



Hurry, Before the Product Sells Out!

A cross-cultural study on the effect of scarcity on purchase intention

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Preface

I have a fascination for marketing and I would like to explain how it all started. Eighteen years ago, my parents showed me their office at a bring-your-family-to-work-day. My father was chief executive officer for a publicity agency and my mother was marketing professional for a similar company. They always told me all the ins and outs of marketing and from a very young age I was intrigued by it. Fun fact, my first presentation in elementary school was about marketing. From that moment on I knew that I had the same passion as my parents, and when I got older, I dreamed of a career in marketing. It will probably not surprise you that I have written my thesis about scarcity, an effective marketing technique that is often used to persuade consumers. Hereby, I am proudly presenting you my thesis *Hurry, Before the Product Sells Out: A cross-cultural study on the effect of scarcity on purchase intention*.

To be honest, writing a thesis feels similar to being taught to ride a bike. It takes time, a lot of effort and motivation to finish it correctly and it never goes as planned. However, once you have mastered it you are extremely proud. Just as with learning to ride a bike, you cannot write your thesis without help. I would like to thank my supervisor Peter Broeder in particular. Without his assistance and feedback my thesis would not have been of this quality. Besides, I would like to thank my parents, boyfriend and friends. Not only for their mental support but also for their critical reflections on my written texts. Finally, I would like to thank my fellow students Sebastiaan van Bergen, Timo Hooyen, Kinga Jazębowska and Kristy Wielinga, for creating an inspiring work environment, in which we always motivated each other to improve our work.

My dream to work for a large marketing agency has never changed. Therefore, I am really proud to announce that this dream came true. After graduation, I will start a traineeship as online marketing consultant at Merkle, an international marketing agency. Hard work pays off.

Roos van Ginkel

Amersfoort, July 2021

Abstract

In recent years, it has become extremely difficult for companies to distinguish themselves from competitors in online retail environments. Therefore, companies use scarcity as a persuasion strategy to positively influence the purchase intention of consumers. One often used scarcity strategy is demand-induced scarcity with limited quantity. The positive effect of this strategy on purchase intention is mediated by self-control. In a way, that consumers with low levels of self-control are more susceptible to scarcity and have a higher purchase intention than consumers with high levels of self-control. In addition, cultural background has an effect on this relationship. However, no research has yet been done about the effect of indulgence on this relationship. Therefore, the purpose of this study is to contribute to existing literature and expand knowledge about the effect of demand-induced scarcity on purchase intention. In addition, the mediated effect of self-control and the moderated effect of cultural background are investigated. Consequently, this study compares the Chinese culture with the Dutch culture, because they score different on the indulgence scale. In all, 142 Dutch consumers and 114 Chinese consumers participated. As expected, this study showed that demand-induced scarcity has a positive effect on the purchase intention of consumers in online retail environments. In contrast to what was expected, demand-induced scarcity had no significant effect on self-control. Furthermore, self-control had no significant effect on purchase intention. As expected, Dutch consumers score higher on indulgence than Chinese consumers. Yet, indulgence had no significant effect on the relationship between demand-induced scarcity and purchase intention. Lastly, limitations of this study, practical implications and ideas for future research are provided.

Keywords: demand-induced scarcity, limited quantity, purchase intention, self-control, indulgence, online retail environments, e-commerce

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1. Introduction

In the last two decades, e-shopping has become one of the most common ways for consumers to buy their products (Yan et al., 2016). As a response to the growing demand of e-shopping, companies spend millions of dollars to establish online presence (Tankovic & Benazic, 2018). However, in this highly competitive market being present online alone is not enough (Fachryto & Achyar, 2018). Therefore, companies use various persuasion strategies to differentiate themselves from online competitors (Adaji et al., 2020). One often used persuasion strategy is scarcity, which highlights the limited availability of a product (Jang et al., 2015). This strategy is found to be effective because consumers value an object higher when it is scarce than when there are plenty of it (Guo et al., 2017). As a result, scarcity can positively influence the decision-making process of consumers, which can lead to a higher purchase intention (Eisenbeiss et al., 2015; Guo et al., 2017).

Individual's susceptibility for scarcity is highly dependent on one's level of self-control (Cheung et al., 2015). Self-control is the conflict between relinquishment and persistence, and high levels of self-control will decrease impulsive purchases and will help consumers to resist persuasive attempts (Ladeira et al., 2018). Cheung et al. (2015) have found that consumers with lower levels of self-control are more susceptible to scarcity than individuals with higher levels of self-control. That is because consumers with lower levels of self-control instantly respond to their consumption impulses, to fulfill their needs. In contrast, consumers with higher levels of self-control ignore their consumption impulses to reach their long-term goals. Consequently, consumers with lower levels of self-control are more susceptible to scarcity than consumers with higher levels of self-control (Guan & He, 2018).

Self-control also has an effect on the purchase intention of consumers. Efendi et al. (2019) have found that consumers with lower levels of self-control make more impulsive purchases and have a higher purchase intention than consumers with higher levels of self-

control, because they have less self-discipline (Achtziger et al., 2015). Therefore, scarcity has a more positive effect on the purchase intention of consumers with lower levels of self-control than on consumers with higher levels of self-control.

Culture can affect behavior of consumers, and can influence their susceptibility to scarcity (Kuman & Pansari, 2016). Orji (2016) for example, showed that consumers in individualistic cultures are more susceptible to scarcity and have a higher purchase intention than consumers in collectivistic cultures. This can be explained by the fact that consumers adapt their behavior to that of others in their cultural environment (Young et al., 2018). Yildirim (2016) also showed that cultural background influences consumers' purchase intention. Hence, cultural background affects the relationship between scarcity and the purchase intention of consumers in online retail environments.

Culture consists of multiple dimensions, including indulgence. Indulgence is defined as "the extent to which people try to control their desires and impulses" (Hofstede, 2010, p. 88). Hofstede (2021) argues that consumers with lower levels of self-control often live in high indulgent cultures, whereas consumers with higher levels of self-control often live in low indulgent cultures. This can be explained by the fact that in high indulgent cultures it is socially accepted to act upon desires, such as having fun and spending money on non-necessities. Contrary, in low indulgent cultures it is socially less accepted to act upon these needs. As a result, consumers use self-control to suppress their impulses (Hofstede, 2010). A meta-analysis by Oruc (2015) on the effect of scarcity on consumers' purchase intention reveals that this topic is widely studied. However, Oruc (2015) states that to her knowledge little research has yet been done on the effect of indulgence on this relationship. Yet, there is only one study by Pandey (2015) that has investigated the relationship between indulgence and impulsive buying. The results of this study showed that scarcity has a positive effect on impulsive buying of consumers in both low and high indulgent cultures (Pandey, 2015). Guo

et al. (2017) state that impulsive buying on itself can increase consumers' purchase intention. In line with that study, Ladeira et al. (2018) have found that consumers in high indulgent cultures have a higher purchase intention than consumers in low indulgent cultures. However, no research has yet been done on the effect of indulgence on the relationship between scarcity and purchase intention. The purpose of this study is to contribute to existing literature and to expand knowledge about the effect of scarcity on purchase intention. In addition, the mediated effect of self-control and the moderated effect of cultural background are investigated. As a result, the following research question is formed:

RQ: "What is the effect of scarcity on consumers' purchase intention and does this vary across cultures?"

It is worth noting that this study is a follow-up study to the study of Wentink (2019). Wentink (2019) examined the effect of limited time scarcity on purchase intention. In addition, the mediating effect of competitive arousal was studied. It was a cross-culture study in which two different cultures (Italian and Dutch) were compared based on their different scores on the individualism-collectivism scale. The study of Wentink (2019) offered some interesting findings, yet some areas of scarcity remained unexplored. To fill gaps in the literature this follow-up study is conducted. Consequently, it may be that some sections overlap.

2. Theoretical Framework

As noted, this study is a follow-up study to the study of Wentink (2019). Therefore, some sections may overlap.

2.1 Demand-Induced Scarcity

Scarcity occurs when the supply of a product is lower than the demand (Fan et al., 2018). When it is used as a strategy, it highlights the limited availability of a product or service on purpose (Robinson et al., 2016). Scarcity is one of Cialdini's influential Principles of Persuasion and will increase the desirability of a product and will increase consumers' purchase intention (Li et al., 2021). Wu et al. (2021) even conclude that scarcity is the most effective Persuasion Principle, compared to the other five Principles, due to its positive effect on purchase intention.

Scarcity can be categorized into demand-induced or supply-induced scarcity. Demand-induced scarcity gives the impression that the product demand has surpassed the product supply, and supply-induced scarcity highlights that there is a limited number of products offered, which can lead to shortage (Roy & Sharma, 2015). Huan et al. (2020) argue that demand-induced scarcity has a more positive effect on the purchase intention of consumers than supply-induced scarcity. That is because demand-induced scarcity will initiate the feeling that the product is of high quality, which will increase perceived product value, and will in turn increase purchase intention (Roy & Sharma, 2015). Huan et al. (2020) investigated the difference between demand-induced scarcity and supply-induced scarcity in an experiment, in which participants had to evaluate the flavour of snacks. Some participants were told that there were not many snacks left because other participants already ate them, and the other group was told that the snacks were just removed by the researcher. The results revealed that the first group evaluated the flavour of the snacks more positively than the second group,

which indicates that demand-induced scarcity has a more positive effect than supply-induced scarcity. In line with that study, Shi et al. (2020) showed that demand-induced scarcity leads to a higher perceived product value and a higher purchase intention than supply-induced scarcity. Concluding, previous research provides convergent evidence that demand-induced scarcity has a more positive effect on purchase intention than supply-induced scarcity. Therefore, this study investigates the effect of demand-induced scarcity on the purchase intention of consumers in online retail environments.

There are two types of demand-induced scarcity: limited quantity and limited time scarcity (Shi et al., 2020). Jang et al. (2015) have found that limited quantity scarcity has a more positive effect on the purchase intention of consumers than limited time scarcity, because consumers feel that they have to compete with other consumers. Li et al. (2021) showed the same positive effects of limited quantity scarcity on purchase intention. Jang et al. (2015) argue that limited time scarcity still is an effective persuasion strategy. Wentink (2019) however, did not find a positive effect of limited time scarcity on purchase intention. Furthermore, Hmurovic et al. (2016) argue that limited time scarcity only has a negative effect on purchase intention, because consumers will evaluate the product more negatively. As a result, they will buy the product somewhere else (Hmurovic et al., 2016). Concluding, the literature is not consistent about the effect of limited time scarcity on purchase intention. Yet, the literature is consistent about the positive effects of limited quantity scarcity. On top of that, Wentink (2019) did not investigate the effect of limited quantity scarcity, whilst it seems that limited quantity scarcity has a more positive effect than limited time scarcity. Since this study is a follow-up study on the study of Wentink (2019), it is interesting to investigate if limited quantity scarcity itself does have a positive effect on purchase intention. Therefore, this study will investigate the effect of demand-induced scarcity with limited quantity on the purchase intention of consumers in online retail environments.

The positive effect of demand-induced scarcity on purchase intention is studied in in-store settings. Robinson et al. (2016) discovered that when shelves in supermarkets are not fully stocked consumers perceive it as evidence that the product is popular. As a result, consumers feel an increasing urge to buy the product, which will increase product purchases (Aggarwal et al., 2011). By way of contrast, Campo et al. (2004) state that if the level of scarcity is too high this can have a negative effect on purchase intention, since consumers can always choose other brands or alternative stores. Arguably, scarcity only has a positive effect on purchase intention in stores when the product is not perceived as too scarce.

In recent years, scarcity is not only investigated in the context of in-store shopping but also in the context of shopping in online retail environments. Godinho et al. (2016) have found that demand-induced scarcity also has a positive effect on consumers' purchase intention in online retail environments. In this study it is argued that scarcity will decrease a consumers' ability to process all the information. As a result, consumers will make decisions based on heuristics, which has a positive effect on their purchase intention (Godinho et al., 2016). In addition, Guo et al. (2017) argue that consumers are less likely to refuse an offer when demand-induced scarcity is used, which will increase consumers' purchase intention. Wu et al. (2021) showed the same positive effect of scarcity on impulsive purchases and Guo et al. (2017) have found the same positive effect on impulsive behaviour.

Contrary to these studies, Fenko et al. (2017) showed that demand-induced scarcity is not always effective. If scarcity is presented with social proof cues it has a negative effect on purchase intention. An example of such a message is "Already 100 other consumers bought this product". The product will not be perceived as scarce due to the fact that a lot of other consumers already bought it, which will decrease the perception of product quality, which has a negative effect on purchase intention (Fenko et al., 2017). To rule out this negative effect, this study will present demand-induced scarcity without social proof cues.

A recent study of Li et al. (2021) also showed a negative effect of scarcity on purchase intention. In this study they investigated the effect of scarcity in hospitality businesses on consumers' purchase intention during the COVID-19 pandemic. This study showed that scarcity can also decrease consumers' purchase intention. That is because consumers consider scarce hospitality businesses during the pandemic as less safe, which has a negative effect on purchase intention. Yet, this negative effect only applies when an online purchase awakens a safety concern (Li et al., 2021). With respect to that study, it is not expected that these results will also occur in this study. Mainly because this study will rather focus on businesses in online retail environments than businesses in the hospitality industry. Furthermore, this study uses electronic products as stimuli and it is less likely for those products to trigger safety concerns. Therefore, it is not expected that scarcity will negatively affect purchase intention.

To conclude, previous research showed that scarcity can be an effective strategy to persuade consumers and to increase their purchase intention, especially when demand-induced scarcity with limited quantity is used (Fenko et al., 2017). Moreover, to rule out the potential negative effects of demand-induced scarcity on purchase intention, this study will focus on online retail environments and not on the hospitality industry. In addition, this study will use electronic products as stimuli, because they are less likely to trigger a safety concern (Li et al., 2021). Hence, the following hypothesis is formulated:

H1: Demand-induced scarcity in online retail environments will increase the purchase intention of consumers.

2.2 Self-Control

Self-control is defined as “the ability to control or override one’s thoughts, emotions, urges and behaviour” (Sultan et al., 2011, p. 62). Another description of self-control is “the

ability to arrange, to guide, to control and to direct a form of behavior so that behaviour brings the consumers to more positive consequences” (Vazsonyi et al., 2017, p. 54). Self-control in particular is enhanced when consumers are aware of the long-term consequences of their behaviour, and behave in accordance to their future goals (Vazsonyi et al., 2017). Nguyen et al. (2019) have found that consumers with higher levels of self-control are better at regulating emotions and control behaviour than consumers with lower levels of self-control. It is important to regulate emotions because a lack of it will have a negative effect on personal development and can lead to exclusion from society (Nguyen et al., 2019). Consumers with lower levels of self-control are less able to live according to the social norms and rules (Li et al., 2018). Self-control also has an effect on behaviour. A meta-analysis by Vazsonyi et al. (2017) showed that low levels of self-control can cause someone to engage in criminal behavior. Furthermore, Nguyen et al. (2019) reveal that consumers with lower levels of self-control are found to be more impulsive, and make more short-term consumption decisions than consumers with higher levels of self-control. Thus, self-control can affect both cognitive abilities and emotion regulation.

One way to influence an individual’s level of self-control is by demand-induced scarcity. Laran (2019) showed that product information can affect people’s ability to utilize self-control. To be specific, if a product is presented as scarce, it can decrease a person’s self-control, because scarcity will make it look more attractive to respond to short-term impulses, and will make long-term goals less important (e.g., buy now or save up for later) (Horváth et al., 2015). In line with that study, Fernbach et al. (2015) argue that scarcity reduces attention to the future consequences of behavior. Furthermore, scarcity creates a sense of urgency, which will decrease self-control and increase impulsive behavior (Efendi et al., 2019). Concluding, scarcity will lead to an internal conflict between two contradicting goals: to indulge now or to restrain impulsive behavior to reach future goals. In the end, it is one’s

level of self-control that will determine whether an individual can resist temptation (Horváth et al., 2015). In other words, one's level of self-control determines one's susceptibility for scarcity. Cheung et al. (2015) showed that consumers with lower levels of self-control are more susceptible to scarcity than consumers with higher levels of self-control. That is because consumers with lower levels of self-control instantly respond to their consumption impulses to fulfill their needs, which will make them more susceptible to scarcity than consumers with higher levels of self-control (Guan & He, 2018). Thus, the effectiveness of scarcity depends on one's level of self-control but can also affect one's level of self-control.

An individuals' level of self-control can determine one's purchase intention. Zhong et al. (2018) have found that self-control is negatively correlated with purchase intention. To be specific, consumers with lower levels of self-control will have more impulsive purchase behavior and have a higher purchase intention than consumers with higher levels of self-control (Kaur & Singh, 2018; Efendi et al., 2019). Furthermore, Achtziger et al. (2015) showed that consumers with lower levels of self-control have more problems with impulse control, which results in higher credit card expenditures, than consumers with higher levels of self-control. This can be explained by the fact that consumers with lower levels of self-control have less self-discipline, and therefore make more impulsive purchases (Achtziger et al., 2015).

Contrary to these studies, Rozana et al. (2020) have found that the effect of self-control on impulsive buying is low. However, with respect, there are some limitations in that study that may question the generalizability of the results. Firstly, only Unisba University students are used in the sample of that study, which is not an accurate representation of the population. Secondly, no additional information is offered about the sample of that study (e.g., no distribution of participants gender and age and no information about sample size). Thirdly, no information is provided on the stimuli, operationalization of constructs or

Cronbach Alpha scores. Lastly, no descriptive statistics (e.g., mean scores and standard deviations) or detailed descriptions of the analyses are provided. Consequently, with respect it is questionable whether the results can be generalized to the population.

Young et al. (2018) argue that an individual's level of self-control is highly affected by their social environment, because individuals will look at their social environment and will change their behavior to that of others (Eisenberg, 2020). The effect of social environment on individuals' level of self-control is also found in the study by Laran (2019). Pandey (2015) argues that this effect can be explained by the fact that individuals in some cultures focus more on certain behaviour or values that are related with higher levels of self-control, than in other cultures. Li et al. (2018) have found that Chinese consumers have higher levels of self-control than American consumers. Pandey (2015) argues that culture can shape individuals' levels of self-control. Consequently, this can affect one's purchase intention (Eisend, 2008). Imelia and Ruswanti (2017) conclude that social environments can affect consumers' online purchase intention. To be specific, if self-control is high in one's environment this will increase one's level of self-control, which will decrease one's purchase intention. Therefore, the social environment of consumers has an effect on both self-control and on purchase intention.

Concluding, previous research demonstrates the relationship between self-control and demand-induced scarcity. In a way, that consumers with lower levels of self-control are more susceptible to demand-induced scarcity and have a higher purchase intention, than consumers with higher levels of self-control. Hence, the following hypotheses are formulated:

H2: Consumers with lower levels of self-control will be influenced more by demand-induced scarcity in online retail environments than consumers with higher levels of self-control.

H3: Consumers with lower levels of self-control will have a higher purchase intention than consumers with higher levels of self-control.

2.3 Cultural Background

A culture is defined as “the collective programming of the mind that distinguishes the members of one group or category of people from other groups” (Hofstede, 2010, p. 88).

Culture can affect behaviour of individuals, and can influence their susceptibility to persuasive tactics (Kumar & Pansari, 2016). Yildirim (2016) for example, showed that cultural values can affect consumers’ purchase intention in online retail environments.

In recent years a couple of frameworks have been developed to study cultures, and one of them is the cultural framework of Hofstede (2010), which describes five different cultural dimensions. Engelen and Brettel (2011) argue that it is the most effective framework to analyse cultural differences. On the other hand, there has been some criticism to Hofstede’s framework, because it puts a national cultural index to one person (Hoehle et al., 2015). Despite these comments, Rosillo-Díaz et al. (2019) argue that it is still one of the most effective frameworks to analyse cultures, and therefore it will be used in this study to compare cultures.

One of the dimensions of Hofstede’s framework is indulgence, which is defined as “the extent to which people try to control their desires and impulses” (Hofstede, 2010). Laran (2019) states that indulgence occurs when people act upon their impulses and neglect their long-term goals. Hence, when they choose in favour of their long-term goals, self-control is used (Ladeira et al., 2018). Therefore, you could say that self-control is the opposite of indulgence. In high indulgent cultures consumers instinctive needs are more likely to be gratified than in low indulgent cultures, because in high indulgent cultures it is socially accepted to act upon desires, such as having fun and spending money on non-necessities (Guo

et al., 2018). In contrast, in low indulgent cultures it is less socially accepted to act upon these needs (Hofstede, 2021).

Low levels of self-control and indulgence are highly related, and can lead to negative behavior (Fatima et al., 2020). Laran (2019) found that indulgence may lead to obesity, addiction or debt. Fatima et al. (2020) explain that this negative behavior is a result of the inability of consumers to use self-control. In line with that study, Ladeira et al. (2018) reveal that consumers in high indulgent cultures encounter self-control failure, which increases their purchase intentions. In contrast, consumers in low indulgent cultures use self-control as a mechanism to resist temptation, which will decrease purchase intentions (Ladeira et al., 2018). Thus, the level of indulgence within a culture can affect consumers' purchase intention, because consumers mainly base their purchase decisions on individual cultural values (Rosillo-Díaz et al., 2019). Yildirim et al. (2016) also showed this effect. In their study, they analysed online shopping data from consumers in 54 different countries. The results reveal that consumers in high indulgent cultures make more online purchases and spend more money than consumers in low indulgent cultures (Yildirim et al., 2016). Another study of Ruiz-Equihua et al. (2019) reveals that high indulgent countries have higher booking intentions than low indulgent cultures. Thus, it is expected that consumers in high indulgent cultures have a higher purchase intention than consumers in low indulgent cultures.

The relationship of scarcity with other cultural dimensions is widely studied. Orji (2016) for example, investigated the effect of individualistic cultures (versus collectivistic) on consumers' susceptibility to scarcity. This study showed that consumers in individualistic cultures are indeed more susceptible to scarcity than consumers in collectivistic cultures, due to the fact that they want to buy products that make them special (Orji, 2016). Moreover, Abdullahi et al. (2017) showed that cultural differences, such as cognitive skills, can influence the effect of persuasive strategies. Yet, the study of Pandey (2015) is the only study that

investigated the relationship between indulgence, compulsive buying and scarcity. The results reveal that scarcity has a positive effect on consumers' compulsive buying in both low and high indulgent cultures. However, this study only looked at limited time scarcity and not at limited quantity scarcity (Pandey, 2015). Hence, multiple studies state that de limited quantity scarcity has a much more positive effect on the purchase intention of consumers than limited time scarcity (Hmurovic et al., 2016; Jang et al., 2015). Therefore, this study investigates the effect of limited quantity scarcity on purchase intention. It is expected that limited quantity scarcity will positively influence purchase intentions of consumers.

In order to investigate the effect of cultural background on the relationship between demand-induced scarcity and purchase intention, two different cultures are selected. The cultural index of Hofstede (2010) revealed that the Netherlands scores high on indulgence, with an average score of 68 on a scale of 100, which makes it a high indulgent culture (Hofstede, 2020). In opposite, China scores low on indulgence with an average score of 24, which makes it a low indulgent culture. Based on this index, this study compares the Chinese culture with the Dutch culture.

Concluding, past research has shown that cultural background affects a consumers' susceptibility to scarcity. However, to our knowledge no research has yet been done on the effect of indulgence on the relationship between demand-induced scarcity and purchase intention. It is expected that consumers in high indulgent cultures are more susceptible to demand-induced scarcity than consumers in low indulgent cultures. Hence, the following hypothesis is formulated:

H4: Consumers in high indulgent cultures will be influenced more by demand-induced scarcity in online retail environments than consumers in low indulgent cultures.

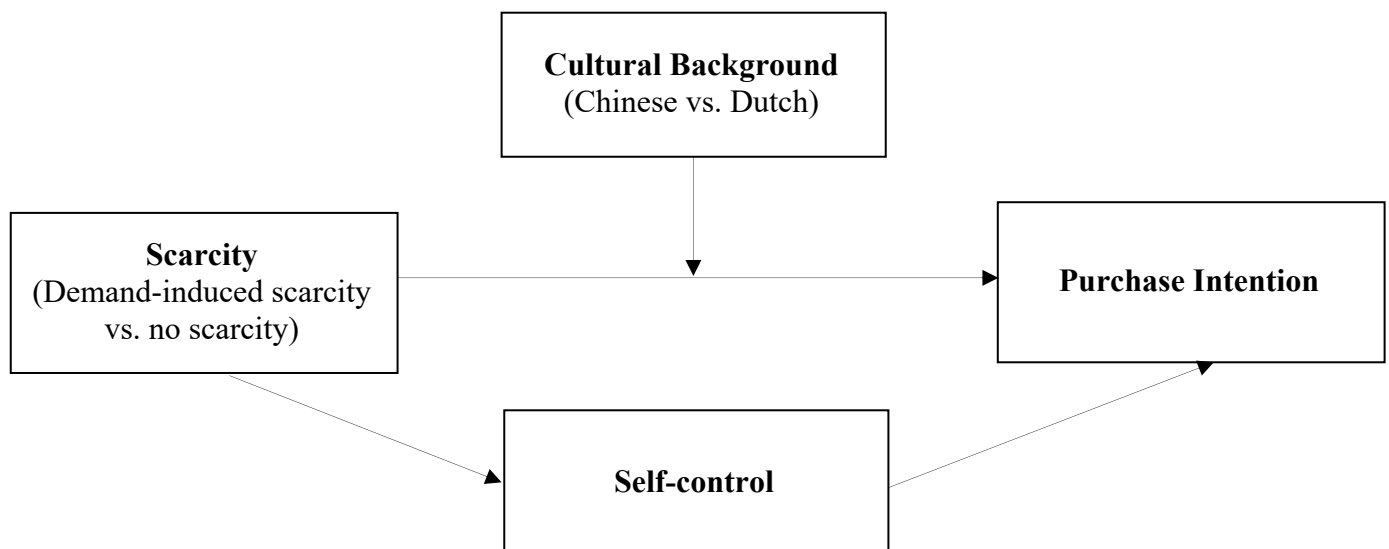
3. Method

3.1 Design

To test the hypotheses a 2 by 2 between-subject factorial design was used. The independent variable in this study was scarcity (demand-induced scarcity versus no scarcity), the mediating variable was self-control, the moderating variable was cultural background (Chinese versus Dutch) and the dependent variable was purchase intention. An illustration of the conceptual model can be seen in Figure 1. As noted, this study is a follow-up study to the study of Wentink (2019). Therefore, some sections may overlap.

Figure 1

Illustration of the Conceptual Model



3.2 Stimuli

In this study two different stimuli were used to examine the effect of scarcity on purchase intention, one with demand-induced scarcity and one without scarcity. All the information on both stimuli was the same, except from the manipulation of the pop-up message. To be specific, both stimuli comprised of a webshop background, and on top of this

background was a pop-up that showed a product and context information. The stimulus with demand-induced scarcity can be found in Figure 2 and the stimulus with no scarcity can be found in Figure 3. The results from the stimuli pilot study can be found in Appendix A.

Figure 2

Illustration of Stimulus with Demand-Induced Scarcity

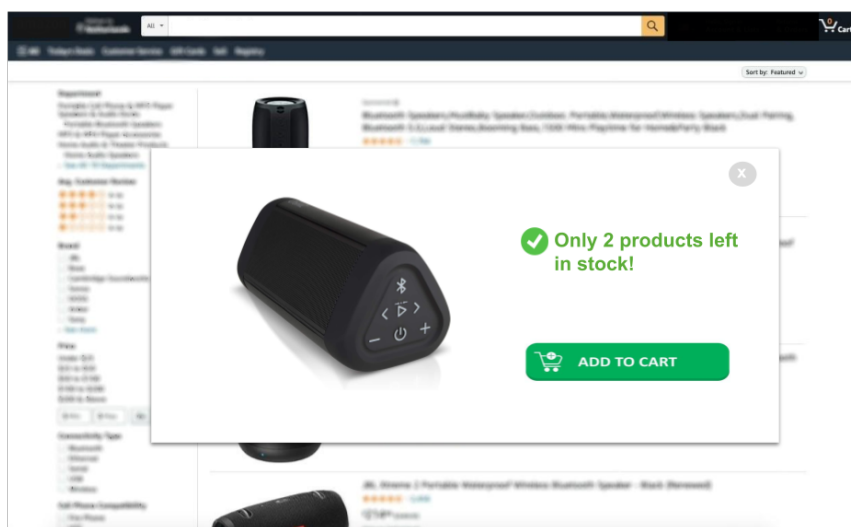
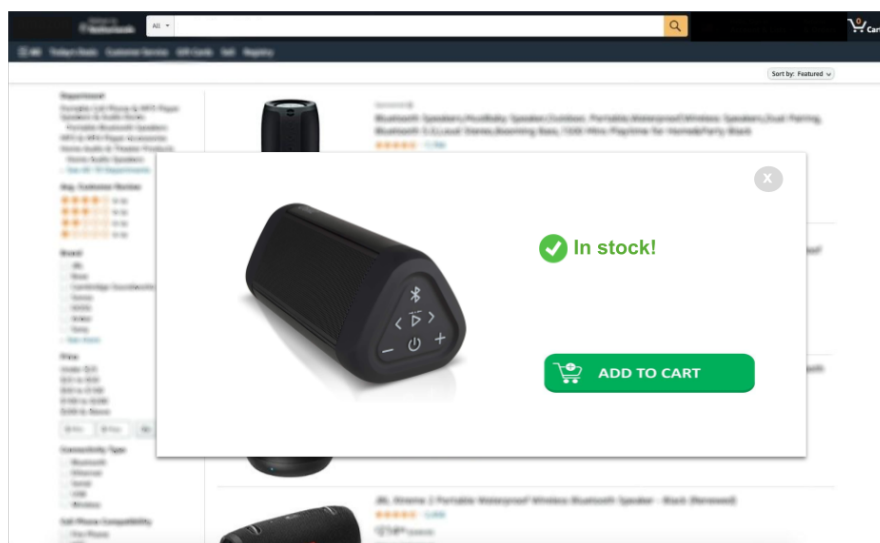


Figure 3

Illustration of Stimulus with No Scarcity



Webshop background. The webshop background is based on an existing webshop, namely Amazon. Amazon was used in the stimuli because the results of the pilot study showed that Amazon was perceived as a realistic and convenient webshop, by both Chinese and Dutch consumers. To make the stimuli as realistic as possible, most information that is offered in the stimuli is derived from the existing webshop from Amazon. Yet, to rule out the potential risk of attentional bias the information is blurred out. In addition, the logo is deleted because this could also affect a person's attention.

Product. The product is posited left on the pop-up. Urminsky and Zauberan (2016) argue that scarcity is most effective for non-consumable goods (e.g., laptops, TVs and Bluetooth speakers). In line with that study, Roy and Sharma (2015) analysed over 20 studies and also concluded that the positive effect of scarcity on self-control is larger for products that involve alcohol, cigarettes, health, food and non-consumable goods. Therefore, this study uses the non-consumable Bluetooth speaker as product.

Context information. Context information is posited right on the pop-up. The difference between the stimuli is the manipulation of the pop-up message (i.g., one message with demand-induced scarcity and one without scarcity). Meta-analysis by Oruc (2015) reveal that demand-induced scarcity messages are most of the time formulated as “only 2 products left in stock” and no scarcity messages are formulated as “in stock”. Based on the study by Oruc (2015), this study also presented the demand-induced scarcity pop up message as “Only 2 products left in stock” and the no scarcity pop up message as “In stock”. Just as in the existing webshop, an “add to cart” button was provided in the pop-up. However, in the existing webshop the ‘add to cart’ button is orange. Yet, to make the button more prominently visible, in the stimuli it is changed to green. Furthermore, the existing webshop offers other context information on the pop-up (i.g., product price and reviews of other consumers).

However, this information can also lead to attentional bias, and to rule out the risk of such biases this information is excluded in the stimuli.

3.3 Participants

The initial sample of this study consisted of 393 participants. 6 participants were eliminated because they did not fall within the target audience (18 till 60 years old). 95 participants were removed because they did not answer all the questions of the questionnaire.

Three questions were asked to assess the cultural background of participants, and one of those questions is “To what ethnic group do you belong?”. This study compares Dutch consumers with Chinese consumers, thus participants that answered a different ethnic group (e.g., Italian) were eliminated ($N = 13$). The other two questions concerning the cultural background of participants were “In what country were you born?” and “In what country do you live?”. Participants that were not born in or were currently not living in China or the Netherlands were eliminated from the sample ($N = 23$). In addition, there were 33 participants that identified themselves with the Chinese culture and were born in China but are currently living in the Netherlands, see Table 1. To determine whether these participants could be accepted to the sample a randomization check was conducted, with a MANCOVA. The dependent variable was cultural background and the independent variables were age, gender and educational level. The results of the randomization check revealed that the participants’ age and gender were equally divided among the conditions. However, the participants’ educational level was not equally divided among the conditions. Yet, exclusion of those 33 participants would not lead to a difference in the deviation of educational level. To investigate whether could be a significant difference, two factorial ANOVA’s were performed, one with the 33 participants included and one with the participants excluded. The independent variables were age, gender and educational level, and the dependent variable was country

living. The first ANOVA (with 33 participants in sample) did not show a significant main effect of age, $F(1, 113) = 1.09, p = .35, \eta_{\text{partial}}^2 = .21$, did not show a significant main effect of gender $F(1, 113) = 0.78, p = .38, \eta_{\text{partial}}^2 = .01$, but did show a significant main effect of educational level $F(4, 113) = 1.10, p = .001, \eta_{\text{partial}}^2 = .13$. The second ANOVA (without the 33 participants) also did not show a significant main effect of age, $F(1, 105) = 1.04, p = .43, \eta_{\text{partial}}^2 = .22$, did not show a significant main effect of gender $F(1, 105) = 1.42, p = .24, \eta_{\text{partial}}^2 = .01$, and also did show a significant main effect of educational level $F(4, 105) = 0.95, p = .001, \eta_{\text{partial}}^2 = .14$. Given these results it can be concluded that it makes no significant difference in the deviation of the sample when these participants were removed. Therefore, these 33 participants were accepted to the sample, leaving a usable sample of $N = 256$.

Table 1

Overview of the Country Participants Live In and the Country They Are Born In ($N = 256$)

		Country born		
		China	The Netherlands	Total
Country living	China	81	0	81
	The Netherlands	33	142	175
Total		114	142	256

The Dutch subsample ($n = 142$) consisted of 60 males and 82 females, with a mean age of 29 years ($SD = 9.71$). The Chinese subsample ($n = 114$) consisted of 45 males and 69 females, with a mean age of 26 years ($SD = 6.78$). Concluding, the final sample consisted of 256 participants (105 males and 151 females), the mean age was 28 ($SD = 8.61$). The

education level of participants can be found in Table 2. As can be seen, 53% of all the participants finished university and 30% finished higher education.

Table 2

Overview of Participants Educational Level and Cultural Background (N = 256)

		Cultural background		
		Chinese	Dutch	Total
Educational level	Elementary school	1	3	4 (2%)
	High school	9	9	18 (7%)
	Middle level education	3	19	22 (9%)
	Higher education	20	56	76 (30%)
	University	81	55	136 (53%)
Total		114	142	256

3.4 Instrumentation

The questionnaire starts with an introduction, in which the purpose of this study is described. Furthermore, it is made clear that participation in this questionnaire is completely voluntary and that participants have the right to withdraw from the research at any time. In addition, participant's confidentiality is promised. In this questionnaire, answers were given on a 5-point scale, ranging from *completely disagree* to *completely agree*. See Appendix B for the written questionnaire.

Demographics. Three demographic questions were asked, adapted from Wentink (2019). The items were as follows: (1) "What is your gender?", (2) "What is your age in years?", (3) "What is the highest level of education you have completed?" In addition, three

questions were asked with regards to the cultural background of participants, adapted from Broeder et al., (2012) and Wentink (2019). The items were as follows: (1) “What country were you born in?”, (2) “In what country do you live at the moment?”, and (3) “To what ethnic group do you belong?”.

Purchase intention. Purchase intention was measured with one statement, adapted from Wentink (2019). The item was as follows: “I would like to buy this product”. The mean score on this scale was 2.87 ($SD = 1.23$).

Perceived scarcity. Perceived scarcity consisted of two subconstructs, the first measuring webshop scarcity and the second measuring product scarcity. Webshop scarcity was measured with five items, adapted from Wentink (2019). The items were as follows: (1) “The webshop is exclusive”, (2) “The webshop creates a sense of urgency”, (3) “I need to act quickly on this webshop”, (4) “This webshop is inconvenient”, and (5) “I feel pressured by this webshop”. Product scarcity was measured with two items, adapted from Gupta and Gentry (2016). The items were as follows: (1) “This product seems highly demanded”, (2) “I think this product sells out fast”. The fourth item of the webshop scarcity construct was recoded (i.g., “This webshop is inconvenient”), and the scores were computed, by calculating the mean scores of all the items of both subconstruct taken together. The Cronbach α from all the seven items together was respectively $\alpha = .902$. The mean score on this scale was 2.93. ($SD = 1.08$).

Self-control. Self-control was measured with six items, adapted from Unger et al. (2016). The items were as follows: (1) “I am good at resisting temptation”, (2) “I never allow myself to lose control.”, (3) “I have trouble saying no”, (4) “I have iron self-discipline”, (5) “I am impulsive”, and (6) “I am able to work efficiently towards long-term goals”. The third item (i.g., “I have trouble saying no”) and the fifth item (i.g., “I am impulsive”) were recoded

and the scores were computed, by calculating the mean scores of the six items together. The Cronbach α was respectively $\alpha = .879$. The mean score on this scale was 3.11 ($SD = 0.96$).

Indulgence. Indulgence was measured with five items, adapted from Rarick et al. (2014). The items were as follows: (1) “I always buy something to feel better”, (2) “Buy now, think about it later describes me”, (3) “I make a thorough plan before making purchase decisions”, (4) “I make purchase decisions impulsively”, and (5) “If I see something I want, I buy it”. The third item (i.g., “I make a thorough plan before making purchase decisions”) was recoded and the scores were computed, by calculating the mean scores of the five items together. The Cronbach α was respectively $\alpha = .715$. The mean score on this scale was 2.99 ($SD = 1.23$).

Final review. To test whether participants perceived the stimuli as realistic, two statements were offered, adapted from Wentink (2019). The statements were as follows: (1) “I think the webshop is realistic” and (2) “I think the price is missing”. In addition, to test whether the manipulation of the stimuli was successful two statements were offered, adapted from Wentink (2019). The statements were as follows: (1) “I noticed that the webshop showed the message “Only 2 products left in stock”” and (2) “I noticed that the webshop showed the message “In stock””. Answers were given with a yes or no.

3.6 Pilot Study Questionnaire

To spot potential weaknesses of the questionnaire and to test the feasibility, a pilot study was conducted. This pilot study consisted of two different pre-tests that were conducted via Zoom. In the first pre-test, the thinking-aloud method was used, in which participants had to share their thoughts as they moved through the survey. 3 participants finished this pre-test (1 Chinese and 2 Dutch participants). For the second pre-test the debriefing method was used, in which participants had to answer a standard set of debriefing questions (e.g., “Did you see

the message “Only two products left in stock?””). For this part, 3 other participants finished the test (1 Chinese and 2 Dutch participants).

Results from both pre-tests revealed that participants found the questionnaire clear and convenient. Two participants did not understand the relevance of the questions “What ethnic group do you belong to?” because there were also two other questions about culture. Yet, the study of Broeder et al. (2012) revealed that in cross-culture research it is relevant to ask those three questions. Therefore, this question is not removed. In addition, 5 out of 6 participants argued that they were not able to answer all the questions accurately, since they did not see the stimuli long enough. Therefore, in the final version of the questionnaire the stimuli are showed a few times. Furthermore, 4 out of 6 participants indicated that they did not understand the question: “People say that I have iron self-discipline”. In their opinion, it was double barreled. Therefore, in the final questionnaire the question is changed to: “I have iron self-discipline”.

The last step of this pilot study was to test the survey flow of the questionnaire in Qualtrics. By the preview survey mode, it was possible to move through the survey multiple times. This test revealed that the randomization and branched control questions worked fine, hence the survey flow worked as supposed. In the end, the questionnaire data was exported to SPSS to check whether all the data was exported correctly.

3.7 Procedure

The questionnaire was made via Qualtrics and an anonymous link was distributed via LinkedIn, Instagram and WhatsApp. Both Dutch and Chinese participants were gathered through convenient sampling. Before participants could start the questionnaire, they had to give informed consent. Then, participants had to answer demographic questions. Subsequently, participants were randomly assigned to one of the two conditions: one in which

they did see demand-induced scarcity and one in which they did see no scarcity, see Table 3 for the overview of the distribution of participants per condition. Afterwards, participants had to answer multiple questions and statements. Finally, participants were thanked for their contribution to this study, and contact details of the researcher were provided. Finishing the questionnaire took around four minutes.

Table 3

Overview of the Distribution of Participants per Condition (N = 256)

	Condition		
	Scarcity	No scarcity	Total
Chinese	54	60	114
Dutch	96	46	142
Total	150	106	256

4. Results

As noted, this study is a follow-up study to the study of Wentink (2019). Therefore, some sections may overlap.

4.1 Preliminary Analyses

Two preliminary analyses were performed to check whether the manipulation was successful. Firstly, a cross-tabulation analysis was conducted to test if participants successfully indicated that they had seen the correct message, see Table 4. 120 (80%) participants that had seen the demand-induced scarcity stimuli successfully indicated that they had seen the correct message and 30 (20%) participants failed to indicate the correct message. Furthermore, 86 (81%) participants that had seen the no scarcity stimuli successfully indicated that they had seen the correct message and 20 (19%) failed to indicate the correct message. Based on these results, it can be concluded that the manipulation was successful. It is worth noting that this study is a follow-up study to the study of Wentink (2019), therefore some sections may overlap.

Table 4

Results of the Manipulation Check (N = 256)

	Demand-induced scarcity	No scarcity
	N = 150	N = 106
Successfully indicated the correct message	120 (80%)	86 (81%)
Failed to indicate the correct message	30 (20%)	20 (19%)

Secondly, three other manipulation questions were asked to see if the manipulation was successful. Firstly, the statement “I think the webshop is realistic” was asked. 39 (15%)

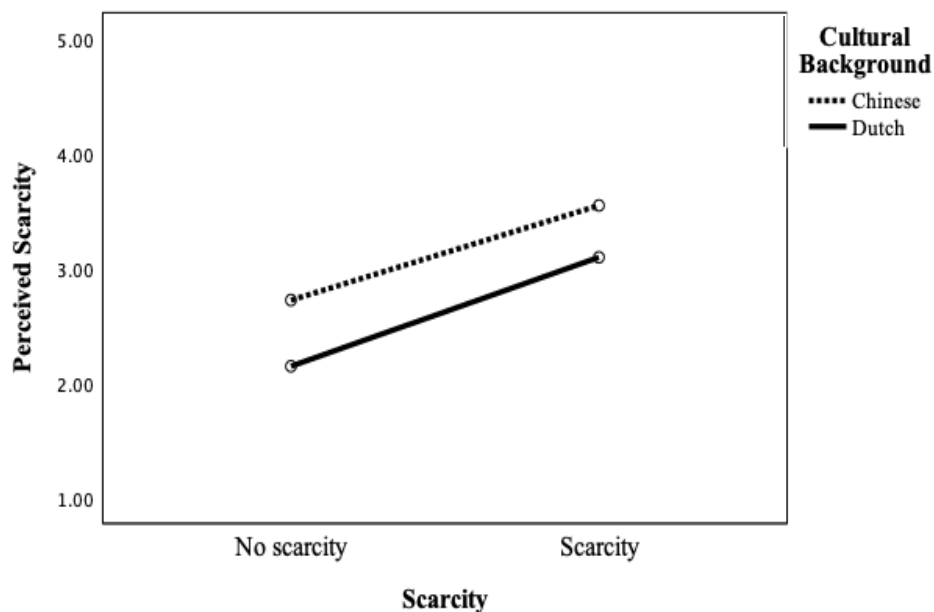
participants disagreed with that statement. Secondly, the statement “There seems to be a limited number of products available” was asked. In the scarcity condition 30 (20%) participants disagreed with the statement. In the no scarcity condition 56 (52%) participants disagreed with the statement. Lastly, the statement “I think the price was missing” was asked. 32 (13%) disagreed with the statement. Since not many participants disagreed with these statements it is expected that the manipulation was successful.

To test statistically if participants perceived the demand-induced scarcity stimuli as scarcer than the no scarcity stimuli, a factorial ANOVA was conducted. The independent variables were scarcity (demand-induced scarcity versus no scarcity) and cultural background (Chinese versus Dutch), and the dependent variable was perceived scarcity. The data was not normally distributed for cultural background, because the Chinese participants scored $z_{skewness} = -0.28$; $z_{kurtosis} = -1.97$ and the Dutch participants scored $z_{skewness} = 1.92$; $z_{kurtosis} = -2.07$. In addition, the data of perceived scarcity for both demand-induced scarcity and no scarcity were normally distributed, since the scores of Kurtosis and Skewness were between -1.95 and 1.95. Furthermore, the assumption of homogeneity of variances was met, because the Levene’s test of equality of error variances was not significant, $F(3,252) = 1.32$, $p = .27$. Since that data was not normally distributed the p-value may not be reliable and more weight should be placed on the bootstrapped 95% confidence interval that will be provided. Furthermore, the factorial ANOVA is fairly robust against the violations of these assumptions. Yet, the results must be interpreted with caution. The factorial ANOVA did show a significant main effect of scarcity $F(1, 252) = 47.93$, $p < .001$, $\eta_{\text{partial}}^2 = .16$, this represents a large-sized effect. On average, perceived scarcity ($M = 3.26$, $SD = 1.04$, 95% BCa CI [3.09, 3.41]) was higher for participants that had seen demand-induced scarcity than for consumers that had seen no scarcity ($M = 2.47$, $SD = 0.98$, 95% BCa CI [2.29, 2.64]), see Figure 4. This indicates that participants did perceive the demand-induced scarcity stimuli as scarcer than the no scarcity

stimuli. Furthermore, there was also a significant main effect of cultural background, $F(1, 252) = 16.10, p < .001, \eta_{\text{partial}}^2 = .06$, this represents a medium-sized effect. On average, perceived scarcity for participants with a Chinese cultural background ($M = 3.11, SD = 1.06, 95\% \text{BCa CI } [2.94, 3.30]$) was higher than for participants with a Dutch cultural background ($M = 2.79, SD = 1.08, 95\% \text{BCa CI } [2.60, 2.95]$). This indicates that that Chinese consumers did perceive both stimuli as scarcer than the Dutch consumers. Finally, there was no significant interaction effect, $F(1, 252) = 0.24, p = .628, \eta_{\text{partial}}^2 = .001$, this represents a small-sized effect. Given these results it can be concluded that the demand-induced scarcity stimuli indeed is perceived as scarcer than the no scarcity stimuli, for both Chinese as Dutch participants. Yet, the Chinese participants did perceive both stimuli as scarcer than the Dutch participants. Given these results, it can be concluded that the manipulation was successful.

Figure 4

Illustration of Perceived Scarcity of Stimuli Divided by Cultural Background



4.2 Descriptive Statistics

Table 5 shows the different scores of participants that had seen demand-induced scarcity and participants that had seen no scarcity on four main variables. As can be seen, participants that had seen demand-induced scarcity ($M = 3.12$, $SD = 1.19$) had a higher purchase intention than participants that had seen no scarcity ($M = 2.52$, $SD = 1.22$). In addition, participants that had seen demand-induced scarcity ($M = 3.26$, $SD = 1.04$) scored higher on perceived scarcity than participants that had seen no scarcity ($M = 2.47$, $SD = 0.98$). Furthermore, participants that had seen demand-induced scarcity ($M = 3.21$, $SD = 0.93$) scored higher on self-control than participants that had seen no scarcity ($M = 2.98$, $SD = 0.99$). Participants that had seen demand-induced scarcity ($M = 2.87$, $SD = 0.96$) scored lower on indulgence than participants that had seen no scarcity ($M = 3.17$, $SD = 1.05$).

Table 5

Mean Scores and Standard Deviation of Four Variables Divided by Condition

	Condition		
	Scarcity ($N = 150$)	No scarcity ($N = 106$)	Total ($N = 256$)
Purchase intention	3.12 (1.19)	2.52 (1.22)	2.87 (1.24)
Perceived scarcity	3.26 (1.04)	2.47 (0.98)	2.93 (1.08)
Self-control	3.21 (0.93)	2.98 (0.99)	3.11 (0.96)
Indulgence	2.87 (0.96)	3.17 (1.05)	2.99 (1.01)

Table 6 shows the different scores of participants with Chinese cultural background and Dutch cultural background on four main variables. As can be seen, Dutch participants ($M = 2.93$, $SD = 1.28$) had a higher purchase intention compared to the Chinese participants ($M = 2.80$, $SD = 1.18$). Furthermore, Dutch participants ($M = 2.71$, $SD = 0.86$) scored lower on self-

control than Chinese participants ($M = 3.46$, $SD = 0.83$). In addition, Dutch participants ($M = 3.43$, $SD = 0.97$) scored higher on indulgence than Chinese participants ($M = 2.45$, $SD = 0.76$).

Table 6

Mean Scores and Standard Deviation of Four Variables Divided by Cultural Background

	Cultural background		
	Chinese ($N = 114$)	Dutch ($N = 141$)	Total ($N = 256$)
Purchase intention	2.80 (1.18)	2.93 (1.28)	2.87 (1.24)
Perceived scarcity	3.11 (1.06)	2.77 (1.08)	2.93 (1.08)
Self-control	3.46 (0.83)	2.71 (0.86)	3.11 (0.96)
Indulgence	2.45 (0.76)	3.43 (0.97)	2.99 (1.01)

Table 7 shows the correlation coefficients of the four main variables in this study. As can be seen, scarcity is negatively correlated with purchase intention ($r = -.71$, $p < .001$) and indulgence is negatively correlated with self-control ($r = -.82$, $p < .001$). Even though the predictors are negatively correlated, it is not expected that multicollinearity is a problem. The scores were rather low, but not so low that a floor effect is present. Hence, there is still enough variance to warrant a regression analysis.

Table 7*Correlation Coefficients of the Four Main Variables (N = 256)*

	1	2	3	4
1. Purchase Intention	1.00			
2. Scarcity	-0.71	1.00		
3. Self-control	-0.01	0.11	1.00	
4. Indulgence	0.03	-0.09	-0.82	1.00

Note. Significant correlations at the 1-tailed level are in **boldface**. Correlation is significant at 0.05.

4.3 Test of Hypotheses

4.3.1 The Effect of Demand-Induced Scarcity on Purchase Intention

In the first hypothesis, it is described that demand-induced scarcity in online retail environments will increase the purchase intention of consumers. To investigate if there indeed is a relationship between demand-induced scarcity and purchase intention, an independent sample t-test is performed. The data was normally distributed since the scores of Kurtosis and Skewness were between -1.95 and 1.95. On average, the purchase intention of consumers that had seen demand-induced scarcity ($M = 3.12$, $SD = 1.19$) was higher than the consumers who had seen no scarcity ($M = 2.52$, $SD = 1.22$). This difference was significant, $M_{dif} = 0.60$, $t(254) = 3.95$, $p < .001$, BCa CI [0.30, 0.90]. The difference represents a medium-sized effect $d = 0.5$. This indicates that demand-induced scarcity indeed has a positive effect on purchase intention. Therefore, it can be concluded that the data supports that demand-induced scarcity in online retail environments will increase the purchase intention of consumers.

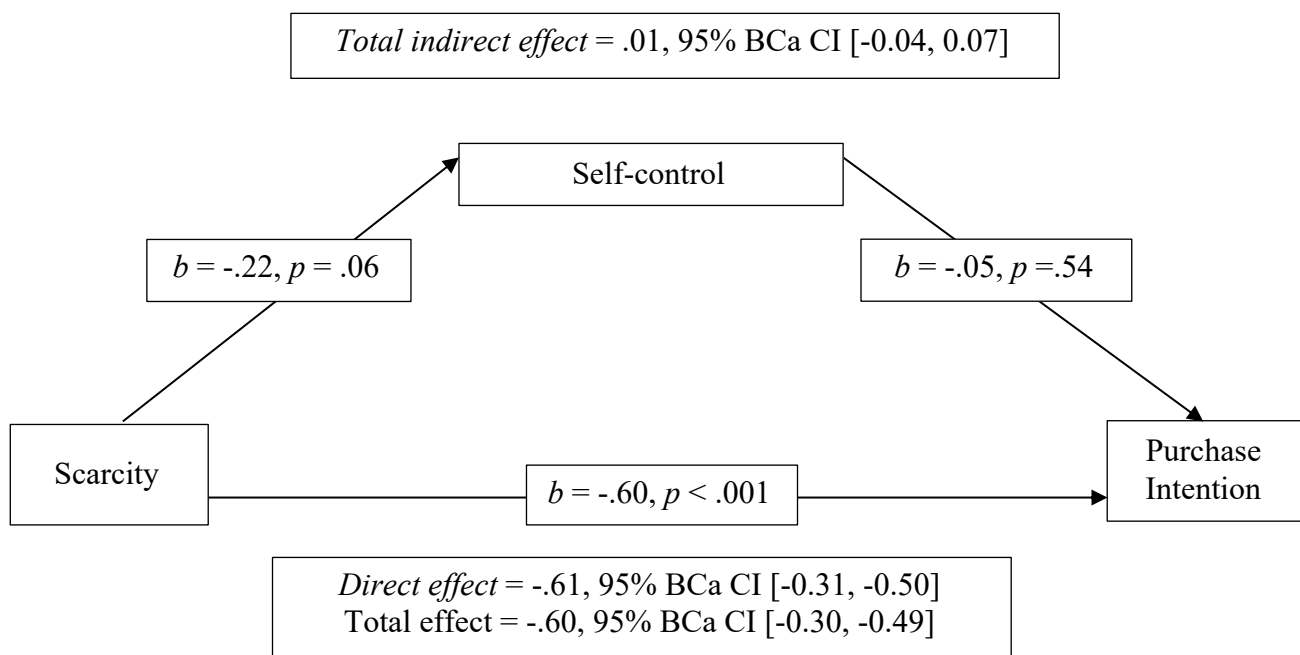
4.3.2 The Mediating Effect of Self-Control

In the second hypothesis it is described that consumers with lower levels of self-control are more susceptible to demand-induced scarcity in online retail environments than consumers with higher levels of self-control, and in the third hypothesis it is described that consumers with lower lower levels of self-control will have a higher purchase intention than consumers with higher levels of self-control. To investigate if self-control indeed has a mediating effect on the relationship between demand-induced scarcity and purchase intention, a mediation analysis using Hayes' PROCESS macro was performed. The predictor variable was scarcity (scarcity or no scarcity), the mediator variable was self-control and the outcome variable was purchase intention. For this final model, there were no cases with a high centered leverage value, a large Mahalanobis distance, a large standardized residual or a worrisome Cook's Distance. Therefore, there is no great concern regarding influential cases. In addition, the residuals were checked. There were 6 cases with a standardized residual score greater than 2 and there was no case of a score greater than 3, so no great cause for concern. Analysis of collinearity statistics show this assumption has been met, as VIF scores were well below 10, and tolerance scores above 0.2 (statistics = 1.01 and .99 respectively). The Durbin-Watson statistic show that this assumption had been met, as the obtained value was close to 2 (Durbin-Watson = 1.78). The plot of standardised residuals versus standardised predicted values shows no obvious signs of funnelling, suggesting the assumption of homoscedasticity has been met. The P-P plot for the model suggested that the assumption of normality of the residuals is also met, since it looks perfectly normal. Therefore, it can be concluded that all assumptions have been met. The results of the mediation analysis can be found Figure 5. The model shows that demand-induced scarcity was not significantly related to self-control. However, it almost did reach significancy. Yet, the bootstrap confidence interval did cross zero. Therefore, this individual indirect effect should be interpreted with caution.

Furthermore, self-control was not significantly related to purchase intention. In line with the results of the independent sample t-test, there was a significant total effect of demand-induced scarcity on purchase intention $b = -0.60$, 95% CI $[-0.30, -0.49]$, $t = -3.95$, $p < .001$. Thus, demand-induced scarcity in online retail environments will increase the purchase intention of consumers. This effect remained almost the same when adding the mediator to the model, the direct effect was significant $b = -0.61$, $SE = 0.15$, $p < .001$, BCa CI $[-0.31, -0.50]$. The total indirect effect was not significant $b = 0.01$, $SE = 0.03$, 95% BCa CI $[-0.04, 0.07]$, so it is not permitted to interpret the individual indirect effects. Given these results it can be concluded that self-control does not mediate the relationship between demand-induced scarcity and purchase intention.

Figure 5

Model with Demand-Induced Scarcity as Predictor of Purchase Intention, Mediated by Self-Control



4.3.3 The Moderating Effect of Cultural Background

In the fourth hypothesis, it was described that cultural background moderated the relationship between demand-induced scarcity and purchase intention. To be specific, consumers in high indulgent cultures will be more susceptible to scarcity than consumers in low indulgent cultures. It is expected that Dutch consumers score higher on indulgence than Chinese consumers. To investigate if Dutch consumers indeed score higher on indulgence than Chinese consumers, a one-way ANOVA was performed. The independent variable was cultural background and the dependent variable was indulgence. The data was not normally distributed, because the Chinese participants scored $z_{skewness} = -0.28$; $z_{kurtosis} = -1.40$ and the Dutch participants scored $z_{skewness} = -0.86$; $z_{kurtosis} = -2.61$. Therefore, the p-value may not be reliable and more weight should be placed on the bootstrapped 95% confidence interval that will be provided. The assumption of homogeneity of variances was also not met, because the Levene's test of equality of error variances was significant, $F(1,254) = 15.29, p < .001$. For this reason, the Welch statistic will be reported. On average, Dutch consumers ($M = 3.43, SD = 0.97, 95\% \text{ BCa CI } [3.27, 3.58]$) scored higher on indulgence than Chinese consumers ($M = 2.45, SD = 0.76, 95\% \text{ BCa CI } [2.87, 3.12]$). This difference was significant (Welch) $F(1,256) = 81.28, p < .001, \eta^2 = .30$, this represents a large-sized effect. Based on this analysis, it can be concluded that Dutch consumers score higher on indulgence than Chinese consumers.

Since there was a difference between the scores on indulgence between Dutch consumers and Chinese consumers, a moderation analysis can be performed to investigate if cultural background has an effect on the relationship between demand-induced scarcity and purchase intention. The moderation analysis was performed using Hayes' PROCESS. The predictor variable was scarcity (scarcity or no scarcity), the moderating variable was indulgence, and the outcome variable was purchase intention. Just as in the mediating analysis

all the assumptions have been met. For a more detailed description see 4.2.1. The results of the moderation analysis can be found Table 8. The overall model was significant, $R^2 = .07$, $F(3, 256) = 6.57, p < .001$. This means that both indulgence and demand-induced scarcity had a main effect on purchase intention. In line with the results of the other analyses, demand-induced scarcity is related to purchase intention ($b = -0.62$, 95% BCa CI [-0.92, -0.31], $SE = 0.15, p < .001$). Furthermore, indulgence had no significant effect on purchase intention ($b = 0.10$, 95% BCa CI [-0.53, 0.24], $SE = 0.08, p = 0.21$). Consequently, it can be concluded that indulgence has no moderating effect on the relationship between demand-induced scarcity and purchase intention. Furthermore, there was no significant interaction effect between scarcity and indulgence ($b = -0.25$, 95% BCa CI [-0.55, 0.05], $SE = 0.15, p = 0.10$). Based on this analysis, it can be concluded that cultural background has no moderating effect on the relationship between demand-induced scarcity and purchase intention.

Table 8

The Moderating Role of Cultural Background on the Relationship Between Demand-Induced Scarcity and Purchase Intention

	<i>b</i> [95% CI]	<i>SE</i>	<i>t</i>	<i>p</i>
Constant	2.89 [2.74, 3.04]	0.08	38.23	< .001
Scarcity	-0.62 [-0.92, -0.31]	0.15	-4.02	< .001
Indulgence	0.10 [-0.53, 0.24]	0.08	1.27	0.21
Scarcity x Cultural Background	-0.25 [-0.55, 0.05]	0.15	-1.66	0.10

Note. *N* = 256. Bootstrap sample size = 1,000.

Concluding, demand-induced scarcity has a positive effect on the purchase intention of consumers in online retail environments. However, self-control did not mediate this relationship. Yet, there seems to be an effect of demand-induced scarcity on self-control. However, this effect did not reach significance and the bootstrap 95% confidence interval did cross zero, which indicates that this individual effect should be interpreted with caution. In addition, there was a significant difference in the scores on indulgence. Specifically, Dutch consumers score higher on indulgence than Chinese consumers. Yet, indulgence had no moderating effect on the relationship between demand-induced scarcity and purchase intention.

5. Discussion and Conclusion

Results from previous research showed that demand-induced scarcity with limited quantity has a positive effect on the purchase intention of consumers in online retail environments. Furthermore, an individuals' level of self-control will affect this relationship. It is expected that consumers with lower levels of self-control are more susceptible to scarcity and have a higher purchase intention than consumers with higher levels of self-control. Moreover, cultural background can also affect the relationship between demand-induced scarcity and purchase intention. Cultural background can be assessed by indulgence, which has an effect on behavior. It is expected that consumers in high indulgent cultures are more susceptible to scarcity than consumers in low indulgent cultures. Yet, no research has yet been done about this relationship. Therefore, the purpose of this study was to contribute to existing literature and expand knowledge about the effect of demand-induced scarcity on purchase intention. In addition, the mediated effect of self-control and moderated effect of cultural background on this relationship were studied. Cultural background was assessed by two cultures (Chinese versus Dutch) that score different on indulgence. As a result, the main research question was: "*What is the effect of scarcity on consumers' purchase intention and does this vary across cultures?*" Four hypotheses were investigated and the conclusion of the results are described in the following sections. As noted, this study is a follow-up study to the study of Wentink (2019). Therefore, some sections may overlap.

5.1 Findings and Theoretical Implications

In the first hypothesis it is described that demand-induced scarcity will increase the purchase intention of consumers in online retail environments. Godinho et al. (2016) found that scarcity has a positive effect on the purchase intentions of consumers, because they are more likely to base their decisions on heuristics. Furthermore, Gue et al. (01&) found that

demand-induced scarcity will positively influence impulsive behaviour, which will increase purchase intentions. Contradicting, Li et al. (2021) found a negative effect of scarcity on purchase intention. Yet, Li et al. (2021) argue that this negative effect only occurs in the hospitality business, for products that trigger safety concerns during the COVID-19 pandemic. In this study, electronic products in online retail environments are used so it is expected that the negative effects found in that study will not occur. In line with these studies, the results reveal that demand-induced scarcity indeed has a positive effect on the purchase intention of consumers in online retail environments.

In the second hypothesis it is described that that consumers with lower levels of self-control will be more susceptible to demand-induced scarcity than consumers with higher levels of self-control. Laran (2019) found that scarcity can affect people's ability to use self-control. Furthermore, Cheung et al. (2015) found that consumers with lower levels of self-control are found to be more susceptible to scarcity than consumers with higher levels of self-control. Surprisingly, this study did not find a significant effect of scarcity on self-control. Although the effect cannot officially be called significant, it however almost reached significancy. Therefore, it can be concluded that there is some effect. Yet, the bootstrap 95% confidence intervals crossed zero, which indicates that this individual effect should be interpreted with caution.

In the third hypothesis it is described that that consumers with lower levels of self-control will have a higher purchase intention than consumers with higher levels of self-control. Nguyen et al. (2019) found that consumers with lower levels of self-control are more impulsive and have a higher purchase intention. Furthermore, Zhong et al. (2018) showed that self-control is negatively correlated with purchase intention. Consumers with lower levels of self-control will have more impulsive purchase behavior and have a higher purchase intention. Surprisingly, in this study no significant effect of self-control on purchase intention

is found. Although the findings are in contrast with the studies mentioned earlier, they are however in line with the study of Rozana et al. (2020). In that study, it is shown that self-control has a low effect on impulsive buying. Hence, the hypothesis in this study did not predict the same results as Rozana et al. (2020), since the limitations of that study made it questionable whether the results could be generalized to the population. Yet, the results of this study suggest the same.

In the fourth hypothesis it is described that that consumers in high indulgent cultures are more susceptible to demand-induced scarcity than consumers in low indulgent cultures. Orji (2016) for example, found that consumers in individualistic cultures are more susceptible to scarcity and have a higher purchase intention than consumers in collectivistic cultures. A meta-analysis of Oruc (2015) reveals that the effect of indulgence on this relationship has never been studied. Only one study of Pandey (2015) found that impulsive behavior of consumers in both low and high indulgent cultures increased by scarcity. Guo et al. (2017) argue that impulsive behavior can increase purchase intentions. In addition, Yilderim et al. (2016) and Ladeira et al. (2018) reveal that high indulgent cultures have higher shopping expenditures and higher purchase intention than low indulgent cultures. Therefore, this study expected that consumers in high indulgent cultures are more susceptible to demand-induced scarcity than low indulgent cultures. Surprisingly, this study did not find a significant effect. Contrary to what was expected, these results are in line with the study of Pandey (2015).

To conclude, the first hypothesis is confirmed, demand-induced scarcity in online retail environments leads to a higher purchase intention of consumers than no scarcity. The second hypothesis is rejected, consumers with lower levels of self-control are not more susceptible to demand-induced scarcity than consumers with higher levels of self-control. The third hypothesis is rejected, consumers with lower levels of self-control do not have a higher purchase intention than consumers with higher levels of self-control. The fourth hypothesis is

rejected, consumers in high indulgent cultures will not be influenced more by demand-induced scarcity than consumers in low indulgent cultures.

5.2 Practical Implications

Based on the results of this study, there are some practical implications. First of all, demand-induced scarcity is an effective persuasion strategy to increase the purchase intention of consumers. Therefore, it can be effective for companies to use scarcity as a strategy to differentiate themselves from online competitors. Secondly, even though there is an indication of a relationship between demand-induced scarcity and self-control, self-control has no effect on purchase intention. Therefore, companies do not have to take personal differences with regard to self-control into account. Furthermore, indulgence has no mediating effect on the relationship between demand-induced scarcity and purchase intention. This indicates that companies do not have to adapt demand-induced scarcity messages to cultural differences. Concluding, demand-induced scarcity is an effective persuasion strategy to increase purchase intentions of consumers and there are no differences between consumers with lower or higher levels of self-control or consumers in high cultures (Dutch) or low indulgent cultures (Chinese).

5.3 Limitations and Further Research

In this study there are also some limitations, which are described below. The first limitation of this study is that some participants that are included in the sample could affected the results of this study. Three questions were asked to determine the cultural background of participants, namely (1) "What country were you born in?", (2) "In what country do you live at the moment?", and (3) "To what ethnic group do you belong?". There were 33 participants who identified themselves with the Chinese culture, were born in China, but were currently

living in the Netherlands. Normally, these participants are excluded from the sample (Broeder et al, 2012). However, in this study that would have led to a much smaller sample, especially for the Chinese subsample. Therefore, a randomization check was performed to check whether inclusion of these 33 participants would lead to a non-equally divided sample. Results revealed that inclusion of these 33 participants did not lead to a significant difference in the deviation of the sample. Therefore, they were accepted to the final sample. Even though these participants did not lead to a non-equally divided sample, they still could have affected the results. For future research, it would be interesting to search for a larger sample of Chinese participants and to compare results.

The second limitation is that sample in this study did not consist of an accurate representation of the population (only higher educated participants, and an average age of 28 years). This will most likely have affected the results. For future research it is necessary to randomly select the participants so that there is an unbiased sample and representation of the total population.

The third limitation of this study is that there may be questionnaire bias. That is because the questionnaire was written in English, which is not the native language of both Dutch and Chinese consumers. Fortunately, Dutch citizens are found to be very sufficient in speaking and reading English. Hence, they finished on the first place in the global ranking of 100 countries. However, Chinese citizens are found to be moderate English speakers and readers. They finished on the 45th place in the global ranking list (EF, 2020). Therefore, this language gap could have affected the results of this study. For future research it could be interesting to translate the questionnaire into the native languages of participants.

The final limitation of this study is that it only investigated the effect of self-control and cultural background on the relationship between demand-induced scarcity and purchase intention. However, it could have been that other variables also affected this relationship. For

future research it is interesting to study other variables as well, such as brand preferences, brand familiarity and product quality.

5.4 Generalizability of the Results

To ensure reliability, all the questions for every construct in this questionnaire were based on previous research. In addition, a pilot study within the target audience of this study was conducted to minimize questionnaire errors. Furthermore, to ensure that the stimuli were perceived as gender, age and culture neutral a pilot study for the stimuli was conducted. Moreover, a manipulation check was performed to ensure that the manipulation was successful. Results reveal that the manipulation indeed was successful, since most participants had seen the correct message. In addition, the demand-induced scarcity stimulus was indeed perceived as scarcer than the no scarcity stimulus, which indicates that the manipulation was successful. Furthermore, the internal coherency of every construct is high, since they all score excellent on Cronbach Alpha. In addition, the assumptions of the mediation and moderation analyses were met, which increase the generalizability of the results. One limitation is that the participants were gathered via a non-randomized convenient sampling. By this, it is questionable whether the sample is an accurate representation of the population. However, a large sample size will decrease the risk of such sampling errors. Therefore, this study has a large sample size ($N = 256$). Yet, the Chinese subsample would have been smaller if the 33 participants that did not live in China were excluded. Consequently, this could have affected the validity of the sample. However, the results of the randomization check revealed that exclusion of those 33 participants would not have led to a significant difference in the deviation of the sample. Therefore, this study did not exclude these participants. In addition, to ensure generalizability of the results, bootstrapped 95% confidence intervals were provided for all significant results. As can be seen, all the significant results did not cross zero, which

indicates that these findings indeed can be generalized to the population. Even though there were some limitations with regards to the generalizability, the results still provide some interesting findings.

5.5 Conclusion

The purpose of this study is to contribute to existing literature and expand knowledge about the effect of demand-induced scarcity on purchase intention in online retail environments. In addition, the mediated effect of self-control and moderated effect of cultural background on this relationship was studied. In line with previous research this study found that demand-induced scarcity indeed has a positive effect on consumers' purchase intention in online retail environments. Furthermore, self-control did not mediate this effect. Yet, this study did find an effect of demand-induced scarcity on self-control, that almost reached significance. However, the bootstrap 95% confidence interval crosses zero, which indicates that this individual effect should be interpreted with caution. Furthermore, no effect was found of self-control on purchase intention. In addition, Dutch consumers scored higher on indulgence than the Chinese consumers. Yet, cultural background had no effect on the relationship between demand-induced scarcity and purchase intention.

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Appendices

Appendix A

Pilot Study Stimuli

A pilot study was set up to explore the suitability of the stimuli. In total, seven participants were selected to review the stimuli. Of these, five were Dutch and two were Chinese. This pilot study consisted of two different pre-tests that were conducted via Zoom. In the first pre-test, participants were shown multiple electronic products (Airpods, speaker and television), and two e-commerce contexts (one that was based on Amazon and one of AliExpress). After exposure, participants were asked to what extent they found the products age, gender and brand neutral and if they would be likely to buy the product. In addition, statements were given regarding the webshop background (e.g., “This webshop looks realistic”). Finally, questions were asked about the context information and manipulation (e.g., “Did you see information about the availability of the product?”). Based on these results, one product and one background context were used for the final stimuli. In the second pre-test four participants were shown the optimized stimuli and the same questions were asked as in the first pre-test.

The sample of this study consists out of different nationalities (Dutch, China), gender (both male and females) and age groups (ranging from 18 till 65), which makes it important to choose products that are suitable for all these groups. Other studies that investigated the effect of scarcity on purchase intention most of the time used electronic equipment as stimuli. Based on these studies, this study also uses electronic equipment as stimuli. Electronics are suitable for stimuli since they are gender, age and nationality neutral. In this pilot study, three electronic products were used.

To make the background as realistic as possible the background is based on two existing e-commerce platforms named AliExpress and Amazon. These platforms are used in both the Netherlands as China, and therefore are used for the background of the stimuli. Yet, to let past experience not impact the reliability of this study the backgrounds are not identical to the real websites. For example, the logos and names of the websites are changed. The name AliExpress is changed to GlobalExpress, Amazon is changed to Globalzon. Furthermore, to make the stimuli look realistic some information was added. To be specific, photos of the product and the 'add to cart' button. AliExpress and Amazon offer a lot of additional information (not about the product) that might distract people from the actual message. Therefore, some of this additional information is blurred. For example, delivery information, reviews and shipping information were blurred.

Results from the first pre-test revealed that participants perceived all the products as gender and age neutral. Yet, the AirPods were perceived as less brand neutral. Moreover, they find the Bluetooth speaker the most appealing product. Therefore, for the final stimuli the Bluetooth speaker is used. Furthermore, both webshop backgrounds were perceived as realistic. Yet, they did find the webshop that was based on Amazon more appealing. In addition, they perceived the AliExpress webshop as cheap and not trustworthy. Therefore, as final stimuli the Amazon based webshop is used. Hence, participants found the information about the availability of the product not visible enough. Therefore, in the final stimuli a pop-up was used to make the scarcity cue more visible.

In line with the first pilot study, results from the second pilot study revealed that the final stimuli were perceived as gender, age and brand neutral. The webshop context looks realistic and the manipulation was clearly visible. These results were the same for both Chinese as Dutch participants.

Appendix B

Written Questionnaire

Dear participant,

At this moment Tilburg University is doing a study about buying in webshops. We would like to ask you some questions about online shopping and your preferences.

Voluntary participation

Your participation in this questionnaire is completely voluntary. You have the right to withdraw from the research study at any time. In addition, you are free to decline to answer any particular question you do not wish to answer for any reason.

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
Roos van Ginkel
Researchgrouptil@gmail.com

Informed consent

Select "yes" if you have read this consent and are willing to participate in this survey.

Do you agree to participate?

- Yes
- No

What is your gender?

- Male
- Female

What is your age in years?

□□

What country were you born in?

- China
- The Netherlands

- Other, please specify...

In what country do you live at the moment?

- China
- The Netherlands
- Other, please specify...

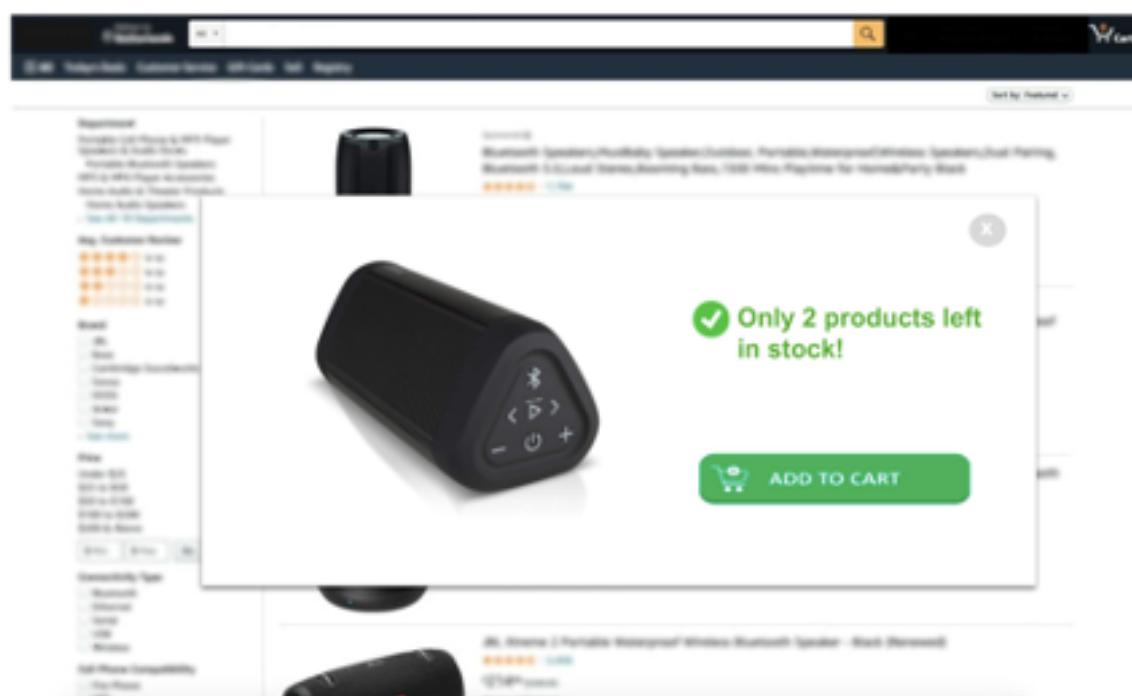
To what ethnic group do you belong?

- Chinese
- Dutch
- Other, please specify...

What is the highest level of education that you have completed?

- Elementary school
- High school
- Middle level education
- Higher education
- University

Have a close look at the webshop. Imagine that you are searching for a new Bluetooth speaker.



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

	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
I would like to buy this product	0	0	0	0	0
	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
The webshop is exclusive	0	0	0	0	0
This webshop creates a sense of urgency	0	0	0	0	0
I need to act quickly on this webshop	0	0	0	0	0
This webshop is inconvenient	0	0	0	0	0
I feel pressured by this webshop	0	0	0	0	0
I think this product sells out fast	0	0	0	0	0
This product seems highly demanded	0	0	0	0	0

	Completely disagree	Disagree	Neither agree nor disagree	Agree	Completely agree
I am good at resisting temptation	0	0	0	0	0
I never allow myself to lose control	0	0	0	0	0
I have trouble saying no	0	0	0	0	0
I have iron self-discipline	0	0	0	0	0

You have completed this survey. If you have any questions or you would like to be kept informed about the results of this study, please send an e-mail to researchgrouptil@gmail.com