. Particularly in a period in which many organizations switch to more sustainable policies, scarcity appeals may no longer fit in the norms and values of certain companies. However, several booking platforms (e.g., airline KLM) already acted upon the travel restraint due to air pollution by offering options to ‘pay off’ your CO2 footprint. To conclude, besides organizational profit due to scarcity messages, practitioners as well as consumers should bear in mind the welfare of our planet.

From the viewpoint of the consumer, scarcity cues prove to heighten their competitive arousal and perceived uncertainty. However, this may result in uncomfortable feelings or stress for the consumer. Nonetheless, as scarcity cues are produced by the retailer, consumers should bear in mind that this perceived arousal might be artificially created. Many e-commerce platforms still use scarcity cues without giving true information of the product’s availability, so consumers should take these cues with a grain of salt. Besides, the truthfulness of scarcity cues is difficult for consumers to determine. The present research confirms that many consumers feel aroused at a certain point, which is exactly what marketers aim to do with placing such a scarcity

cue. When consumers are more aware of the manufactured process scarcity cues create, and therefore not rely too much on scarcity cues, their effectiveness may decline over time.

### **4.3 Limitations and Future Research**

Beyond the findings there are some limitations which should be addressed. The generalizability of the results may have been impacted by the use of certain stimuli. First, the stimuli did not contain prices, which, according to participants, would be a crucial element for determining whether or not to book the room. For future research, however, it might be interesting to include prices in the stimuli and test whether or not stock scarcity cues remain its effectiveness.

Moreover, some participants might have been more familiar with the scarcity messages as other ones, which could have been influential for their responses. Regarding the question about how realistic of the offer was, Indian respondents scored significantly lower than the Dutch. Taking into consideration that the non-limited stock condition was viewed as more realistic compared to the limited stock condition, it may have been the case that the Indian people were indeed less familiar with stock scarcity messages. Therefore, they might have answered differently compared to when they were highly experienced with the stock scarcity cues.

Furthermore, whereas the differences in uncertainty avoidance between the Indian and the Dutch group were relatively small, individual differences in uncertainty avoidance were high. Therefore, future research could compare two cultural groups that have clearer low and high values on uncertainty avoidance, and therefore differences between those cultures are larger. It might be that for cultures with larger between-group differences in uncertainty avoidance, there

could be conclusions drawn in terms of the relationship between stock scarcity and impulse buying.

Other than that, some participants were highly skeptical about stock scarcity messages, which is an important factor for the scarcity one perceives when seeing such a cue. According to the control questions, participants viewed the manipulated offer as less realistic in general, which confirmed prior literature of Aguirre-Rodriguez (2013) and may clarify the skepticism among consumers. In their research, they specifically found that demand related scarcity appeals led to lower perceived credibility of the advertisement (Aguirre-Rodriguez, 2013). For future research, it might be valuable to gain insights into whether people evaluate the scarcity message in the stimuli as credible, or to ask them about their potential skepticism. As Booking.com and other hotel booking platforms were obligated to adapt their websites according to the ACM (Autoriteit Consument & Markt), the limited availability messages should be true to how many rooms there are left in real life (Bierling, 2020). For better results, future research could add this information in an introductory text in order to create more stability in terms of perceived credibility. Besides, some in-depth interviews would be valuable to gain deeper understanding and a clear picture of the general opinion of the sample instead of only focusing on questionnaires.

Lastly, the limitations of data analysis are worth noting. First, there was a large number of fallout and incomplete responses with regard to the survey. This might have been caused by the length or the language of the questionnaire, as English was not the native language of either of the cultural groups. Furthermore, the two manipulation check questions included many errors, which indicates these questions might have been confusing for the respondents. Moreover, when statistically analyzing the hypotheses, some assumptions were violated (e.g., assumption of normality), which resulted in a more cautious interpretation of the results.

#### 4.4 Conclusion

The present study examined the effectiveness of stock scarcity on impulse buying and found that it is dependent on how consumers cope with uncertainty. A stock scarcity message does not directly affect impulse buying in an online hotel booking context. However, stock scarcity heightens perceived competitive arousal which indirectly leads to more impulse buying among consumers. Cultural background does not impact the relationship between stock scarcity and impulse buying. Nonetheless, individual differences in uncertainty avoidance do impact the effectiveness of scarcity cues. As scarcity cues provoke uncertainty for missing out on a deal, consumers who dislike uncertainty are affected by such messages. As a consequence, the effect of stock scarcity on impulse buying does work for individuals who score *high* on uncertainty avoidance, leading them to immediately purchase the scarce deal to reduce uncertainty. In conclusion, consumers who strongly avoid uncertainty tend to make impulsive investments when facing stock scarcity messages.

### References

- Aggarwal, P., Jun, S.Y. & Huh, J.H. (2011). Scarcity messages: a consumer competition perspective. *Journal of Advertising*, 40(1), 19-30. <https://doi.org/10.2753/JOA0091-3367400302>
- Aguirre-Rodriguez, A. (2013). The effect of consumer persuasion knowledge on scarcity appeal persuasiveness. *Journal of Advertising*, 42(4), 371-379. <https://doi.org/10.1080/00913367.2013.803186>
- Ali, S. W., & Sudan, S. (2018). Influence of cultural factors on impulse buying tendency: A study of Indian consumers. *Vision*, 22(1), 68-77. <https://doi.org/10.1177/0972262917750247>
- Appelman, A., & Sundar, S. S. (2016). Measuring message credibility: Construction and validation of an exclusive scale. *Journalism & Mass Communication Quarterly*, 93(1), 59-79. <https://doi.org/10.1177/1077699015606057>
- Babič, K., Černe, M., Škerlavaj, M., & Zhang, P. (2018). The interplay among prosocial motivation, cultural tightness, and uncertainty avoidance in predicting knowledge hiding. *Economic and Business Review*, 20(3), 395-422. <https://doi.org/10.15458/85451.71>
- Bierling, S. (2020, 18 December). Booking en Expedia informeren consumenten nu duidelijker over hun aanbod. ACM. <https://www.acm.nl/nl/publicaties/booking-en-expedia-informeren-consumenten-nu-duidelijker-over-hun-aanbod>
- Biraglia, A., Usrey, B., & Ulqinaku, A. (2021). The downside of scarcity: Scarcity appeals can trigger consumer anger and brand switching intentions. *Psychology & Marketing*, 38(8), 1314-1322. <https://doi.org/10.1002/mar.21489>

- Broeder, P. (2022). The moderating effects of age and gender on the relationship between culture and uncertainty avoidance: Evidence from Europe and Asia. *Journal of the Academy of Business and Emerging Markets*, 2(1), 3-18. <https://doi.org/10.5281/zenodo.6330561>
- Broeder, P., & Nguyen, C. (2020). Deal exclusivity in cross-cultural e-commerce. *International Journal of Research in Marketing Management and Sales*, 2(2), 26-32.
- Broeder, P., Stokmans, M., & van Wijk, C. (2012). Etniciteit en leesklimaat: De noodzaak van een strakke begripsbepaling geïllustreerd aan een peiling van leesgedrag. *Papers of the Anéla 2012 Applied Linguistics Conference*, 213-222.
- Cakanlar, A., & Nguyen, T. (2019). The influence of culture on impulse buying. *Journal of Consumer Marketing*, 36(1), 12-23. <https://doi.org/10.1108/JCM-03-2017-2139>
- Chae, H., Kim, S., Lee, J., & Park, K. (2020). Impact of product characteristics of limited edition shoes on perceived value, brand trust, and purchase intention; focused on the scarcity message frequency. *Journal of Business Research*, 120, 398-406. <https://doi.org/10.1016/j.jbusres.2019.11.040>
- Chan, T. K., Cheung, C. M., & Lee, Z. W. (2017). The state of online impulse-buying research: A literature analysis. *Information & Management*, 54(2), 204-217. <https://doi.org/10.1016/j.im.2016.06.001>
- Chen, S., Min, Q., & Xu, X. (2021). Investigating the role of social identification on impulse buying in mobile social commerce: a cross-cultural comparison. *Industrial Management & Data Systems*, 121(12), 2571-2594. <https://doi.org/10.1108/IMDS-09-2020-0550>
- Chen, T. Y., Yeh, T. L., & Wang, Y. J. (2020). The drivers of desirability in scarcity marketing. *Asia Pacific Journal of Marketing and Logistics*, 33(4), 924-944. <https://doi.org/10.1108/APJML-03-2020-0187>

- Chen, Y. F., & Wang, R. Y. (2016). Are humans rational? Exploring factors influencing impulse buying intention and continuous impulse buying intention. *Journal of Consumer Behaviour, 15*(2), 186-197. <https://doi.org/10.1002/cb.1563>
- Chou, H. Y. (2019). Units of time do matter: How countdown time units affect consumers' intentions to participate in group-buying offers. *Electronic Commerce Research and Applications, 35*, 1-14. <https://doi.org/10.1016/j.elerap.2019.100839>
- Chun, D., Zhang, Z., Cohen, E., Florea, L., & Genc, O. F. (2021). Long-term orientation and the passage of time: Is it time to revisit Hofstede's cultural dimensions?. *International Journal of Cross Cultural Management, 21*(2), 353-371. <https://doi.org/10.1177/14705958211026342>
- Cialdini, R. B. (2001). The science of persuasion. *Scientific American, 284*(2), 76-81. <https://doi.org/10.1038/scientificamerican0201-76>
- Cremer, S., & Loebbecke, C. (2021). Selling goods on e-commerce platforms: The impact of scarcity messages. *Electronic Commerce Research and Applications, 47*, 1-14. <https://doi.org/10.1016/j.elerap.2021.101039>
- Desai, V. (2019). Digital marketing: A review. *International Journal of Trend in Scientific Research and Development, 5*(5), 196-200. <https://www.ijtsrd.com/papers/ijtsrd23100.pdf>
- Dilissen, J. (2022). *Owning the one-of-a-kind: A cross-cultural study on the effect of limited edition on consumer competition and purchase intention* [Master thesis, Tilburg University]
- Ditta-Apichai, M. & Kattiyapornpong, U. (2019). Assessing the link between cultural influences and persuasibility in online daily deals. *Journal of Hospitality, 1*(1), 31-40.

[https://ro.uow.edu.au/buspapers/1622?utm\\_source=ro.uow.edu.au%2Fbuspapers%2F1622&utm\\_medium=PDF&utm\\_campaign=PDFCoverPages](https://ro.uow.edu.au/buspapers/1622?utm_source=ro.uow.edu.au%2Fbuspapers%2F1622&utm_medium=PDF&utm_campaign=PDFCoverPages)

Evans, N. J., & Park, D. (2015). Rethinking the persuasion knowledge model: Schematic antecedents and associative outcomes of persuasion knowledge activation for covert advertising. *Journal of Current Issues & Research in Advertising*, 36(2), 157-176.

<https://doi.org/10.1080/10641734.2015.1023873>

Friestad, M., & Wright, P. (1994). The persuasion knowledge model: How people cope with persuasion attempts. *Journal of Consumer Research*, 21(1), 1-31.

<https://doi.org/10.1086/209380>

Gierl, H., Plantsch, M., & Schweidler, J. (2008). Scarcity effects on sales volume in retail. *The International Review of Retail, Distribution and Consumer Research*, 18(1), 45-61.

<https://doi.org/10.1080/09593960701778077>

Guo, J., Xin, L., & Wu, Y. (2017). Arousal or not? The effects of scarcity messages on online impulsive purchase. *International Conference on HCI in Business, Government, and Organizations*, 29-40. [https://doi.org/10.1007/978-3-319-58484-3\\_3](https://doi.org/10.1007/978-3-319-58484-3_3)

Gupta, S., & Gentry, J. W. (2019). 'Should I Buy, Hoard, or Hide?'-Consumers' responses to perceived scarcity. *The international Review of Retail, Distribution and Consumer Research*, 29(2), 178-197. <https://doi.org/10.1080/09593969.2018.1562955>

Hamilton, R., Thompson, D., Bone, S., Chaplin, L. N., Griskevicius, V., Goldsmith, K., ... & Zhu, M. (2019). The effects of scarcity on consumer decision journeys. *Journal of the Academy of Marketing Science*, 47(3), 532-550.

<https://doi.org/10.1007/s11747-018-0604-7>

Harikrishnan, P. K., Dewani, P. P., & Behl, A. (2021). Scarcity Promotions and Consumer

- Aggressions: A Theoretical Framework. *Journal of Global Marketing*, 1-18.  
<https://doi.org/10.1080/08911762.2021.2009609>
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations* (2nd Ed.). Thousand Oaks, CA: SAGE Publications.
- De Mooij, M., & Hofstede, G. (2010). The Hofstede model: Applications to global branding and advertising strategy and research. *International Journal of Advertising*, 29(1), 85-110.  
<https://doi.org/10.2501/S026504870920104X>
- Hofstede, G. (2022). Country Comparison. Retrieved from [www.hofstede-insights.com](http://www.hofstede-insights.com)
- Huang, H., Liu, S. Q., Kandampully, J., & Bujisic, M. (2020). Consumer responses to scarcity appeals in online booking. *Annals of Tourism Research*, 80(1), 1-14.  
<https://doi.org/10.1016/j.annals.2019.102800>
- Jung, J. M., & Kellaris, J. J. (2004). Cross-national differences in proneness to scarcity effects: The moderating roles of familiarity, uncertainty avoidance, and need for cognitive closure. *Psychology and Marketing*, 21(9), 739-753. <https://doi.org/10.1002/mar.20027>
- Ku, G., Malhotra, D., & Murnighan, J. K. (2005). Towards a competitive arousal model of decision-making: A study of auction fever in live and internet auctions. *Organizational Behavior and Human decision processes*, 96(2), 89-103.  
<https://doi.org/10.1016/j.obhdp.2004.10.001>
- Lawrie, S. I., Eom, K., Moza, D., Gavreliuc, A., & Kim, H. S. (2020). Cultural variability in the association between age and well-being: The role of uncertainty avoidance. *Psychological Science*, 31(1), 51-64. <https://doi.org/10.1177/09567976198887348>
- Leong, L. Y., Jaafar, N. I., & Ainin S. (2018). The effects of Facebook browsing and usage

- intensity on impulse purchase in f-commerce. *Computers in Human Behavior*, 78, 160–173. <https://doi.org/10.1016/j.chb.2017.09.033>
- Li, C., Wang, Y., Lv, X., & Li, H. (2021). To buy or not to buy? The effect of time scarcity and travel experience on tourists' impulse buying. *Annals of Tourism Research*, 86, 1-13. <https://doi.org/10.1016/j.annals.2020.103083>
- Manggarani, C. A., Ahmad, Z. A., & Patiro, S. P. S. (2022). The tremendous effect of scarcity promotion on consumer aggressivity: An experimental Study. *Academy of Entrepreneurship Journal*, 28(1), 1-13.
- Marder, B., Archer-Brown, C., Colliander, J., & Lambert, A. (2019). Vacation posts on Facebook: A model for incidental vicarious travel consumption. *Journal of Travel Research*, 58(6), 1014-1033. <https://doi.org/10.1177/0047287518786465>
- Mehrabian, A., & Russell, J.A. (1974). *An Approach to Environmental Psychology*. Cambridge, USA: The MIT Press.
- McSweeney, B. (2002). Hofstede's model of national cultural differences and their consequences: A triumph of faith-a failure of analysis. *Human relations*, 55(1), 89-118. <https://doi.org/10.1177/0018726702551004>
- Moser, C., Schoenebeck, S. Y., & Resnick, P. (2019, May). Impulse buying: Design practices and consumer needs. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, UK*. 1-15. <https://doi.org/10.1145/3290605.3300472>
- Nazlan, N. H., Tanford, S., Raab, C., & Choi, C. (2018). The influence of scarcity cues and price bundling on menu item selection. *Journal of Foodservice Business Research*, 21(4), 420-439. <http://dx.doi.org/10.1080/15378020.2018.1440129>
- Nichols, B. S. (2012). The development, validation, and implications of a measure of consumer

- competitive arousal (CCAr). *Journal of Economic Psychology*, 33(1), 192-205.  
<https://doi.org/10.1016/j.joep.2011.10.002>
- Peña-García, N., Gil-Saura, I., Rodríguez-Orejuela, A., & Siqueira-Junior, J. R. (2020). Purchase intention and purchase behavior online: A cross-cultural approach. *Heliyon*, 6(6), 1-11.  
<https://doi.org/10.1016/j.heliyon.2020.e04284>
- Poortinga, Y. H., De Ridder, R. (2019). “Jumping the Queue”: Implications of Norm Violations Research in India and the Netherlands. In: Pandey, J., Kumar, R., Thapa, K. (Eds.) *Psychological Perspectives on Diversity and Social Development*. Springer, Singapore.  
[https://doi.org/10.1007/978-981-13-3341-5\\_5](https://doi.org/10.1007/978-981-13-3341-5_5)
- Portnoy, F., & Marchionini, G. (2010). Modeling the effect of habituation on banner blindness as a function of repetition and search type: Gap analysis for future work. *CHI'10 Extended Abstracts on Human Factors in Computing Systems* (pp. 4297-4302). Association for Computing Machinery. <https://doi.org/10.1145/1753846.1754142>
- Rook, D. W., & Gardner, M. P. (1993). In the mood: Impulse buying's affective antecedents. *Research in Consumer Behavior*, 6(7), 1-28.  
[https://www.researchgate.net/profile/Meryl-Gardner/publication/284059785\\_In\\_the\\_mood\\_Impulse\\_buying's\\_affective\\_antecedents/links/57545f7608ae6807fb04cde4/In-the-mood-Impulse-buyings-affective-antecedents.pdf](https://www.researchgate.net/profile/Meryl-Gardner/publication/284059785_In_the_mood_Impulse_buying's_affective_antecedents/links/57545f7608ae6807fb04cde4/In-the-mood-Impulse-buyings-affective-antecedents.pdf)
- Rosillo-Díaz, E., Blanco-Encomienda, F. J., & Crespo-Almendros, E. (2019). A cross-cultural analysis of perceived product quality, perceived risk and purchase intention in e-commerce platforms. *Journal of Enterprise Information Management*, 33(1), 139–160.  
<https://doi.org/10.1108/jeim-06-2019-0150>
- Roy, R., & Sharma, P. (2015). Scarcity appeal in advertising: Exploring the moderating roles of

- need for uniqueness and message framing. *Journal of Advertising*, 44(4), 349-359.  
<https://doi.org/10.1080/00913367.2015.1018459>
- Sharma, P., Sivakumaran, B., & Marshall, R. (2010). Impulse buying and variety seeking: a trait-correlates perspective. *Journal of Business Research*, 63(3), 276-283.  
<https://doi.org/10.1016/j.jbusres.2009.03.013>
- Shi, X., Li, F., & Chumnumpan, P. (2020). The use of product scarcity in marketing. *European Journal of Marketing*, 54(2), 380-418. <http://dx.doi.org/10.1108/EJM-04-2018-0285>
- Sohaib, O., Kang, K., & Miliszewska, I. (2019). Uncertainty avoidance and consumer cognitive innovativeness in e-commerce. *Journal of Global Information Management*, 27(2), 59–77. <https://doi.org/10.4018/jgim.2019040104>
- Song, M., Choi, S., & Moon, J. (2021). Limited time or limited quantity? The impact of other consumer existence and perceived competition on the scarcity messaging - purchase intention relation. *Journal of Hospitality and Tourism Management*, 47, 167-175.  
<https://doi.org/10.1016/j.jhtm.2021.03.012>
- Statista. (2022, March 9). *Most visited travel and tourism websites worldwide as of January 2022*.  
<https://www.statista.com/statistics/1215457/most-visited-travel-and-tourism-websites-worldwide/>
- Szymkowiak, A., Gaczek, P., & Padma, P. (2021). Impulse buying in hospitality: The role of content posted by social media influencers. *Journal of Vacation Marketing*, 27(4), 385-399. <https://doi.org/10.1177/13567667211003216>
- Teubner, T., & Graul, A. (2020). Only one room left! How scarcity cues affect booking intentions on hospitality platforms. *Electronic Commerce Research and Applications*, 39,

- 1-11. <https://doi.org/10.1016/j.elerap.2019.100910>
- Timokhina, G., Wagner, R., & Ürkmez, T. (2018). Cross-cultural variations in consumer behavior: A literature review of international studies. *South-East European Journal of Economics and Business*, 13(2), 49-71. <https://doi.org/10.17170/kobra-202107074261>
- Wang, M., & Min, D. (2020). Exploring the effect of online time-deals on actual purchase in China: An empirical study on JD.com. *Journal of Information Technology Services*, 19(2), 11–21. <https://doi.org/10.9716/KITS.2020.19.2.011>
- Wellens, S. A. K. (2022). *Book Your Stay Within 48 Hours! A Cross-Cultural Study on the Effect of Limited Time Promotions and Consumer Competition on Impulsive Buying Intention* [Master's thesis, Tilburg University].
- Wentink, E. (2019). *Time is running out: A cross-cultural study on the effect of limited time messages on purchase intention* [Master's thesis, Tilburg University].
- Won, M., & Shapiro, S. L. (2021). Analysis of price bundling and framing: the impact of availability and discount messaging. *Sport, Business and Management: An International Journal*, 11(5), 493-514. <https://doi.org/10.1108/SBM-09-2020-0093>
- Wu, Y., Xin, L., Li, D., Yu, J., & Guo, J. (2021). How does scarcity promotion lead to impulse purchase in the online market? A field experiment. *Information & Management*, 58(1), 1-10. <https://doi.org/10.1016/j.im.2020.103283>
- Xue, L., & Gao, J. (2021). Negotiating air pollution as a travel constraint: an exploratory study. *Journal of Sustainable Tourism*, 1-14. <https://doi.org/10.1080/09669582.2021.1986054>
- Yi, S., & Jai, T. (2020). Impacts of consumers' beliefs, desires and emotions on their impulse buying behavior: application of an integrated model of belief-desire theory of emotion. *Journal of Hospitality Marketing & Management*, 29(6), 662-681.

<https://doi.org/10.1080/19368623.2020.1692267>

Zhao, Y., Li, Y., Wang, N., Zhou, R., & Luo, X. R. (2021). A meta-analysis of online impulsive buying and the moderating effect of economic development level. *Information Systems Frontiers*, 1-22. <https://doi.org/10.1007/s10796-021-10170-4>

## Appendix A

### *Pilot stimuli*

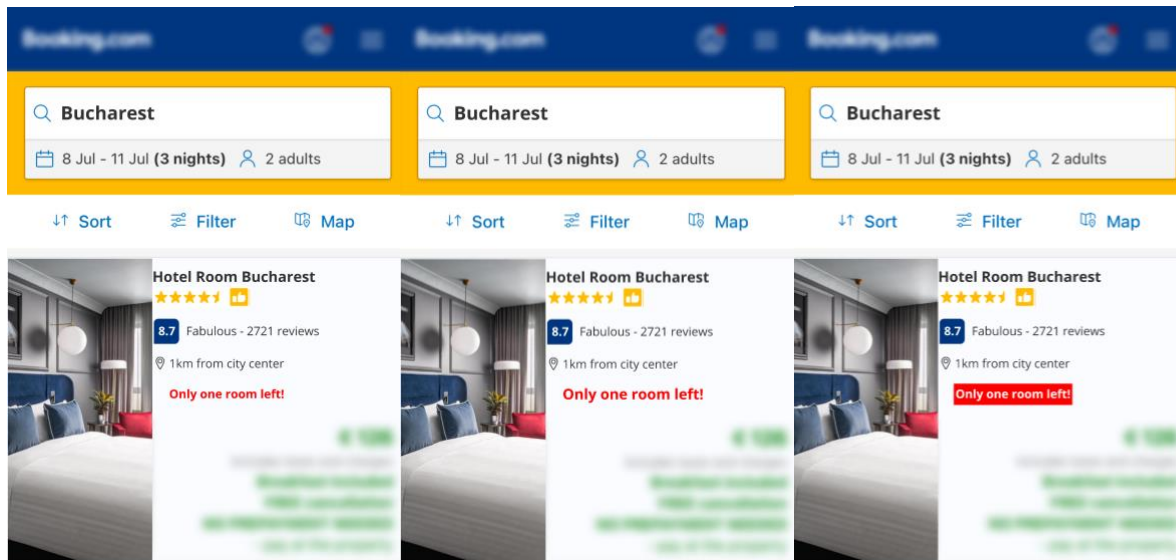
As parts of the pilot for the stimuli were co-created with Wellens (2022), certain elements may overlap. Three different hotels were presented in the pilot study (i.e., a standard Indian hotel, a standard Dutch hotel, and a standard Romanian hotel). These specific rooms were selected for a few specific reasons: they had similar distances towards the city center, they were all located in the capital city of the country, and they had ratings above 8. The group of participants ( $N = 11$ ) included both Indian ( $n = 4$ ) and Dutch ( $n = 7$ ) people for which there were more females ( $n = 6$ ) than males ( $n = 5$ ). Their age ranged from 21 to 57 years old. Two of the participants were experienced in online marketing. To increase understanding of the participants' opinions, semi-structured interviews were conducted mostly via mobile calls or face-to-face. Participants were asked to answer questions based on a 5-point Likert scale to create some kind of structure.



*The three hotel options for the stimuli (Indian - Dutch - Romanian)*

Participants were asked which hotel they considered as most applicable for this research. Additionally, they were asked which hotel looked most universal, as architecture and style could differ between cultures. Also, the participants were asked to give an indication of how many nights they would book for such an accommodation in general. Finally, different examples of the stimuli were presented which varied in some textual and visual details. Consequently, the following statements were answered by the participants in order to find the most suitable stimulus material:

1. This Booking.com advertisement looks realistic.
2. This Booking.com advertisement makes me likely to book the hotel room.
3. The background components take my attention away from the hotel room.
4. I am aware of the limited stock message given at the advertisement.
5. I could also see this limited stock message on Booking.com in real life.
6. This limited stock message makes me feel urged to book the hotel room before it is too late.
7. The limited stock message makes me feel like I have to compete with other customers to get the hotel room.
8. The limited stock message increases the likelihood that I will book the hotel room.



*Three versions of the stimuli*

1. *Logo blurred yet readable, price not visible, scarcity message equal size as real website.*
2. *Logo blurred yet readable, price not visible, scarcity message bigger size.*
3. *Logo blurred yet readable, price not visible, scarcity message on a red surface.*

**Background.** As there was aimed for a realistic-looking advertisement, different original elements remained stable such as the Booking.com colors, the sort/filter/map options and the number of nights and persons. According to the pilot study, the participants highly valued the score and reviews for their booking process. Therefore, these elements were adapted to an average score and number of reviews over all three hotel options. To ensure the participants' focus on the important parts of the stimulus material, some elements were blurred. For instance, the Booking.com logo was blurred, as well as the price for the stay. The decision to remove price was made as this might have manipulated the results as room budget is considered person-specific and hotel prices may vary between cultures and countries. As some of the pilot participants argued that the displayed city (in this case Bucharest) could influence whether one

would book a hotel in that particular city, it was decided to change the city name into “Anywhere” and the hotel name into “Hotel Room City Center”. This way, the ad looked more general. One of the participants also pointed out that adding the link “Show on map” would make the advertisement more realistic. In general, all participants evaluated the stimuli as realistic looking and they could focus on the important parts of the ad.

**Product.** The majority of the pilot participants evaluated the Romanian hotel room as most standard. One of the participants argued that this particular hotel room did not have a clear outside view (which might differ between cultures and locations), has neutral colors and a straightforward room shape. Most participants indicated that they would book this room in practice.

**Context information.** All participants noticed the limited stock message in the different stimuli, which might have been caused by the red color that draws attention. However, advertisement 1 was evaluated as least remarkable and advertisement 3 was evaluated by one participant as clickbait. Option 2 was pointed out by almost all participants as the most credible ad. Therefore, to ensure the scarcity message was notable as well as realistic looking, there was chosen for option 2 as the final advertisement. To ensure the neutrality of the control advertisement, in the pilot study was discussed in what particular color the “Enough rooms available” message should be displayed. As a few respondents argued that green text indicates positivity and therefore some direction, it was decided to simply put the message in black to ensure neutrality.

## Appendix B

At the moment we are doing a study about online accommodation booking.

We would like to ask you some questions about online accommodation booking and your preferences. This short questionnaire will take about 5 minutes.

### Voluntary participation

Your participation in this survey is completely voluntary. You have the right to withdraw from the research study at any time. To have your response included, please click the “submit” button at the end of the survey.

### Confidentiality

Your answers will be stored anonymously. You do not have to fill in your name or address. In order to protect the anonymity of your responses, no IP addresses, email addresses, or identifying information will be collected.

Thanks in advance!

Research group ‘Online consumers’ Tilburg University.

Pleun van Haren

p.vanharen@tilburguniversity.edu

Do you agree to participate?  Yes  No

What is your gender?       Male  Female  Other

What is your age? \_\_\_\_\_

What country were you born in?

The Netherlands

India

Other, please specify \_\_\_\_\_

In what country do you live at the moment?

The Netherlands

India

Other, please specify \_\_\_\_\_

To what ethnic group do you belong?

Dutch

Indian

Other, please specify \_\_\_\_\_

What language do you mostly use at home? \_\_\_\_\_

What is the highest level of education you have completed?

Elementary school

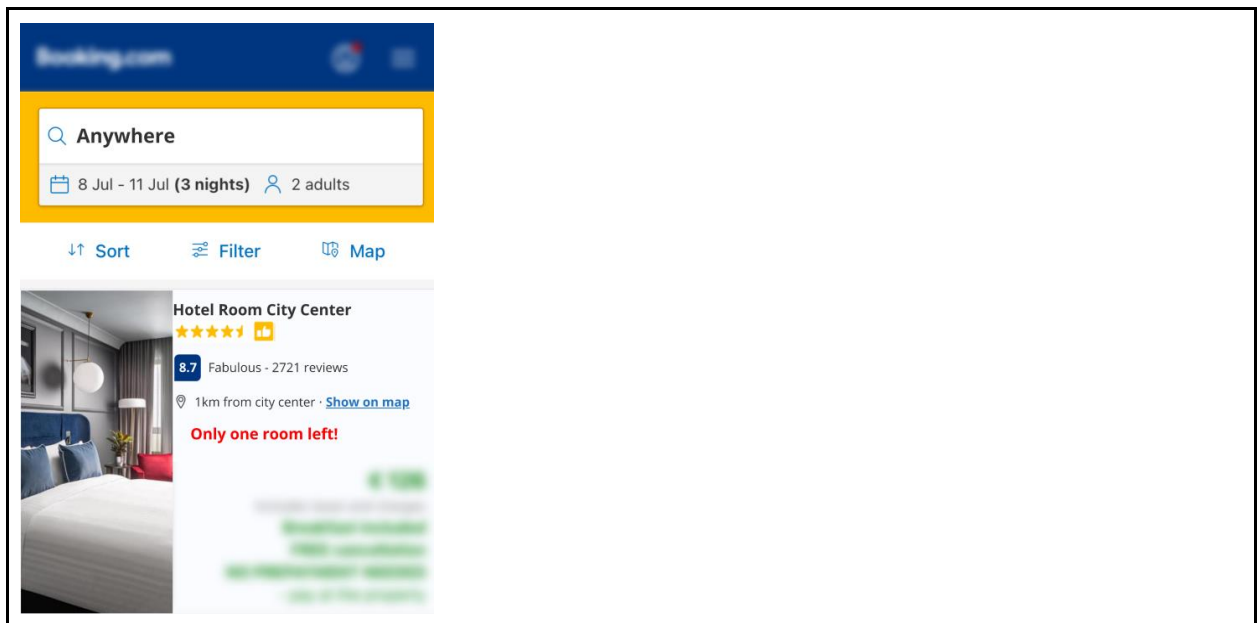
High school

Middle level education

Higher education

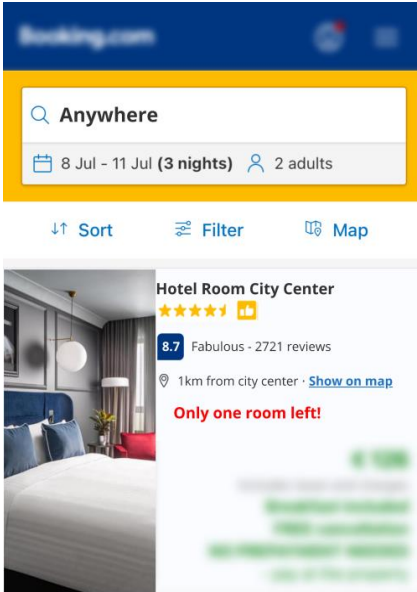
University

STOCK SCARCITY, COMPETITIVE AROUSAL, AND IMPULSE BUYING



Have a close look at the offer above. Imagine you are looking for a hotel room.

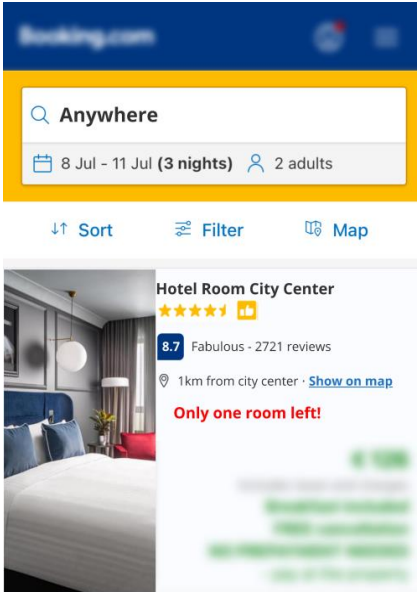
	Completely disagree	Disagree	Neither disagree nor agree	Agree	Completely agree
I would like to book this hotel room.	0	0	0	0	0



Please indicate to what extent you agree with the following statements.

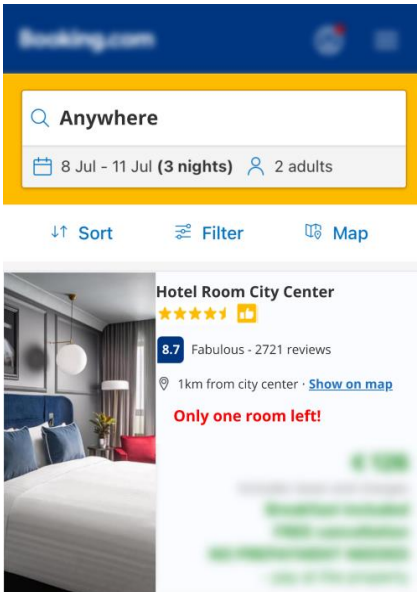
	Completely disagree	Disagree	Neither disagree nor agree	Agree	Completely agree
I experience a sudden desire to book a room in this hotel.	0	0	0	0	0
I would like to book a hotel room in this hotel, although I did not plan on it.	0	0	0	0	0
I feel a strong need to book a room in this hotel.	0	0	0	0	0

STOCK SCARCITY, COMPETITIVE AROUSAL, AND IMPULSE BUYING

	Completely disagree	Disagree	Neither disagree nor agree	Agree	Completely agree
					
This offer will be sold out soon.	0	0	0	0	0
This offer intentionally limits product scarcity.	0	0	0	0	0
This offer strategically creates product scarcity.	0	0	0	0	0
This offer creates a sense of urgency.	0	0	0	0	0
I need to act quickly in response to this offer.	0	0	0	0	0
This offer is exclusive.	0	0	0	0	0
This offer is quantity-restricted.	0	0	0	0	0

STOCK SCARCITY, COMPETITIVE AROUSAL, AND IMPULSE BUYING

	Completely disagree	Disagree	Neither disagree nor agree	Agree	Completely agree
					
This offer will be sold out soon.	0	0	0	0	0
This offer intentionally limits product scarcity.	0	0	0	0	0
This offer strategically creates product scarcity.	0	0	0	0	0
This offer creates a sense of urgency.	0	0	0	0	0
I need to act quickly in response to this offer.	0	0	0	0	0
This offer is exclusive.	0	0	0	0	0
This offer is quantity-restricted.	0	0	0	0	0

	Completely disagree	Disagree	Neither disagree nor agree	Agree	Completely agree
					
I will have to compete with others to book this hotel room.	0	0	0	0	0
For this hotel room, other potential customers are "rivals" of mine.	0	0	0	0	0
I will feel like a winner if I am able to book this hotel room.	0	0	0	0	0
Trying to book this hotel room feels like a competition.	0	0	0	0	0
I will feel successful if I am able to book this hotel room.	0	0	0	0	0
I will feel nervous trying to book this hotel room.	0	0	0	0	0

## STOCK SCARCITY, COMPETITIVE AROUSAL, AND IMPULSE BUYING

	Completely disagree	Disagree	Neither disagree nor agree	Agree	Completely agree
I prefer structured to unstructured situations.	0	0	0	0	0
I prefer specific instructions to broad guidelines.	0	0	0	0	0
I tend to get anxious easily when I don't know an outcome.	0	0	0	0	0
I feel stressed when I cannot predict consequences.	0	0	0	0	0
I would not take risks when an outcome cannot be predicted.	0	0	0	0	0
I believe that rules should not be broken for mere, pragmatic reasons.	0	0	0	0	0
I don't like ambiguous situations.	0	0	0	0	0

	Completely disagree	Disagree	Neither disagree nor agree	Agree	Completely agree
I think the offer was realistic.	0	0	0	0	0
I am familiar with booking hotel rooms online.	0	0	0	0	0
I like the hotel room that I saw.	0	0	0	0	0
The hotel room that I saw is of good quality.	0	0	0	0	0
I am familiar with using Booking.com.	0	0	0	0	0
Finally, I noticed that...					
The offer showed the message "Only one room left!".				0 Yes 0 No	
The offer showed the message "Enough rooms available".				0 Yes 0 No	
We thank you for your time spent taking this survey. Your response has been recorded.					
If you have any further questions or you would like to be kept informed about the results of this study, please send an email to					
Pleun van Haren					
<a href="mailto:p.vanharen@tilburguniversity.edu">p.vanharen@tilburguniversity.edu</a>					

## Appendix C

### *Pilot questionnaire*

In order for the questionnaire to run without any errors, a pilot study for testing the questionnaire was conducted. The pilot questionnaire was spread among 6 respondents, of which an equal number of women ( $n = 3$ ) as men ( $n = 3$ ), from which more Dutch ( $n = 5$ ) than Indian ( $n = 1$ ) people. Results indicated that there was no minimum or maximum age, which was why these values were added. Also, people could fill in numbers at the “other, please specify...” option for country of living, language spoken, and ethnic culture. Therefore, there was added the prerequisite to only fill in letters for these questions. Furthermore, the questionnaire was evaluated as clear and no major technical or textual problems were identified.