

Wageningen University – Department of social sciences

Marketing and consumer behaviour group

The influence of quantity scarcity and time restrictions on consumer preference and purchase intention

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Student: Martijn Schins
Reg. nr: 870814738040

Supervisor: Dr. van Herpen
2nd supervisor: Robert Goedegebure

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Abstract:

This literature overview helps in understanding mechanisms which relate to specific types of actual scarcity and by vendor invented scarcity appeal messages. It was found that limited product availability, quantity scarcity appeals and time restrictions may affect purchase likelihood through several mediating variables. In some cases scarcity prompts consumers to rely on heuristics, while in other cases scarcity enhances motivation to process information. When consumers use scarcity information as a heuristic cue it induces relatively thoughtless and reflexive responses which most of the times leads to a rapid purchase decision. In this case consumers use a 'scarce is good' or 'scarce is expensive' heuristic which concurrently decreases their reliance on other product attributes. Furthermore, actual scarcity is sometimes interpreted as popularity cue. A scarce product is then more attractive because consumers have a need to conform to fellow consumers or they infer that its popularity signals quality. On the other hand, when scarcity enhances consumers' motivation to process information, they tend to elaborate more about product benefits and/or the deal value, especially when they have a low initial involvement towards the product. Besides that, they may think more about possible regret associated with non-purchase and/or it increases their counterfactual thoughts. Scarcity can also evoke feelings of uniqueness, especially in consumers who have a high need for this. In this case, acquiring a scarce product is a competitive process, where fellow consumers are seen as the competitors. This happens principally with hedonic products, but in the case of a limited edition product it can also occur with fast-moving-consumer-goods.

Besides the mediators, multiple moderating constructs were found to affect the strength of scarcity effects. The presence of them strongly depends on the self, the situation, the message and/or source, and the product. The discussed moderators are: psychographic personality traits, initial consumer involvement and cognitive load, persuasion knowledge, message credibility and information congruence, competing cues in the retail environment, the product category, and finally the price/discount level.

Keywords: limited product availability, scarcity appeals, time restrictions, heuristic cue, consumer decision making, purchase intention, deal evaluation, online shopping

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1. Introduction

Scarcity has proven to be a successful tactic in influencing consumers to purchase a product and it moreover tends to increase consumers' susceptibility to a promotional offer. Because of this, scarcity has emerged as a major research topic. There is however such a magnitude of work that it became quite indistinct. There are for instance different types of scarcity, supply-caused scarcity, demand-caused scarcity and time scarcity, but it is not really clear how consumers respond to each specific type. Supply-caused scarcity implies that the number of potential co-owners of a product is restricted (Gierl & Huettl, 2010), while demand-caused scarcity implies that a lot of fellow consumers purchased the product. Both types are defined as quantity scarcity. Time scarcity is a denomination for restrictions in time, either to acquire a product or access a promotion.

Prior research has highlighted a variety of psychological mechanisms and possible mediating variables that give rise to scarcity effects (Brehm, 1966; Brock, 1968; Cialdini, 2001; Fromkin, 1970; Lynn, 1989). However it is unclear which theory is applicable to each specific type of scarcity. It is for instance still indistinct in what situations consumers respond positively or negatively when they perceive a specific type of scarcity. Besides, research (Aggarwal et al., 2011; Bae & Lee, 2005; Eisend, 2008; Inman et al., 1997; Jung & Kellaris, 2004; Ku et al., 2012; Lee & Seidle, 2012; Soni, 2013; Terman, 2007; Yeo & Park, 2009) has come up with several moderators which affect scarcity effects, it is however a challenge to gain insight in these variables. It remains unclear which of these variables are beneficial or detrimental to the scarcity effect and how their influence depends on the situation.

Research objective

The objective of this report is to examine literature on scarcity effects in order to give a clear and up-to-date overview of the research conducted on this topic. This overview helps in understanding mechanisms which relate to specific scarcity types and scarcity appeals. It deepens out the different types of scarcity and their influence on consumer preference (reflecting utility or desirability of products) and purchase likelihood. Furthermore it clarifies how the (subjective) value of a product changes due to the mere fact that it is available in limited quantity or for a limited time and how an individual's cognitive elaboration mediates this.

Follow-up study

The ultimate goal of this literature review is to provide the necessary information to set up an empirical study on consumers' response to product availability information and limited time when shopping online. This follow-up study (i.e. master thesis) focusses on online shopping because nowadays more and more e-commerce vendors use scarcity tactics to create an urgency to buy. Moreover, already a large number of researchers proved the effect of scarcity (messages) in advertisements and off-line shopping situations (Eisend, 2008; Inman et al., 1997; Jung & Kellaris, 2004; van Herpen et al., 2009).

General research question

How do consumers respond to actual product scarcity, quantity scarcity appeals and time restrictions?

Sub questions

To be able to answer the general research question, five sub questions are formulated.

1. Which underlying motivations affect consumers' preference and purchase intention for products that are scarce due to limited supply?
2. Which underlying motivations affect consumers' preference and purchase intention for products that are scarce due to excess demand?
3. Which underlying motivations affect consumers' purchase intention for products promoted with a time restriction?
4. Which underlying motivations affect consumers' purchase intention for products promoted with a quantity restriction?
5. Which moderators are found to influence the effect of quantity and time scarcity on consumers' preference and purchase intention?

Structure

Chapter 2 deals with the challenges retailers and e-tailers face and when consumer use cues to make decisions. Furthermore different approaches to use scarcity as a sales tactic are outlined and the scientific literature on the topic is briefly introduced. Chapter 3 deals with literature on related theories and mediating variables, explaining scarcity effects. Chapter 4 deals with variables found to moderate scarcity effects and chapter 6 contains the discussion.

2. The scarcity phenomenon

Here the challenges of retailers and e-tailers are discussed. This section will provide an overview of the types of (un)availability, the different types of scarcity, and the use of scarcity appeals in practice.

2.1 Introduction

Everyday consumers are faced with decisions they have to make. During offline and online shopping situations consumers are influenced by multiple cues, their motivational orientations, the consideration set and the choice of others. Retailers and e-tailers are faced with two challenges. First to get potential customers into their store or on their website and second, persuade them to buy. Retailers know that when consumers visit their shop it is likely they already have products in mind or on their shopping list, however this is not the case with fun-shopping. This is similar in an online context, where consumers find their product of interest by visiting the website of the retailer directly or by searching among alternative vendors using a shopping search engine. Once the potential customers are in the (online) shopping environment they are often also appealed by other products or product promotions. In such situations, consumers seldom deeply process each piece of information, instead they often rely on quick mental shortcuts, or general heuristic rules, to guide their attitudes and behaviour (Chaiken, 1980). Cialdini (2001) terms this psychological principle as 'click', 'whirr' behaviour and describes it as the tendency to react automatically without conscious thought. Such mental shortcuts are activated when consumers encounter various intrinsic and extrinsic cues present in a shopping situation or in a promotional message. Here an intrinsic (sensory) cue is any product characteristic inherent in the product itself. An extrinsic cue is not fundamental to the product itself, but externally attributed to the product, such as, price, brand, packaging shape, availability and country of origin (Veale and Quester, 2009).

In order to persuade consumers to visit their store or webshop and actually buy something, retailers and e-tailers use several tactics to activate mental shortcuts. A frequently used and widely applicable tactic to do this is emphasizing scarcity. However it is the question if just any type of scarcity in any situation automatically operates as a mental shortcut or that it maybe engenders the opposite, thoughtful thinking (Brannon & Brock 2001a). Scarcity can be real or manipulated and therefore several denominations for the different conditions are formulated. When there are actually very few products available we speak of real or *actual scarcity*. When depleted inventory due to limited supply or excess demand is noticeable on the shelf, it is called *shelf-based scarcity*. Note that in such situation it is unclear for consumers if the particular product is actually scarce, because there can still be more reserves in the storeroom or outside this specific store. At last, when availability is intentionally manipulated, for instance in the case of quantity or time restrictions given with promotional offers (i.e. scarcity appeal), is it called *artificial scarcity*. But why is a scarce

product (real or manipulated) more attractive than the abundant alternatives? And, why do time restrictions affect product desirability and deal attractiveness?

2.2 Basic scarcity bias

Some researchers propose that there exists a basic scarcity bias that is created by the occurrence of events because from infancy onward the infrequency of events captures attention (Brannon & Brock, 2001b). Mittone et al., (2005) state for instance that “scarcity operates as a basic and primary bias leading individuals to operate choices in favour of scarce goods” (p. 6). This happens in an automatic and not necessarily conscious manner. They treat scarcity as a local-based attribute and are not interested in the effect played by scarcity within the market mechanism and on prices. They suggest that young children possess a basic scarcity rule that naturally increases the goods’ attractive power. However, this bias decreases with age, presumably due to cognitive development. “As the child grows older the basic scarcity bias is diluted (substituted or overcome) due to the intervention of other social schema or rules learned through experience” (Mittone et al., 2005, p. 11). In their approach scarcity thus guides preferences and choice in an implicit way. This literature review is based on a broader point of view, it explores the mediating variables and theories.

2.3 Product (un)availability

Besides unavailability, three conditions of scarcity are described in the literature; restricted availability, limited availability and conditional availability (Verhallen and Robben, 1995). These conditions elicit different types of reactions, which can be seen in table 1. This literature review will only focus on *limited availability* and all related theories and perspectives. Hereby prior research in psychology, marketing, consumer behaviour and advertising is used interchangeably. The literature on unavailability (e.g. Fitzsimons, 2000; Zinn and Liu, 2001; Min, 2003) and the other two conditions of availability is not discussed. Henceforth the use of the term “*scarcity*” refers to limited availability (time and/or quantity).

Table 1: Conditions of product availability

Type of availability	Description	Behavioural mechanism
Unavailability	Due to natural reasons or regulations	Respectively reactance and frustration
Restricted availability	Only available for certain individuals, group membership	Status for members, otherwise reactance and frustration
Limited availability	Due to market circumstances or accident	Status, uniqueness striving behavioural cost evaluation conformity and bandwagon reasoning
Conditional availability	Only available if specific conditions or task requirements are met	Behavioural cost evaluation, monetary sacrifice evaluation and social cost evaluation

[Verhallen and Robben, 1995]

2.4 Market induced vs. human-induced scarcity

Verhallen (1982) and Verhallen and Robben, (1994) suggest that limited availability in quantity enhances the intention to buy only in the case when the scarcity is a result of market circumstances and when the scarce good is relevant and desirable. Thus, “scarcity alone does not have an effect on preference; it is the consumer’s perception of the cause of the scarcity that influences preference” (Castro, 2010, p.6). Moreover scarcity is only an effective approach in enhancing likelihood of buying when it reflects positively on the product. When consumers are not aware of the cause of quantity scarcity or when it is caused due to nonmarket circumstances, it may be perceived negatively and does therefore not affect product value (Lynn, 1992). In fact, when this happens scarcity represents a practical product feature related to the ease of attaining the product (acquisition utility). Purchase intention is then merely affected by feasibility considerations and not by increased involvement towards the product (Steinhart et al., 2013).

When a consumer notices actual lack of product availability on the shelf in a retail store, he/she is unlikely to know why one alternative is scarcer than another. Although the product is most likely scarce due to excess demand it could also be a missed order or failed delivery. In such situation the consumer will need to infer scarcity’s cause. The desirability for the scarce product then depends on the perception of stocking frequency and the believe that the producer produced enough to meet demand.

Scarcity in the form of a time limitation is in most cases, besides seasonal products, not genuine. Consequently, most consumers who are confronted with such scarcity appeal know that the vendor intentionally created it.

2.5 Quantity scarcity vs. time scarcity

Actual quantity scarcity stems from changes in supply and demand. Supply generated scarcity in specific results from a limitation of the available units caused by the producer or vendor. “Scarcity due to limited supply implies that the number of potential co-owners of a product is restricted from the beginning of the market process” (Gierl & Huettl, 2010, p. 227). In most cases such products are labelled as limited editions.

Scarcity due to excess demand is scarcity resulting from public demand which is not met by supply. Here demand is the amount consumers are willing to purchase at a given price over a given period of time.

The third type, time scarcity is mostly communicated in the form of a temporary discount or a sole product promotion. Moreover, limited purchase opportunities (e.g. pop-up stores, deal website) and seasonal availability of products also reflect time scarcity. It should be noted that there is an essential difference between temporary discounts and limited purchase opportunities. First, consumers have come to expect future discounts, making a temporary discount less of a one-time offer. Secondly, after the discount period has passed only the opportunity of saving money is foregone, which is different than losing the entire purchase opportunity (Abendroth & Diehl, 2006). Despite this difference, time scarcity can

evoke feelings of pressure and urgency and it therefore tends to influence consumer choice processes, deal evaluation and consequently buying behaviour.

The distinction of scarcity types (actual vs. invented and quantity vs. time) is important in explaining consumers' response, because each scarcity type evokes different inferences. [Jung and Kellaris \(2004\)](#) state for instance that in cases of actual scarcity the acquisition of a scarce product is seen as an opportunity to distinguish him- or herself from the crowd. The opposite is however also true, consumers sometimes see scarce products as social proof (he/she infers a product is scarce because it is popular with a large group of people). They then acquire a scarce product because they want to conform with fellow consumers. Besides these different motives for acquiring actual scarce products, there are also opposing accounts on how consumers react to scarcity appeal messages (quantity/time) given with promotions. These messages are processed heuristically ([Cialdini, 2001](#)) or with increased systematic thinking ([Brannon & Brock, 2001a](#)).

Quantity scarcity, time scarcity and a combination of these two can be used as a marketing tactic to lure potential customers into the store. Demand-caused scarcity also functions as point-of-purchase information. It has therefore the potential to positively influence attractiveness and purchase likelihood of products when consumers are in a store. Demand-caused scarcity can thus be especially advantageous in the final stage of decision making, when consumers are on the brink of their decision. Supply-caused product scarcity on the other hand can be used to target consumers both outside and inside the store. It might initiate need recognition in the first place or is extra appealing in the final stage of the decision making process ([Mallalieu, 2006](#)). The most prominent example of scarcity due to limited supply can be seen in the case of limited edition products. [Amaldoss and Jain \(2008, 2010\)](#) suggest that brands could actually sell more by offering a limited edition, than without such a supply constraint. Consumers who were offered a limited edition seemed to make their purchase decisions more rapidly. Especially high-involvement categories, like shopping and specialty goods are very suitable for limited editions, but also low-involvement product categories like convenience or fast-moving-consumer-goods (FMCG) can profit from this limited availability.

The third type, invented scarcity appeals (quantity, time or a combination) in promotions, are especially effective in targeting deal prone consumers. Scarcity appeals might then increase the transaction value (value of the deal) which makes consumers more susceptible to the promotional offer.

In practice, scarcity appeals on offers can be difficult to differentiate. There is (unpublished) empirical evidence ([Soni, 2013](#)) that in some circumstances consumers' reaction to quantity scarcity and time scarcity is not different (dependent variables: purchase intention, attitude towards products, and perceived symbolic/functional value). It is indeed plausible that in some cases it is difficult for consumer to notice the difference. Possible explanations could

be (i) the continuous availability of promotions over the decade which uses scarcity appeal very often (ii) consumers' lack of a-priori associations with the product (iii) the difference between stimuli like "limited stock" and "limited time" is vague and/or (iv) time scarcity is inherent in quantity scarcity and the other way around, i.e. an offer given with one type of scarcity appeal implicitly indicates the other type of scarcity appeal (e.g. "while stock lasts"). Thus when a product is low in quantity, consumers have to hurry up (time scarcity) if they want to acquire that product. On the other hand, when time to respond to a promotional offer is short, consumers know that it is likely that fellow consumers were also appealed by this scarcity message and therefore already purchased the product in the promotion (quantity scarcity due to excess demand).

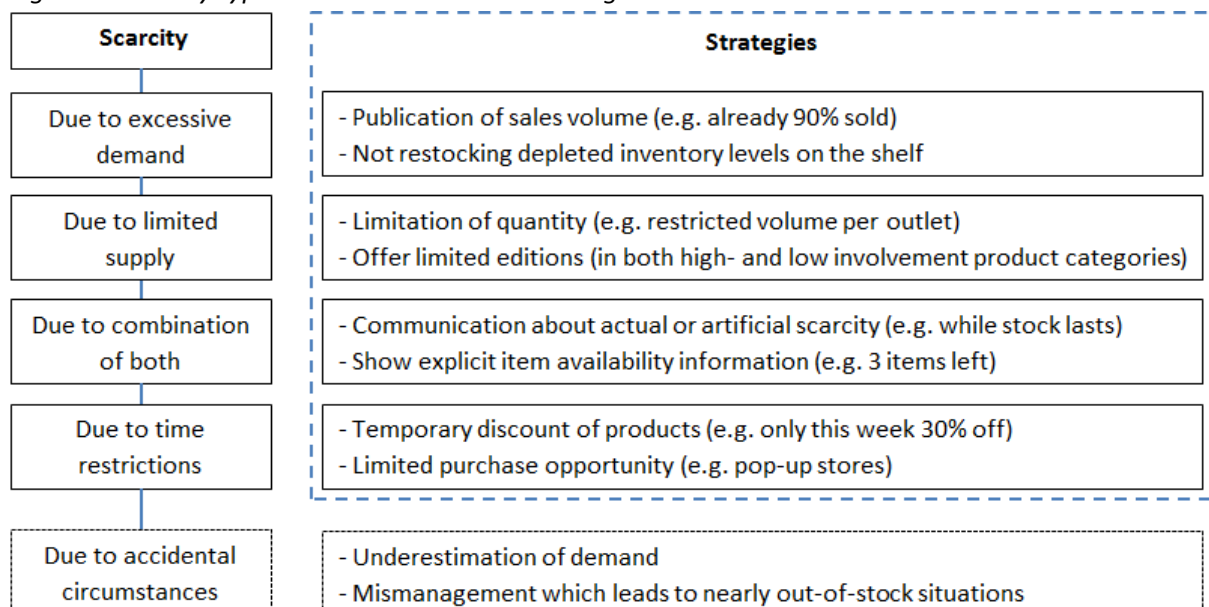
2.6 Communication of scarcity

This section describes different communication strategies and the usage frequency of scarcity appeals in promotional offers.

2.6.1 Communication strategies of scarcity appeals

A scarcity appeal can be described as restricting the opportunity of accessing a promotional offer or product. Here a promotional offer can be either a price discount or a sole product promotion without a price discount. Given the strong support that scarcity appeals have proven to be successful (Eisend, 2008; Jung & Kellaris, 2004; Innman et al., 1997, Lynn, 1989; Devlin, 2007) they are frequently used by retailers and e-tailers. There are several approaches to implement the scarcity tactic in practice (see figure 1).

Figure 1: Scarcity types and communication strategies



A great advantage with most of the commonly used scarcity appeals is that they are inexpensive to impose and retailers and/or e-tailers have the freedom to extend the offer or

retract the offer prematurely by communicating that stocks have run out. The most commonly used scarcity tactics are:

(1) Produce in limited quantity: Developers of brands or fashion designers could label their products as limited editions. This tactic is used in high involvement product categories like shopping and specialty goods as well as fast-moving-consumer-goods. Furthermore, a small shelf facing of a particular product can also suggest supply-caused scarcity.

(2) Show item availability information: This is a variant on the limited quantity tactic. Retailers and e-tailers show that there are only X items left after which there will be no more. Likewise, retailers could keep their shelves only half-filled to point out the strong demand for an article.

(3) Give limited quantity or time offers: Retailers and e-tailers embed scarcity in their advertising by using time restrictions in their promotional message. The advertised sales have time limit after which customers have to pay full price. This approach can even generate residual sales after the offer has expired.

(4) Create competition amongst consumers: Creating consumer competitive arousal (Nichols, 2012) is a technique that combines quantity and time scarcity. This tactic emphasizes that consumers should place their order now because supplies are dwindling fast, and there is a chance the product will not be available tomorrow. Advertised products are mostly accompanied by vague slogans like 'while stock lasts' or explicit slogans 'already 90% sold, hurry up'. Because consumers are conjecturing when stocks really run out, they are forced to think about the potential loss aspect of the sales offer (e.g. Kahneman and Tversky, 1984).

2.6.2 Usage and frequency of scarcity appeals

Howard and Kerin (2006) conducted a content analysis on 13,594 US newspaper retail advertisements and examined the use of scarcity and reference price techniques. Results show that scarcity was used more frequently than reference pricing. In 7.9% of the advertisements limited time availability was used alone as selling strategy, while only 0.9% of the advertisements used reference pricing alone. In approximately 60% of the advertisements that featured reference pricing, scarcity was also present. This finding provides indisputable evidence that scarcity messages are strongly associated with reference pricing. That a combination of these strategies can be an effective sales strategy is proven by for instance Anderson and Simester (1998).

Further interpretation of results revealed that limited time messages are used 3.5 times more often than limited quantity messages. This is a remarkable finding because for instance Aggarwal et al., (2011) and Devlin et al., (2007) conclude that limited quantity messages are more effective in persuading consumers than limited time messages.

Fritchie & Johnson (2003) examined the use of six persuasion strategies by the hosts of home-shopping television channels (social proof, scarcity, authority, commitment and consistency, liking, and reciprocation; Cialdini, 2001). In total 104 segments (duration

approximately 3 minutes) where coded and all the segments featured either apparel or jewellery products. Every statement during a single segment was analysed to determine whether it contained any of the persuasion strategies. In all the segments one or more persuasion strategies were used, with an average of two per segment. Scarcity appeal in particular was found in 28,4% of the segments. This is not surprising since home-shopping television channels are very suitable for using scarcity tactics. The retailer has the ability to control the length of the segments in which products are presented. Even though the products can be purchased at any time, the viewers might perceive that they can only buy a product during its presentation. Moreover, the viewers' perception of scarcity (due to limited time to respond) can even be amplified when the host of the show emphasizes limited availability of a product. In this situation quantity scarcity and time scarcity are both likely to affect purchase intention.

2.7 Scarcity literature

Since scarcity has proven to initiate purchase acceleration, it is a widely investigated subject as well as in psychology as in marketing. The scarcity literature is focused on exploring how consumers evaluate the limited available commodity and finally how this affects their buying decision. In the literature limited product availability is generally considered as an enhancer of the intention to buy the product (Fromkin et al., 1971; Ku et al., 2012; 2013; Lynn, 1992; Verhallen, 1982). This happens because scarcity implies value via several mediating processes. Appendix I deals with studies on shelf-based scarcity, appendix II with studies on quantity scarcity appeals and appendix III with studies on time scarcity. The overview of studies reveals that results are somewhat mixed. These mixed results may be explained by the presence of moderator variables. See table 4 for an overview of these variables.

2.7.1 Scarcity's effect on value and purchase intention

"Value refers to a commodity's potency for affecting attitude and behaviour" (Brock, 1968, p. 246). Any enhancement of value will increase perceived utility and will make the product more desirable and sought after (Lynn, 1991), hence the term 'value' is in the scarcity literature often equated with 'utility' or 'desirability'.

First it should be mentioned that Dai, (2008) suggest a bi-directional relationship between value and scarcity. He states that a consumers use a circular inference process and thereby use a value heuristic (i.e. a products' worth in the eyes of the consumer) to infer scarcity. That is, consumers infer scarcity from product value in the first place, and then, in turn, infer even higher value from inferred scarcity. However, studies on scarcity effects mainly explore which mediating processes caused by scarcity lead to increased perceived value (Wu & Hsing 2006; Wu et al., 2012; Chen and Sun, 2014). These mediating construct will be discussed later on in this review.

Quantity scarcity

Consumers process deal restrictions and/or item availability in conjunction with a products' attributes and the terms of the offer. This ultimately increases or decreases their purchase likelihood. When consumers encounter a restrictive offer or see a limited edition product in a promotion they first scrutinize if the offer/product is personally relevant (e.g. familiarity with the brand, product category), after that they process different pieces of information together (deal size and restriction) (Sinha et al., 1999). An early study (Lessne & Notarantonio, 1988) investigated the effects of quantity limits in retail advertisements (i.e. limit X per customer). Findings reveal that participants in the restricted condition evidenced a greater purchase intention to the advertised product (soda) than those who were exposed to an advertisement without a limit. Other research empirically shows that quantity restrictions sometimes lead to a positive deal evaluation and purchase intention, but only with a substantial discount level (Inmann et al., 1997). The evaluation (value) of a personally relevant deal thus might depend on perceived monetary savings but also psychological benefits (i.e. being a "smart shopper"). When the accompanying discount level is low or not appealing, consumers tend to evaluate quantity restrictions negatively (e.g. Steinhart et al., 2013; Soni, 2013). This might happen because they (i) perceive inconvenience or hassle (increased focus on perceived feasibility), (ii) perceive the offer as misleading (it activates persuasion knowledge) or (iii) perceive a binding commitment. In other words, "consumers appear to resent when expectations of higher savings from deals are contradicted by the presence of restrictive limitations on them" (Sinha et al., 1999, p. 48). Restrictions can thus sometimes unintentionally obfuscate deal value and consequently lower purchase intentions.

Time scarcity

Various studies have found that time scarcity can increase perceptions of value (Vermeir & Van Kenhove, 2005; Tan & Chua, 2004; Suri et al., 2003; Suri & Monroe, 2003; Dahr & Nowlis, 1999 and Kumar et al., 1998). Furthermore, two studies have found that imposing a time-limit on an offer can increase choice probability and perceived deal value (Inman et al., 1997; Swain et al., 2006). However one study (Suri et al., 2007) found that this only holds with an relatively low priced offer. Two other studies (Devlin et al., 2007; Teng & Huang, 2007) found no effect or an opposite effects which again suggest the presence of moderators.

Besides 'value', a vast body of research found positive effects of time scarcity in promotions on consumers purchase intention (e.g. Inman et al., 1997). Lessne (1987) shows that an advertisement for a "one day only" sale results in greater purchase likelihood than advertisements with for a "three day only" sale, a "five day only" sale and sale of an unstated duration. Also Amir's (2001) findings reveal that purchase intent increases when discounts are temporary. Huang (2011) in specific found that this also holds in an online context. It thus appears to be true that buying opportunities become more valued as a deadline approaches (Pennebaker et al., 1979). In addition to that, Dhar and Nowlis (1999)

show that the propensity to delay purchase decreases with increased time scarcity, and [Ariely and Wertonbroch \(2002\)](#) show that pre-set deadlines help to avoid procrastination of activities.

Several researchers have thus proven that time limits can help motivate customers to buy now rather than later (or not at all), however some studies found that in some cases a time restriction can be detrimental. When the limit is over/under restrictive it might actually hurt response more than help. If the time frame is too short, sales loss could occur from potential customers who could not meet the deadline. At the same time, imposing longer time limits can reduce the urgency of an offer, leading consumers to delay their purchase (perhaps) indefinitely, resulting in a lower response ([Hanna et al., \(2005\)](#); [Chiang et al., 2011](#)). It should also be noted that a time restriction can be detrimental for sales when the promoted products are irrelevant for consumers who encounter the offer or when the heuristic cue (scarcity appeal) and message content in the offer are incongruent (e.g. low deal size with high time restriction). In this case consumers tend to see the restriction as inconvenient or misleading ([Sinha et al., 1999](#); [Shen, 2011](#); [Steinhart et al., 2013](#)).

Altogether can be said with reasonable amount of confidence that under conditions of scarcity (quantity and/or time) consumers are more likely to (i) overestimate the product quality, (ii) the subjective value of the product, or (iii) the value of the deal (transaction value) ([Ahmetoglu et al., 2014](#)). Several studies confirm that perceptions of value lead consumers to have positive feelings about the product and ultimately encourages them to buy ([Monroe and Krishnan, 1985](#); [Wu et al., 2012](#); [Chen and Sun, 2014](#); [Dodds et al., 1991](#)) [Eisend \(2008\)](#) also confirms this, but found that the relationship between perceived value and purchase intention is mediated by consumers' perceptions of personal susceptibility and the susceptibility of others. In other words, results of his study support a mediating effect between value and purchase intention, in that, enhanced value perception increases the perceived influence of the self relative to others. Note that, besides mere purchase intentions scarcity's effect on value (desirability) may also lower consumers' search intentions ([Aggarwal & Vaidyanathan, 2003](#)) and in some cases it prompts in-store hoarding and in-store hiding of items ([Gupta, 2013](#)).

3. Psychological theories and mediating variables

The first theory offering an explanation of the desirability of scarce objects is reactance theory. The theory posits that when individuals' existing freedom of choice is threatened, they will experience psychological reactance (Brehm, 1966). "The consumer whose decision alternative is blocked (partially or wholly) by a barrier should become increasingly motivated to obtain that alternative" (Clee and Wicklund, 1980, p. 39). Psychological reactance thus proposes a direct effect of product scarcity (no mediator) on purchase intention (Jeong & Kwon 2012). The theory is not discussed in detail in this review because it became obsolete and there is to my knowledge no recent study on it. Moreover it is difficult to determine whether individuals are indeed experiencing reactance. Gierl and Huettl (2010) even propose that consumer reactance is unlikely to occur in a category which contains multiple options because people will hardly interpret the scarcity of one option as an important restriction of their freedom. Likewise reactance is also unlikely to occur with scarcity appeals in promotional discounts (e.g. Soni, 2013). This happens because of the great amount and continuous availability of promotions using the scarcity tactic.

3.1 Commodity theory

That scarcity may function as a heuristic cue can be traced back to commodity theory, which is a psychological theory describing scarcity effects on product perception (Brock, 1968; Brock & Brannon, 1992). Brock (1968) stated that "any commodity will be valued to the extent that it is unavailable" (p. 246). Here a commodity can be a consumer product (Lynn, 1989), a health condition, a message or an experience. (Brannon & Brock, 1992; Brock & Mazzocco, 2004; Lynn, 1991). The theory posits that "scarcity enhances the value (or desirability) of anything that can be possessed, is useful to its possessor, and is transferable from one person to another" (Lynn, 1991, p. 5). A consumer product, in this case, will therefore only be more attractive when (a) the number of suppliers is small, (b) a restriction on availability is imposed by the retailer, (c) the consumer has to wait to attain the product or (d) the consumer has to make extra effort to attain the product (Gupta, 2013).

In a later study Brock and Brannon (1992) proposed a liberalization of the commodity theory. They extended the domain of commodities to traits and skills. Furthermore they added negative objects, and acknowledged the role of cognitive elaboration as a mediator between scarcity and consumers' evaluative polarization.

It should be noted that a lot of research conducted on commodity theory operationalized unavailability as scarcity and value as desirability. These studies typically found that scarce commodities are desired more than available commodities (see Lynn, 1991 for an overview). Despite the fact that commodity theory is thus largely associated with the effect of scarcity on preference, it does not explain *why* this effect occurs. It can thus be seen as a meta-theory which suggest that one or more psychological processes explain this relationship (i.e. naïve economic theories) (Lynn, 1992).

3.2 Scarcity and cognitive processing

Since the liberalization of commodity theory researchers debate about two contradictory perspectives explaining the effect of scarcity, the heuristic cue perspective and the motivation-enhancement perspective. The heuristic-cue perspective posits that scarcity functions as a heuristic cue and may thus induce relatively thoughtless and reflexive responses in consumers. As a consequence items and opportunities are seen as more valuable as they become less available (Cialdini, 2001), especially when consumers have a low motivation to process information (Lynn, 1991). Their evaluation is then determined by the heuristic inference of perceived scarcity or a restriction in the scarcity appeal. This happens automatically because their experience learned them to associate scarcity with evaluative extremity.

The opposite perspective, the motivation-enhancement perspective posits that scarcity may motivate consumers to scrutinize product message and thus make decisions based on the true merit of an object (Bozzolo & Brock, 1992; Brock & Brannon 2001a). Brannon and Brock (2001) termed this process attention-based rumination. In order to empirically test this they placed half of the participants under cognitive load and let them evaluate scarce of common characteristics. Their results reveal that in this situation the scarcity manipulation did not correlate with attitude extremity. It is thus indeed suggested that elaboration is a key mediator of scarcity's extremization of evaluations (Terman, 2007). Also Worchel et al., (1975) and Ditto and Jemmot, (1989) suggest that when commodities are scarce, consumers have an increased attention towards them. However they argue that this happens because it limits their freedom to possess them (reactance).

Research supporting the motivation-enhancement theory proposes that scarcity in low-involvement choices can lead to psychological arousal. This arousal, when not excessive, reduces the proportion of consumers' reliance on irrelevant cues (heuristics). As a result consumers have the tendency to rely on systematic thinking. This in turn leads to increased attention for the intrinsic product attributes that are personally relevant or the message content in the advertisement. Some researchers found support for this. Van Herpen et al., (2009) found for instance that the scarcer a product is on the shelf, the longer consumers inspect it. Bozzolo and Brock (1992) and Steinhart (2013) found that when limited edition of a product was perceived positively, it increased consumer's involvement and thus cognitive resources devoted to the task. Although it should be mentioned that the motivation to processes information was only enhanced when the message was strong (vs. weak). In addition to these studies on actual scarcity, Inman et al., (1997) shows that restrictions in promotions can also prompt elaborate processing. Their study reveals that in such situations consumers prefer larger discounts, which suggests a more thoughtful evaluation of the restricted offer. Likewise, Yoon and Vargas (2011) examined whether quantity restrictions evoke counterfactual thinking, which is the mental process of thinking about unrealized alternative versions of past and present outcomes. (e.g. "It could have been even better, if they had offered a greater discount"). They found when a point-of-purchase discount is

restricted by an upper limit (i.e. X% off, limit X per customer) it indeed leads to increased counterfactual thinking resulting in that consumers want to buy even more than the specified amount. This may occur because they want to make optimal use of the presented offer. When counterfactual thoughts arise in such scarce condition they might affect purchase volume deliberations. The results outlined above suggest that cognitive elaboration is the most important mediator in explaining scarcity's enhancement of desirability.

In addition to the countervailing perspectives there is an alternative perspective; information congruity theory. It suggests that conflicting information from heuristic cue (i.e. time restriction) and message content (or product type) can have a considerable influence on consumers' cognitive elaboration (e.g. high restriction/weak message) (Shen, 2011; 2013). The congruence of information between the scarcity message and other information thus determines whether consumers use heuristic or systematic processing. When information is incongruent consumers' feel inadequate to continue relying on scarcity as heuristic cue. As a consequence they are more motivated to process information systematically in order to come to their judgment (Shen, 2011, 2013). Low-involved consumers who strongly relied on the heuristic cue in the first place then shift their reliance to the content of the message. On the other hand, high-involved consumers who initially rely on both the heuristic cue and the message content then solely rely on message content to come to their judgment. It should be noted that the opposing theories and the alternative perspective on this strongly rely on the heuristic-systematic model (HSM) (Chaiken, 1980). Hence the effect of scarcity on cognitive elaboration is mediated by the level of involvement initiated by that scarcity.

3.3 Uniqueness theory and snob effect

A psychological theory called uniqueness theory and a micro-economic perspective called the snob effect partially explain why supply-caused scarce products are extra appealing for consumers.

3.3.1 Uniqueness theory

As mentioned, mechanisms underlying scarcity's effects were not originally specified by commodity theory and reactance theory. Brock (1968) however already suggested that people may desire scarce commodities because they convey feelings of uniqueness. Consumers thus may desire scarce commodities more than comparable available commodities because the possession of scarce commodities can be used to convey personal distinctiveness (Fromkin et al., 1971; Lynn 1991). Snyder and Fromkin (1980) have taken and expanded this speculation into a separate theory known as uniqueness theory. According to the theory, people seek to establish and maintain a sense of moderate self-distinctiveness. Although they strive to be unique, it is assumed that they avoid extreme dissimilarity because this may prompt unpleasant feelings like social isolation.

Uniqueness can basically be established in three types of behaviour; (1) creative choice counter-conformity, which is the search for social differentness through the consumption of products that are acceptable to others, (2) unpopular choice counter-conformity, where consumers willingly risk social disapproval to establish their uniqueness by consuming products considered outside group norms and (3) avoidance of similarity, which refers to consumers' avoidance of mainstream products and the tendency to favour products that are unpopular or not likely to become popular (Tian et al., 2001). In practice consumers often use 'creative choice counter-conformity' to pursue and show their uniqueness to others. Scarcity then signals exclusiveness, which in turn leads to an increased symbolic benefit. Uniqueness theory posits that acquiring a scarce product can engender feelings of uniqueness, but at the same time that the need-for-uniqueness varies across individuals and situations. An individual's innate need-for-uniqueness is therefore a moderating personality variable which will be discussed later on (Harris, et al., 1991).

3.3.2 The snob effect

An economical perspective on consumers response to scarcity effects is the snob effect (Leibenstein, 1950). Leibenstein (1950) highlighted the importance of external effects on perceived utility. He proposes that the value which consumers derive from certain products can be enhanced or decreased when other consumers take some form of action related to that product. The snob effect asserts that an individual's demand is *decreased* due to the assumption or knowledge that others possess or consume the same good (Leibenstein, 1950). A scarce good has thus only snob value if it is scarce due to limited supply. Note that, not only products with limited quantity availability tend to have snob value, also products that have an upper quantity restriction or can only be obtained under certain conditions (table 1) possess an intangible utility.

It is clear that the snob effect has a lot of resemblance with uniqueness theory, there is however an important difference. Similar to uniqueness theory, the snob effect builds on the premise that consumers have a desire to be exclusive and different; they want to dissociate themselves from others. However, dissimilar to uniqueness theory, the snob effect presumes that public display or usage of a product with high snob value conveys a higher social status. The difference is that Snyder (1992) argues that the underlying engine of uniqueness theory is the sense of specialness per se that scarce possessions impart to the self (rather than to social status) (Wu et al., 2012). Snyder (1992) thus asserts that consumers are in a continuous cycle in which the acquisition of scarce products results in a search for yet other scarce products that affirm the individual's sense of uniqueness. Despite of the differences between the theories, they are both essential in explaining scarcity's enhancement of desirability.

3.4 Popularity inferences, quality inferences and bandwagon effect

Popularity inferences, quality inferences and the bandwagon effect partially explain why demand-caused scarce products can be extra appealing for consumers.

3.4.1 Popularity inferences and quality inferences

Retailers know that the lay-out of their store and the presentation of their products matters. They generally believe that fully stocked and mirrored shelves tend to increase purchase intentions. However partially stocked shelves or product displays can also serve as a cue to product scarcity. This noticeable scarcity in the form of relative stocking level depletion can influence the inferences consumers make and hence their buying decisions (van Herpen et al., 2005; Ward, 2007). This might occur because people make judgements about the unknown on the basis of information they receive from the cues available to them (Huber & McCann, 1982). Based on prior knowledge consumers infer that when a product is scarce due to high demand, many people bought it, so it must be good. The *valuation* of the product is in this case not only determined by the utility that consumers derive from its attributes, but also by informational influence. Here “informational influence is a person’s tendency to use other people’s behaviour as a source of information about the objectively best course of action” (Lynn & Harris 1997a, p. 1865). In this case a product’s valuation thus stems from its personal relevance, its perceived utility, the price and its scarceness.

It is clear that in the case of shelf-based scarcity due to popularity, uniqueness seeking plays an inferior role on value inferences. However it should be noted that van Herpen et al., (2014) conclude that uniqueness goals do not (completely) counteract the effect of demand-caused scarcity on choice.

That demand-caused scarcity promotes inferences of product popularity and that product popularity signals the superiority to alternative products was proven by several researchers (Castro, 2010, Parker & Lehmann, 2011; van Herpen et al., 2008; 2009). Castro (2010) and van Herpen et al., (2009) in particular found that this even holds in a situation which resembled a real life shopping experience. In other words, the studies come to the conclusion that consumers assume that the popular product is of higher quality than the other available alternatives (Castro, 2010; van Herpen et al. 2009; Parker & Lehmann, 2011). Similarly, Eisend (2008) found that quantity scarcity appeals in advertisements also result in the enhancement of perceived product quality. Despite that, Jeong & Kwon (2012) found contradicting results in an online context, in that, a limited availability claim did not have an effect on quality inferences while a specific popularity claim did. This unexpected finding was most likely caused due to perceived incredibility of the limited availability message. So, online shoppers are more likely to infer quality from an explicit popularity claim rather than from an explicit scarcity claim.

Despite this latter finding, it can be said that the link between product popularity and quality specifically is very intuitively and the inference is therefore likely to be made automatic. Castro (2010) found for instance that the interaction between product availability and brand

familiarity on the likelihood to buy was fully mediated by perceived quality. It should however be mentioned that findings of a later study ([Parker & Lehmann 2011](#)) reveal that the impact of popularity inferences was not completely explained (mediated) by quality inferences. Even if they controlled for the consumer's quality inferences about the available alternatives, popularity inferences had a significant effect on preferences but only if alternative was of relatively higher quality than when both alternatives were of high quality. In their study quality inferences thus only partially mediated the effect of relative scarcity on preference. Apparently product popularity also has a direct effect on preference, meaning that even when the available alternatives are of equal quality, shelf-based scarcity will still impact consumers' preferences. In this situation the influence of inferred quality and relative scarcity on choice is thus cumulative.

3.4.2 The bandwagon effect

Bandwagon effects refer to "the extent to which the demand for a commodity is increased due to the fact that others are also possessing or consuming the same commodity" ([Leibenstein, 1950, p. 189](#)). More precisely, "bandwagon effects appear when consumer buy products that other consumers have chosen before them" ([Van Herpen et al., 2009 p. 303](#)), which is exactly what demand-caused scarcity implies. One of the drivers for bandwagon reasoning is consumers' striving for conformity, which is the act of matching attitudes, beliefs, and behaviours to group norms ([Cialdini & Goldstein, 2004](#); [Baumeister and Bushman, 2011](#)). Basically consumers act like this because they seek for social appropriateness or social membership.

Other drivers for bandwagon behaviour are consumer's fear of losing something and, as earlier mentioned, the social validation of product quality. Clearly in the former situation consumers want to diminish the possibility that the product will be sold out, because it is such a popular product. In the latter situation, which is in fact not different than popularity inferences causing quality inferences, consumers infer that the probability that such a huge number of buyers would buy a bad product should be rather small ([Gierl et al., 2008](#)). Consumer demand or traces of this are often notable inside the store (depleted inventory) but also outside the store. The latter can obviously only be noticed with products that are used in public (vs. private). Altogether it can be said that in such situations consumers sometimes apply bandwagon reasoning because fellow consumers' demand implies value.

There is however an exception, [van Herpen et al., \(2009\)](#) found that in some cases the bandwagon effect reverses. This may happen when a scarce product is important for establishing and communicating consumers' unique identity, and when close others possibly own the same product. In this case uniqueness is threatened, even though the product was not scarce due to limited supply in the first place ([van Herpen et al., 2009](#); [Cheema & Kaikati, 2010](#)). [Ward \(2007\)](#) found quite comparable results. In his study he primed the subjects in advance of the experiment with either uniqueness or conformity. He found that preference for the demand scarce product of subjects primed with uniqueness diminished when the

product had already been sold to many others. Subjects primed with conformity showed an increase in their preference for the product that was owned by many.

The bandwagon effect is an essential perspective in explaining scarcity effects, in that, it gives possible explanations why consumers prefer products that are scarce due to excess demand. It can be seen as a mean for minimizing risk (i.e. avoid potential loss) or a mean to acquire belongingness via ‘conformity’. However when individuality is directly threatened by the proximity of fellow customers owning the same product consumers want to be unique again (van Herpen et al., 2009)

Table 2: The bandwagon and snob effect

<i>Effect</i>	<i>Goal</i>	<i>Utility source</i>
Bandwagon	a) Association with the majority of consumers	<u>Popularity</u>
	b) Acquire status via ‘social membership’ through possession of scarce commodities	<i>Status from assimilation</i>
	c) Avoid potential loss (vigilance)	
Snob	(a) Dissociation with the majority of consumers in order to establish uniqueness	<u>Uniqueness or status</u>
	(b) Acquire status from being different than others, through possession of scarce commodities	<i>Status from contrast</i>

3.5 Scarcity and assumed expensiveness

Another perspective on scarcity's enhancement of desirability is that it may be mediated by the belief that scarce things are more expensive than available ones (Lynn 1989, Worchel et al., 1975) or that it affects anticipated price appreciation (Lynn & Bogert, 1996). It is important to notice that Verhallen (1982) found that accidental scarcity produced a significantly smaller effect on assumed expensiveness than scarcity caused by supply or demand. Scarcity is thus only likely to affect consumers' preference when it is caused by market circumstances (Verhallen & Robben, 1994). Lynn's (1992) S-E-D model builds on this, in that it indicates that people associate scarcity with assumed expensiveness which increases desirability through increased positive quality inferences (e.g. Rao & Monroe, 1989) and/or perceived status (Yamouchi & Templer, 1982, Lynn 1990). Later studies (Wu and Hsing 2006; Wu et al., 2012) show that assumed expensiveness is indeed one of the inferences that consumers' make, however results of these studies show that assumed expensiveness mediates the effect of scarcity via consumers' perceived quality and perceived monetary sacrifice. In line of thought, results of Chen & Sun (2014) indicate that perceived scarcity (of video games) indeed led to assumed expensiveness. However they

found that assumed expensiveness directly affects perceived sacrifice, but not perceived quality and perceived uniqueness.

Further results by [Wu et al., \(2012\)](#) show that the effect of perceived scarcity (i.e. limited edition) on purchase intention through perceived uniqueness is stronger than through assumed expensiveness, nevertheless they found that both mediators led to increased *perceived value*. Based on the original S-E-D model, [Wu and Hsing \(2006\)](#) developed a new integrated model to examine the routes of the scarcity effect on consumer's purchase intention. The model indicates that scarcity enhances value by multiple cues, namely directly through enhancing quality and symbolic benefit (as mentioned earlier), and indirectly through the price-quality and price-symbolic benefit associations.

It should be noted not all studies support the belief that scarcity implies expensiveness. ([Mittone & Savadori, 2009](#); [Abendroth & Diehl \(2006\)](#). [Mittone and Savadori \(2009\)](#) in particular found that quantity scarcity works as an attractive mechanism that increases only the subjective value of the good, but not the assessed market value of the good. This may happen because consumers not learned that scarcity increases prices, or that this association is not always salient for the ones who already learned it ([Lynn, 1992](#)). [Abendroth and Diehl \(2006\)](#) examined whether limiting a purchase opportunity increased perceived market price. They found that participants' beliefs about the costs were not affected by a purchase limitation, although they state that the means are in the expected direction.

The studies outlined above give some mixed results on the assumed expensiveness notion, it is however still an important mediator which may explain at least some of the scarcity effects.

3.6 Scarcity and regret/satisfaction

We saw that there is quite a vast body of research on how cognitive factors ultimately influence decision making. However researchers also acknowledge the importance of emotions in decision making ([Bell, 1982](#); [Loewenstein et al., 2001](#); [Loomes & Sugden, 1982](#)). Here the focus is on post-decision reactions instead of pre-purchase processes. However when consumers experience anticipated regret, this can be seen as a process which occurs when they encounter a limited purchase opportunity (e.g. time scarcity appeal on promotional discount).

Regret theory (e.g. [Inman and McAlister, 1994](#)) originally states that consumers who are more aware of their regret tend to use a promotion. However [Teng and Huang \(2007\)](#) found that a longer time limit did not increase consumer's tendency to use the promotion. This is in favour of the scarcity effect, but is also remarkable in the perspective of regret theory, since a longer duration of the time limit gives consumers more time to think about their possible regret. Besides that, there are quite some studies that indeed found that anticipated regret mediates scarcity's effect on desirability. For instance, [Simonson \(1992\)](#) found that consumers were more likely to purchase an item available at a

promotional sales price when asked to imagine how they would feel if they had waited until a later date to make their purchase and then missed out on the offer as a result. [Abendroth and Diehl \(2006\)](#) found that in a limited purchase opportunity, short-term regret associated with non-purchase is greater than satisfaction associated with purchase. Also [Swain et al., \(2006\)](#) and [Teng and Huang \(2007\)](#) acknowledged the mediating role of anticipated regret. However the latter researchers state that anticipated regret only plays a role when the product is personally involving. Other results of their study revealed that consumers have a lower satisfaction when the time restriction is *low*. They therefore conclude that high-involvement products should not be promoted with low time restrictions.

In general it could logically be reasoned that when consumers have less time (ability) to think about their possible regret, they make a quick decision. In this case time restrictions then may indeed give rise to purchase acceleration ([Aggarwal & Vaidyanathan, 2003](#)). Besides that, [Inman and McAlister \(2004\)](#) suggest that expiration dates of coupons may encourage a last-minute surge in redemption pattern just prior to the expiration date. This may happen because consumers are influenced by regret associated with foregone savings, but not thought about it till the moment before the expiration date ([Hanna et al., 2005](#); [Aggarwal & Vaidyanathan, 2003](#)).

3.7 Scarcity and competitive arousal

Competitiveness plays an important role in consumer decision making under conditions of scarcity. Competitiveness arises when the same product meets the preferences of at least two individuals but there is not enough to satisfy both. Successfully obtaining something scarce then signifies that one has won the competition ([Knowles & Linn, 2004](#)). According to this perspective, [Nichols \(2012\)](#) suggests that scarcity is an important antecedent for consumer competitive arousal, which is defined 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” ([Nichols, 2012, p. 193](#)).

When competitive arousal is triggered it affects rational decision making, as consequence consumers are then more likely to rely on heuristics to come to their judgement. Results of [Nichols \(2012\)](#) as well as [Aggarwal et al. \(2011\)](#) show that when products are advertised with scarcity messages (e.g. ‘only five per store, hurry in!’) people’s competitive instincts are activated and they make their choices accordingly. Results of [Nichols \(2012\)](#) indeed reveal that when a scarcity sales message was presented, participant had significantly higher performance anxiety, feelings of rivalry and perceptions of scarcity when compared with a sales message without a scarcity appeal. However it should be noted that this may depend on individual consumer differences, product type and purchase context. Despite that, results reveal that competitive arousal can be an important mediator, giving an explanation of the desirability of products that are scarce in quantity. Besides, [Gupta \(2013\)](#) found other proof that consumers experience competitive arousal when confronted with scarcity. Especially females, shopping in fast-fashion clothes stores experience this. When they notice that the

items that they want are scarce due to limited supply, they tend to hide or hoard those items. This behaviour is the result of competitive arousal, because they want to diminish the chance that other will acquire the same clothes (uniqueness seeking) or that it will be sold out (avoid loss, anticipated regret).

Table 6: Mediators

<i>Perspective</i>	<i>Mediators</i>
Self vs. others	<ul style="list-style-type: none"> - Uniqueness seeking - Seeking for conformity (bandwagon) - Status aspirations (snob) - Competitive arousal
Cognition and emotions	<ul style="list-style-type: none"> - Heuristic cue - Motivation enhancement - Anticipated regret
Product itself	<ul style="list-style-type: none"> - Assumed expensiveness - Popularity inferences - Quality inferences

4. Moderators

A moderator is a variable (qualitative or quantitative) that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable (Baron & Kenny, 1986). Here variables that moderate the effect of quantity and time scarcity on attractiveness, desirability, value and purchase intention are discussed (see table 7 for an overview).

4.1 Product type as moderator

Several researchers propose that product type or product category moderate the scarcity effect. For instance, Parker and Lehman (2011) brought up that the effect of relative (shelf-based) scarcity generalises to multiple product categories, but not with all food products. Although their paper provides no empirical evidence for this premise, they propose that this happens because consumers are aware that the last remaining units of a food product on the shelf are often leftovers which are near the expiration date. In addition, studies by Castro (2010) and Castro et al., (2013) looked at effects of relative scarcity in a retail environment with food and non-food products. They propose that food products are susceptible for consumer contamination effects and therefore compete with signals of scarcity. The distinction between foods vs. non-foods is thus an important antecedent in explaining the effect of relative scarcity on desirability and consequently purchase intention.

Products can be classified into two product types regardless if they are food or non-food. A “utilitarian product” is purchased task-oriented and objectively for problem-solving, whereas a “hedonic product” is purchased on the basis of intuition, symbolic value and emotional satisfaction (conspicuous consumption). A product is sometimes not solely hedonic or utilitarian; products can be both at the same time. Nevertheless, several researchers (Gierl et al., 2008; Gierl & Huettl, 2010, Ku et al., 2012; Ku et al., 2013) found that supply-caused scarcity appeals are more suitable for indubitable hedonic products, while demand scarce appeals are more suitable for indubitable utilitarian products. Van Herpen et al., (2009) in particular found similar results in the case of shelf-based scarcity.

According to Lynn (1992) consumers use a ‘scarce is expensive’ heuristic and associate limited availability with a higher price. However this is primarily expected with hedonic goods. In the case of utilitarian products or fast-moving-consumer-goods scarcity information leads to a ‘scarce is novel’ heuristic, which in turn leads to curiosity and increased perceived product attractiveness (Esch & Winter, 2010). Other results of this study revealed that the introduction of a limited edition may increase the brand attitude for a weak brand, while the attitude towards the strong brand did not change. Besides, for both the weak and the strong brand the introduction of a limited edition increased the perceived brand creativity. These results seem partially contradictory with the propositions of Gierl and Huettl (2010). They recommend that suppliers *only* use limited editions to promote conspicuous consumption goods and in the case of non-conspicuous consumption goods

(FMCG) they propose using signals indicating scarcity due to high demand. [Esch and Winter \(2010\)](#) showed that sometimes a FMCG can also be suitable for a limited editions.

Further research on quantity scarcity appeals found that they can sometimes interact with the brand concept ([Aggarwal et al., 2011](#)). Findings reveal that a restricted offer will have a stronger effect on purchase intentions for a symbolic brand than for a functional brand. However, [Tan and Chua, \(2004\)](#) show that vague quantity scarcity appeals, which concurrently indicate time scarcity (i.e. while stock lasts), can also be beneficial for a functional brand, but only in combination with a tensile claim and a substantial price discount. If this is not the case, the vague restriction arouses scepticism. Besides that, other researchers ([Balachander and Stock, 2009](#)) conclude that only the higher-quality product will benefit from offering it in a limited edition, whereas the firm with the lower-quality product will be hurt by such introduction.

The moderating role of product type on scarcity effects is such an important factor, that it will come back many times while discussing other moderating variables.

4.2 The moderating role of personality traits

A lot of research is conducted on factors that affect the strength of the relation between scarcity and preference. Also personality traits were believed to have influence on this relationship. In general consumer characteristics can be either demographic or psychographic. Demographic variables are for instance, age, financial constraint or mobile ownership. Psychographic variables, -which are discussed here- are for instance, shopping enjoyment, innovativeness, need-for-uniqueness, self-regulatory focus, and level of self-monitoring. It is found that psychographic characteristics explain consumer's response to promotional offer more than demographic traits ([Ailawadi et al., 2001](#)). It is however not completely clear which of these characteristics is more dominant when the product is actually scarce or when an offer contains a scarcity message.

4.2.1 Individual differences in need-for-uniqueness

The individual need-for-uniqueness (NFU) is often a moderating construct in studies on scarcity effects, since it impacts the desirability of scarce products significantly in beforehand ([Lynn & Harris 1997a; Snyder & Fromkin 1980](#)). The level of NFU can be seen as a personality trait and independently influences individual's use of scarcity information and their choices about scarce products ([Ward 2007](#)). Several studies found that subjects with a high NFU show a stronger preference for scarce commodities than those low NFU ([Lynn & Harris 1997b; van Herpen et al., 2008](#)). Moreover a meta-analysis of the literature found that the effect was (marginally) significant when combined across all relevant studies ([Lynn 1991](#)).

There is an essential difference in how high NFU consumers respond to the different types of scarcity (quantity vs. time) and scarcity in different product categories. High NFU consumers may respond different when scarcity appeal given on product than when scarcity appeal

given on promotional offer (i.e. discount) (Soni, 2013). A need-for-uniqueness can thus produce scarcity effects, but does not serve as a robust explanation for scarcity's value enhancement. This is not the case because some product types (e.g. convenience goods/functional goods) are just not suitable for social-identity functions (Lynn 1991). Also scarcity type is important, when products are scarce due to excess demand (many people possess them) they are not suitable for exhibiting distinctiveness (Gierl et al., 2008; Worchel et al., 1975). In other words, when a product already is owned by many others, those concerned with uniqueness should no longer desire it (van Herpen et al., 2009). Van Herpen et al., (2008) found indeed that the need-for-uniqueness increased preference for supply-caused scarce products, but not for demand-caused scarce products. Obtaining a supply-caused scarce product can thus be seen as self-distinguishing behaviour and implies concurrently that consumers who pursue uniqueness through consumption and have a high need for this, incur a utility loss if they encounter another purchaser of the identical product (Gierl & Huettl 2010). This is in line with results of Cheema & Kaikati, 2010, who revealed that when a product that is used in public had been adopted by a friend, high NFU consumers were less likely to buy the product than low NFU consumers.

Soni, 2013 also investigated the moderating role of NFU with different scarcity types, but only examined quantity scarcity vs. time scarcity vs. no-scarcity message accompanied with a promotional discount (25% off). This research is yet unpublished, but the findings are worth to be mentioned. He found for instance that both low and high NFU subjects did not notice any difference between a supply-caused scarcity appeal and a time scarcity appeal, but they did differentiate between scarcities (quantity/time) and no-scarcity message. Other findings show that for a functional product (laptop) scarcity offer as compared to no-scarcity offer did not have a differential impact on high NFU subjects, but did have a differential impact on low NFU consumers (i.e. purchase intention and attitude towards the product). Surprisingly, for a symbolic product (wrist watch), high NFU subjects had a higher purchase intention and perceived functional benefit in the no-scarcity condition than quantity/time scarcity condition. For low NFU subjects there was no difference in their response to quantity/time scarcity as compared to no-scarcity. Apparently, a symbolic product with scarcity appeal sometimes provides the perception of the product being common, so consumers with a high NFU might prefer to buy a symbolic product that is not on offer at all to maintain their uniqueness. Despite the fact that this study provides unexpected results, it verifies the importance of product type in affecting the persuasiveness of scarcity in promotional discounts for consumers with different NFU levels.

Gupta (2013) examined how male and female consumers with different NFU levels react on perceived scarcity within a retail setting (fast-fashion store). Perceived scarcity was split up in two separate constructs, scarcity due to limited supply and "just scarcity" where no specific reason for the cause was given. He found that when males with a high NFU perceive scarcity due to limited supply in such environment they have a higher urgency to buy as

compared to low NFU males. When they noticed supply scarcity of items in the racks it motivated them to hide or hoard scarce these items irrespective of NFU level. On the contrary, when no reason for the cause of scarcity was provided, NFU did not moderate scarcity's effect on urgency to buy, in-store hoarding and in-store hiding. These findings thus support the notion that the role of NFU is only significant in explaining scarcity effect when consumers assume that scarcity is caused by market circumstances (Verhallen & Robben, 1994).

4.2.2 Narcissism and scarcity

Besides an individual's need-for-uniqueness there are other psychographic personality traits. A study conducted by Lee and Seidle (2012) examined how narcissistic consumers engage in information processing in a scarcity-related purchase situation. 'Narcissistic consumers are people characterized by self-centred, self-aggrandizing and dominant tendencies' (Emmons, 1987). They revealed that narcissists have a stronger preference and purchase intention for scarce products (symbolic "limited edition" products) when compared to non-narcissistic consumers. Other findings show that narcissistic consumers tend to purchase scarce products without deliberate processing of information. This may happen because they put more weight on symbolic value than on other salient diagnostic characteristics like design, durability and accuracy. Narcissist see acquiring a limited edition product as an opportunity to validate their excessively positive self-view. Besides that, supply-caused scarcity tends to reduce their depth of information processing.

Lee and Seidle (2012) also discovered that for participants with high narcissistic characteristics the positive effect of scarcity was not affected by argument quality yet for low-narcissistic participants it did, but only when argument quality was strong compared to weak. Argument quality can thus also (besides product type/relevance) be seen as a moderator in scarcity's effect on purchase intention (see also information congruity).

4.2.3 Self-regulatory focus and scarcity

A study by Ku et al., 2012 examined yet another personality trait in relation to scarcity appeal effects, namely individual differences in consumers' regulatory focus goals. Chernev (2004) posits that cues (or attributes) compatible with individuals' regulatory orientation tend to be overweighted in choice. Consumer's "prevention focus" relates to responsibilities, duties and security, while "promotion focus" relate to ideals, hopes and aspirations. The motivational orientations ("prevention" vs. "promotion") of consumers thus may cause them to consider either safe options (e.g., compromise, average alternative, no-choice) or extreme options (e.g. inferior alternative) (Higgins, 1997; Park & Kim, 2010). These motivations may be distinguished not only in terms of the desirability of the end state, but also in terms of the strategies that can be adopted to achieve them (Aaker & Lee, 2001). Take into account that regulatory focus reflects inherent personal orientations (see table 2), but can also be primed (e.g. Chernev, 2004). Particularly Ku et al., 2012 found in both situations (primed vs. not primed) an interaction between scarcity appeal and goal orientation, in that demand-caused

scarcity (“two left, due to excess demand”) generated higher purchase intentions among prevention-focused consumers, whereas supply-caused scarcity (two left, due to limited supply) resulted in low purchase intentions. For promotion-focused consumer it was just the other way around. To rule out the influence of product type in this experiment, he used a digital camera as product because this product offers both hedonic and utilitarian satisfaction. These results are largely in harmony with [Esch and Winter’s \(2010\)](#) findings, who show that exploration seekers (“promotion”) express a significantly more positive attitude judgement and trial interest towards a limited product (supply-caused scarcity) than exploration avoiders (“prevention”).

Another experiment by [Ku et al., 2012](#), hypothesized that different products prompt different regulatory focus concerns, and thus leads to different reactions towards scarcity appeals. Findings confirm that when compared to the non-scarce condition, products associated with a prevention focus (sunscreen) enhanced purchase intentions when presented as scarce due to excess demand, but reduced intentions when presented as scarce due to limited supply. For products associated with promotion focus (perfume) purchase intentions were enhanced if scarcity was presented as supply-caused, but diminished when it was presented as demand-caused scarcity (in line with [Gierl et al., 2008](#) and [Gierl & Huettl, 2010](#); [Ku et al., 2013](#)). The discussed findings altogether confirm that psychographic personality traits are an important predictor in consumers’ response to quantity scarcity appeals and that product type moderates this effect.

4.2.4 Self-monitoring and scarcity

A follow-up study by some of the same authors investigates the extent to which the decision context and consumers’ level of self-monitoring moderates purchase intentions in response to quantity scarcity appeals ([Ku et al., 2013](#)). They thus propose that consumers’ purchase intentions for seemingly scarce products are influenced not only by product type but also by their expectations of how others will evaluate their decision, and by their propensity to self-monitor. The phenomenon of self-monitoring was first described by [Snyder \(1974\)](#); who defines it as personality variable reflecting the relative influence of internal vs. external cues on personal behaviour. “High self monitors” are individuals who regulate their self-representation for the sake of public appearance (impression management/affluent lifestyle), while “low self-monitors” lack this ability, and they therefore rely on internal beliefs and feeling (i.e. pursuing distinctiveness) rather than external factors.

Results demonstrate similar effects of product type as in their previous research ([Ku et al., 2012](#)). An additional experiment showed that when high self-monitors were told that their decision would be subject to third-party pressure to appear rational, they had higher purchase intentions for the demand-caused scarce product than for non-scarce product and lower purchase intentions for supply-caused scarce product (limited edition). When they were told that their decision would be subject to third-party pressure to appear emotional, the effect reversed. High self-monitors whose decision was private were less sensitive to

either demand-caused or supply-caused scarcity (purchase intention was not affected). On the other hand, low self-monitors considered demand-caused scarce products (but not supply-caused scarce products) regardless of whether they knew that their decision would be subject to third-party scrutiny or private (Ku et al., 2013). These results thus show that specifically high-self monitors are susceptible for demand-caused scarcity when they think that others will be judging how rational their choices are. On the contrary, when they will be judged on their emotional decisions they prefer supply-caused scarce products. This moderating effect of decision contextual influence on the effect of product scarcity was also empirically proven by (Gierl et al., 2008; Gierl & Huettl, 2010; van Herpen et al., 2005, 2009; Verhallen & Robben, 1994).

4.3 The moderating role of cognitive load

As discussed, actual scarcity and scarcity messages (quantity and time) have an effect on cognitive processing, hence the level of cognitive resources already available in consumers can be seen as a moderator. In other words, cognitive load has an effect on the effectiveness of scarcity messages on product judgement and on attitude polarization. In line of thought, Brannon and Brock (2001a) show that scarcity can lead to more extreme attitudes (negative or positive) via increased elaborative processing, however this is not the case when consumers are under high cognitive load. Yeo & Park (2009) show for instance that a scarcity message is only likely to produce a positive evaluation in a situation where cognitive resources are constrained. They propose that consumers are then unlikely to make inferences about the manipulative intent. On the other hand, when cognitive resources are available, inferences about the marketer's manipulative intent are more likely to occur because consumers then have the ability to retrieve persuasion knowledge for memory (Acquire-Rodriquez, 2013). This can in turn reduce or completely eliminate any positive consequence of the scarcity message. Mallalieu (2006) even postulates that only so-called final stage consumers, namely, people who have processed all relevant product information (and thus have a small amount of cognitive capacity left) and are on the brink of their buying decision, are strongly affected by scarcity information and thus tend to buy the scarce product. We saw throughout this review that this is not always the case, because scarcity can also trigger consumers to the store.

4.4 The influence of brand familiarity, product involvement and prior preferences

Here is discussed how brand familiarity, strong prior preferences and product involvement can dwindle the effectiveness of actual scarcity, but also scarcity appeal messages given with promotional offers. Parker and Lehmann, 2011 (p. 142) state that "shelf-based scarcity is only likely to affect choices when consumers lack strong prior preferences, under conditions where price promotions are either not present or similar across alternatives" and when the information provided is congruent. They propose that there are factors that possibly moderate the relationship between popularity inferences and preference.

4.4.1 The influence of consumers' familiarity with the brand

Product familiarity is a key factor of purchase intention which stems from product knowledge as well as experience. Besides purchase intent, it has impact on perception, response and evaluation of a promotion. It is likely that in a supermarket consumers rely on prior knowledge of the product category or the familiarity with the brand. When consumers are unfamiliar with the brand or product category they may be influenced by the actions of others because they believe that others' decisions reflect information they do not possess (e.g. [Huang & Chen 2006](#), [Jung & Kellaris 2004](#)). Here, consumers make a logical judgment on the basis of circumstantial evidence, a so-called context-specific choice strategy ([Simonson & Tversky, 1992](#)). They rely on naturally occurring cues in the retail environment and evaluate a particular alternative in the context of the other alternatives that are currently displayed on the shelf. [Castro \(2010\)](#) and [Castro et al., \(2013\)](#) found that when product availability was not attributed to popularity there were no differences in purchase intentions for familiar or unfamiliar brands across availability conditions (consistent with [Lynn 1992](#); [Verhallen 1982](#); [Verhallen & Robben 1994](#); [Worchel et al., 1975](#)). However when consumers inferred that a product was scarce due to popularity (in both manipulation conditions), purchase intentions increased for the unfamiliar brands, but not for familiar brands ([Castro 2010](#); [Castro et al., 2013](#)). Consumers purchase intention for scarce products is thus dependent on their perception of the cause for scarcity (as we already saw) but also on consumers' familiarity with the brand. When consumers are unfamiliar with the product and it appears to be popular, they apply bandwagon reasoning. Otherwise, consumers who are familiar with the product disregard popularity cues in the environment because there is no need to rely on the choices of others. Familiarity with the brand thus mitigates the effect of perceived quantity scarcity on purchase intent. This was also supported by [Bae and Lee \(2005\)](#) who found that the effect of a quantity scarcity message is greater when consumer's product knowledge is low rather high. Furthermore, [Huang et al., \(2011\)](#) found that familiarity positively moderates the effect of time scarcity on purchase intention in an online context.

4.4.2 The moderating role of consumer involvement and prior preferences

Consumer involvement is the perception of the extent to the depth of relation between individual's need, sense of worth and interests of product ([Zaichkowsky, 1985](#)). Individual, product, stimulus and context are the factors that influence the extent of involvement ([Huang et al., 2011](#)). Here only product involvement is discussed. If a consumer finds a product interesting, he or she will naturally show more attention and more active information searching and decision making; reversely, consumer will spend less time on it. [Ward, 2007](#) suggests that consumers' dependence on scarcity as a heuristic is particularly effective in low-involvement choices, not in high-involvement choices. In addition, [Bae and Lee \(2005\)](#) suggest that the effect of quantity scarcity message on consumer's purchase intention is greater when product involvement is low rather than high. This seems logical since consumer involvement is a measurement of consumer attention and concentrating level of a certain product, the more important a product is for the consumer, the more

careful he or she will be in making a decision (Huang et al., 2011). In Parker & Lehman's (2011) paper on shelf-based scarcity they investigated the influence of scarcity on choice with real brands in repeat-purchase categories (FMCG), and if the power of scarcity holds with real choices. Findings show that consumers' prior preferences strongly weaken the effect shelf-based scarcity on preferences.

Bae and Lee (2005) also found that the effect of a message with a time restriction is greater when product involvement is low rather than high. Similarly Huang et al., (2011) suggest that the effect of time pressure in an online context is negatively moderated by consumer involvement. In other words, the higher involved a consumer is, the weaker the effect of time pressure; the lower involved a consumer is, the stronger the effect of time pressure.

4.5 The detrimental influence of competing cues

The effect of actual scarcity and scarcity appeals can be diminished by competing cues. These competing cues comprise of a contradiction between the actual level of scarcity and the message in the scarcity appeal (thus not heuristic cue vs. product message content), Other competing cues are price promotions and perceived consumer contamination.

4.5.1 Competing cues in the retail environment

Parker and Lehmann (2011) conducted several studies on scarcity, and found that the choice share of a real demand-caused scarce product is affected by other information. They show that an explicit popularity cue like sales ranking information (e.g. #1 selling product in category) has a stronger effect on preference than relative shelf-based scarcity. In thus tends to weakens the impact of relative scarcity on choice. Especially when the information was incongruent (abundant product*#1 selling product), preference for the scarce alternative reduced. Besides this study, they conducted a similar study on cues that compete with the scarcity heuristic. In this second study they investigated how the choice share of a scarcer product (wine) varies across various quality ratings. As expected, they found that quality cues which suggest low quality, significantly reduced the effect of relative scarcity on the choice. Thus, when in a retail shopping environment sales rankings (=popularity) or quality cues (ratings) are incongruent with those inferred from demand-caused shelf scarcity, preferences for the scarcer alternative will be weakened (Parker & Lehman, 2011). The last study they carried out in this particular paper was on the impact of price promotions (competing cue) on effects of relative scarcity. They came across the knowledge that the participants tended to ignore relative scarcity when a price promotion was available. However, when they left out the price promotion the choice share of the scarce product was much higher. So a price promotion definitely interferes with scarcity's effect on preference.

Two studies, Castro (2010) and its sequel Castro et al., (2013) examined the interaction of some of the competing cues found by Parker and Lehmann (2011). They were able to isolate scarcity's effect on quality inferences with the use of commonly purchased consumer goods (FMCG). Both studies explore how shelf display cues (i.e. disorganization), brand

characteristics and product type (non-food/food) affect preferences for products that are scarce. They show that shelf-based scarcity due to market circumstances sometimes increases purchase intentions, but also sometimes decreases purchase intentions.

4.5.2 Shelf-based scarcity and consumer contamination

In two studies (Castro, 2010; Castro et al., 2013) products were presented as scarce on the shelf and the cause of scarcity was manipulated by altering the appearance of the shelf (organized = supply-caused scarcity vs. disorganized = demand-caused scarcity). The results show that in the disorganized condition consumers were more likely to buy familiar food products when the products were abundant, than when they were scarce. In this case scarcity decreased purchase likelihood of the familiar product because consumers thought that others contaminated it. However Castro's (2010) results also reveal that this only happens in when the product is not on sale. Price promotions thus mitigate the negative effects of contamination and scarcity. Consumers are apparently able to overcome feelings of disgust. For unfamiliar food products there was no difference in purchase likelihood between the availability conditions. In this condition (unfamiliar/food product/disorganized), perceived contamination and popularity inferences cancel each other out. When scarcity was not attributed to popularity (i.e. organized condition) no negative contamination effects were uncovered. This implies that scarcity on its own does not imply contamination, but it does in combination with a disorganized shelf display and a familiar food product. Shelf-based scarcity may increase perceptions of contamination, but only when consumers infer that contamination has already occurred (Castro et al., 2013).

4.6 The influence of message/source credibility and persuasion knowledge

The concept of persuasion knowledge originally stems from Friestad and Wright (1994). A few studies examined if scarcity activates persuasion knowledge. Yeo and Park, 2009 show for instance that a scarcity appeal can have a positive impact on evaluation of the product, but only when consumers are under high cognitive load (and thus rely on heuristic processing) so that inference processes regarding the manipulative intent are unlikely to operate. This implies that when consumers' cognitive resources are not restricted they process a scarcity message systematically and thereby it is possible that persuasion knowledge is retrieved from memory. In addition Acquire-Rodriquez, 2013 found that that supply-caused scarcity appeal messages are less likely to activate persuasion knowledge than demand-related scarcity appeal messages. Moreover he demonstrates that message specificity moderates this effect, that is, stating the appeal in specific (versus vague) terms decreases the persuasiveness of supply-caused scarcity appeal messages. Yeo and Park, 2009 also show that scarcity in a marketing communication can have a positive impact on consumer evaluation of the product, but only when consumers are under high cognitive load (and thus rely on heuristic processing) so that inference processes regarding the manipulative intent are unlikely to operate.

Table 7: Moderators

Perspective	Moderator(s)
Self	<ul style="list-style-type: none">- Psychographic personality traits- Initial product involvement- Cognitive load- Persuasion knowledge
Situation	<ul style="list-style-type: none">- Competing cues (in environment)
Message/source	<ul style="list-style-type: none">- Information congruity
Product	<ul style="list-style-type: none">- Product category (hedonic vs. utilitarian)- Price/discount level

6. Conclusion and discussion

6.1 Conclusion

This overview of the scarcity literature made a clear distinction between scarcity types, and shows how each type ultimately affects consumers' purchase intention. It answers the general research question which was the following: How do consumers respond to actual product scarcity, quantity scarcity appeals and time restrictions?

Scarcity was found to have an effect on purchase intention when consumers make inferences about the self versus fellow consumers (status seeking, competitiveness) or make inferences about the scarce product itself (e.g. assumed expensiveness) (see table 6). Furthermore, consumers' preference for scarce products mediated by cognitive elaboration and emotions. These mediating processes tend to create an urgency to buy in the consumers mind. We also saw that actual quantity scarcity is more likely to evoke inferences about the self versus others and/or the product itself, while (artificial) scarcity appeals (quantity and time) are more likely to affect the transaction value of the deal and anticipated regret.

The conception of urgency might arise in the first phase of the decision making process; the need recognition phase. The scarce product then provides a utility for the consumer in the first place, and is therefore more desirable (i.e. it satisfies uniqueness needs). However urgency can also arise in a later phase; i.e. information search and alternative evaluation. This happens when consumers infer that the scarce product is of better quality than other alternatives or when they experience competitiveness and consequently want to diminish the chance that the product will be sold out completely. Scarcity can even affect post-purchase evaluation in that it is likely to mitigate feelings of regret after purchase. In this case consumers might justify their purchase a bit easier, because they see themselves as a 'smart shopper' when they for instance purchased a product in a restricted promotional discount.

While exploring the mediating processes, I came across quite some moderators. These moderating constructs affect the strength of the scarcity effect directly or indirectly. The moderators can be divided in different perspectives; the self, the situation, the message or source, and the product (see table 7). It was found that these moderators often relate to a specific scarcity type. The 'need-for-uniqueness' has a strong influence on the desirability of actual supply-caused scarce products, while persuasion knowledge, message credibility and information congruity strongly influence the perceived seductiveness of quantity and time scarcity appeals in marketing communications. Product category and price interact with all types of scarcity.

6.2 Implications

Scarcity has the tendency to increase the purchase likelihood of the product or the product in a deal, but only when the product or deal is personally relevant and the moderating processes do not downsize a consumers' perceived value. Moderators also influence how

consumers respond to scarcity. When the moderators have no or minor influence on the scarcity cue consumers tend to process scarcity information heuristically. On the contrary, when the moderators substantially interact with the scarcity cue, consumers have a greater tendency to process information systematically. They then focus more on other aspects of the product or message. Retailers should thus always be aware that their scarcity appeal does not interfere with the message or product type, because it may then hurt sales more than it will increase them.

We also saw that brand familiarity is a key moderator of the scarcity effect. It is therefore recommended that especially with time limits retailers should make a well introduction of a product and its attributes. Moreover they can give away trial products in order to improve the product familiarity of consumers, and thus, in the end improve the efficiency of the time-limited promotion.

Besides this, there are certain issues with the use of scarcity appeals in online situations where retailers should be aware of. Retailers from all over the world start webshops, which made the market a lot more transparent than before the advent of e-commerce (Grewal, Iyer, & Levy, 2004). Consumers became more and more aware of supply and demand of a product or service because they reach much more retailers than before. This raises the question if limited availability at one webshop really indicates scarcity, since consumers know that they have the possibility to browse other webshops. Another issue with online shopping is that consumers have easy accessibility to customer reviews of products. It is thus plausible that this may interfere with the effect of demand-caused scarcity on quality inferences. Finally, another issue is that it is likely that consumers are less prone to a scarcity appeal in an online context. This is caused by the frequent and continuing use of a wide variety of online promotions. These issues point out that in an online situation there are definitely other cues that compete with scarcity than in an offline situation. Retailers should be aware of this, because it may hurt their sales when they don't.

6.3 Future research

As became clear throughout this overview already a large number of researchers proved the effectiveness of scarcity (messages) in advertisements and off-line shopping situations (e.g. Eisend, 2008; Innman et al., 1997; Jung & Kellaris, 2004; van Herpen et al., 2009), while research on scarcity effects in an online context is still limited. Moreover studies on this are, to my knowledge, all conducted in Asian countries (Bae & Lee, 2005; Gwee & Chang, 2013; Jeong & Kwon, 2012; Zheng, et al., 2013). It would be interesting to extend these studies because nowadays more and more e-commerce vendors use scarcity tactics. E-tailers know that stockouts cost sales and customers, but also know that nearly stockouts can serve as an extra nudge in a quick and/or unplanned purchase decision. A relatively new trend are daily deal websites, where consumers have limited time (e.g. couple hours to one day) to purchase a special offer. These websites publish the daily deals to their member communities via email and mobile channels and promote the deals using online news feeds

in social media channels such as Facebook and Twitter. Given the threat of a sell-out, perceived scarcity then might become a heavy motivator in a quick purchase.

The goal of this overview was to provide the literature for a follow-up study (i.e. master thesis). The follow-up study attempts to find out if consumers' inferences are different when confronted with quantity versus time scarcity in an online situation. It furthermore attempts to explore which 'force' is stronger when individuals shop online; the urgency to buy fast due to quantity or time scarcity, or the option of not buying at all.

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Appendix I: Studies on shelf-based scarcity

Table 3: Overview of studies examining shelf-based scarcity

Author(s)	Product type	Manipulation	Outcome
Castro (2010)	Non-food FMCG [real brand]	a) Respondents were told of product's success b) Depleted inventory levels c) Disorganized shelf display	Higher purchase intention for unfamiliar brands, not for familiar brands
	Food FMCG [real brand]	(a) Depleted inventory levels (b) Disorganized shelf display	Lower purchase intention for familiar brands due to contamination (not when on sale). No difference in purchase intention for unfamiliar brands
Castro et al., (2013)	Non-food FMCG [real brand]	(a) Depleted inventory levels (b) Disorganized shelf display	Higher purchase intention for unfamiliar brands, not for familiar brands
	Food FMCG [real brand]	(a) Depleted inventory levels (b) Disorganized shelf display	Lower purchase intention for familiar brands due to contamination. No difference in purchase intention for unfamiliar brands
Parker & Lehmann (2011)	Wine [fictional brand]	Depleted inventory level (due to excess demand)	a) Positive effect on quality inferences (due to popularity inferences) and consequently preference, regardless of whether subjects were making choices for themselves or for others. b) scarcity's positive effect on preference was weakened by incongruent sales ranking information and quality ratings.
	Non-food FMCG e.g. toilet paper, deodorant [real brands]	Depleted inventory levels (due to excess demand)	Positive effect on preference. However the effect was weakened by brand familiarity
	[real choice]	Toothpaste, bandages, hand soap and soup [real brands]	Depleted inventory levels (due to excess demand)

	Motor oil [real brands]	Depleted inventory levels (due to excess demand)	Positive effect on preferences, but only when consumers (a) lack strong prior preferences and (b) no price promotions where presented
van Herpen et al., (2008)	Wine [fictional brand]	Pre-condition: High involved participants	Irrespective of scarcity cause, the scarce product was preferred over the non-scarce one
		Depleted inventory (due to excess demand)	Positive effect on popularity inferences. Consumers' preference for the product is not moderated by NFU
		Depleted inventory (due to limited supply)	Positive effect on inferences of product exclusiveness, consequently only consumers with a high NFU show a preference for the product
	Shirts [fictional brand]	Depleted inventory (due to excess demand)	Positive effect on popularity inferences. Consumers' preference for the product depends on the possible ownership by relevant others (store location)
Depleted inventory (due to limited supply)		Positive effect on inferences of product exclusiveness. Consumers' preference for the product does not depend on store location	
van Herpen et al., (2009) [realistic virtual environment]	Wine [fictional brand]	Depleted inventory (due to excess demand)	Positive effect on quality inferences (due to popularity inferences) and consequently purchase intention. Increased cognitive elaboration
	Shirts [fictional brand]	Depleted inventory (due to limited supply)	Positive effect on preference irrespective of spatial distance
		Depleted inventory (due to excess demand)	Positive effect on preference, yet reverses when individuality is threatened by the proximity of fellow consumers
Ward (2007)	Clocks [fictional brand]	Depleted inventory (a) typical display (b) backstock inventory	Positive effect on preference, but only in backstock inventory condition.
		(a) scarce backstock inventory (b) sales information (c) level of involvement	Consumers' dependence on scarcity as a heuristic is particularly effective in low-involvement choices, not in high-involvement choices.

(a) scarce back stock inventory
(b) sales information
(c) priming with either uniqueness related or conformity-related information

Conformity prime increased preferences for a demand scarce clock. Consumers predisposed to maintain their sense of uniqueness were more susceptible to social proof cues.

(a) scarce backstock inventory
(b) sales information with demand ubiquity
(c) priming with either uniqueness related or conformity-related information

(a) Preference of subjects primed with uniqueness diminished when the clock had already been sold to many others
(b) Subjects primed with conformity showed an increase in their preference for the clock that was owned by many.

Appendix II: Studies on quantity scarcity appeals in promotions

Table 4: Studies on the effect of quantity scarcity appeals

Level of detail	Nature of scarcity	Authors	Scarcity appeal manipulation (message)	Outcome
Vague	Limited supply	Gierl et al., (2008)	“limited edition” “as long as stock lasts” “limited units available”	a) Positive effect on desirability of conspicuous consumption goods (not for non-conspicuous consumption goods) b) “Limited edition” intensifies the persuasive impact of strong attribute arguments (but not weak arguments)
	Limited supply	Gierl & Huettl (2010)	“due to limited supply, only while stock lasts”	Positive attitude towards the product
	Limited supply	Aggarwal et al. (2011)	“limited quantities only”	Positive effect on purchase intention
	Excess demand	Gierl & Huettl (2010)	“due to high demand, only a few units left” “due to high demand, nearly sold out”	Positive attitude towards the product
	Combination	Tan & Chua (2004)	“while stock lasts”	Positive effect on the perceived informational value of the offer, but only with exaggerated discount
	Combination	Soni (2013)	“25% discount, only limited stock”	No effect on purchase intention and attitude towards the product
	Combination	Bae & Lee, 2005	Message with quantity scarcity (not specified)	Higher purchase intention as compared to non-scarcity message
	Quantity restriction in POP*	Yoon & Vargas (2011)	“40 % off, limit 5 per customer” “20% off, limit 3 per customer”	Discount with an upper quantity restriction leads consumers want to buy more than the specified amount.

	Quantity restriction in advertisement	Lessne & Notarantonio (1988)	"limit 4 per customer"	Greater purchase intention than advertisement without a limitation
Explicit	Limited supply	Aggarwal et al. (2011)	"first 100 customers only"	Positive effect on purchase intention
	Limited supply	Gierl & Huettl (2010)	"due to limited supply, only ... units available"	Increased perception of scarcity and positive attitude towards the product
	Limited supply	Inmann et al. (1997)	"limit X per customer" "restricted offer, maximum 1 product per customer"	a) Positive effect on product sales, brand choice and estimation of sales success b) Positive effect on deal evaluation and purchase intention (but only with a substantial discount level)
	Limited supply	Wu et al. (2012)	"because it is a limited edition, supplies are only limited in 20"	Positive effect on value and consequently purchase intention through a) assumed expensiveness b) perceived uniqueness
	Limited supply	Ku et al. (2013)	"two items in stock due to limited supply"	Increased purchase intention for the hedonic product (not for the utilitarian product)
	Limited supply	Steinhart et al. (2013)	"t-shirt is limited edition and only available in selected stores"	Increased involvement toward the product and consequently purchase intention
	Limited supply	Eisend (2008)	Advertisement of limited edition sunglasses	Enhanced value perception and consequently purchase intention. Mediated by perceived influence on self compared to others
	Limited supply	Gierl et al., (2008)	"only 10.000 units available"	Positive effect on desirability of conspicuous consumption goods (not for non-conspicuous)

			consumption goods)
Combination	Jung & Kellaris (2004)	“two bottles (of wine) left in town”	Positive effect on desirability of the product. a) Brand familiarity mitigates scarcity effect. b) Scarcity effect was different for American respondent than French respondent
Excess demand	Gierl et al., (2008)	“only five units in stock” [online]	No effect on desirability of the non-conspicuous consumption good
Excess demand	Ku et al. (2013)	“two items in stock due to excess demand”	Increased purchase intention for the utilitarian product (not for hedonic product)

*POP: point-of-purchase promotion

Appendix III: Studies on time scarcity appeals in promotions

Table 5: Studies on time scarcity appeals

Level of detail	Author(s)	Scarcity appeal message	Outcome
Vague	Aggarwal et al. (2011)	“for a limited time only”	Positive effect on purchase intention
	Suri et al. (2007)	“limited time”	Positive effect on quality inferences
	Bae & Lee (2005)	Message with time limit (not specified)	Higher purchase intention as compared to non-scarcity message
Explicit	Lessne (1987)	“one day only” sale	Greater purchase likelihood than sale of longer or unstated duration
	Aggarwal & Vaidyanathan (2003)	“3 days only”	a) Negative effect on willingness to wait b) Positive effect on purchase intention (acceleration)
	Aggarwal et al. (2011)	„6 days“	Positive effect on purchase intention
	Gierl et al. (2008)	“discount valid one week only”	Positive effect on desirability (i.e. attractiveness, interest and purchase intention) of the product
	Griskevicius et al. (2009)	“limited-time offer ends this week” “only three days left”	Partially positive effect on desirability of the product
	Inman et al. (1997)	“offer expires on...” “offer available till...” “restricted offer”	Positive effect on deal evaluation and purchase intention (but only with a substantial discount level)
	Brannon & Brock (2001b)	“offer only valid today”	Increased scrutiny of message merit
	Sinha et al., (1999)	“offer valid for one week” “only on Thursday/Friday”	Negative effect on deal evaluation (i.e. restriction obfuscates deal value)
	Swain et al., (2006)	“valid for 5 days”	a) Negative effect on purchase intention (trough negative effect on deal value)

		b) Positive effect on purchase intention (through perceived urgency and anticipated regret)
Brannon & McCabe (2001)	“special recipe today only” [real environment]	Increased scrutiny of message merit. Positive effect on sales when the message is strong, but not when the message is weak.
Devlin et al., (2007)	Non, 10%, 35% discount “for one week only”	a) No direct impact on value perception, searching further information and purchase intention. b) Huge interaction between limited time and discount percentage.
Shen (2011)	“available only one week” “available for 6 months”	When time limit is incongruent with message content, consumers rely only on message content
Dhar & Nowlis (1999)		Propensity to delay choice decreases with increased time pressure
Inmann & McAlister (2004)	Specified coupon expiration date	Last-minute surge in redemption pattern just prior to the expiration date.
Gierl et al., (2008)	“only available for one week” “only available for four weeks”	a) No effect on desirability of the conspicuous consumption good irrespective of degree of scarcity b) Positive effect on the desirability of the non-conspicuous consumption goods, but only when time limit is short
Huang et al., 2011		