INVESTIGATING ONLINE SHOPPING BEHAVIOUR ON MOBILE AND FIXED DEVICES: THE IMPACT OF SCARCITY AND POPULARITY CUES

BY

TESSA HOFFMAN

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Abstract

Smartphones have become ubiquitous in consumers' lives and have been identified as an important online channel. However, consumers have indicated a preference for purchasing products through their fixed devices, such as computers, and few studies have investigated situations where consumers might indicate greater purchase intentions on their mobile devices. This research examines the influence of scarcity messages and popularity cues on purchase intention in the context of online shopping. Two experiments were conducted to evaluate the differences between consumers using mobile and fixed devices.

Study one was a 3 (scarcity: limited quantity vs limited time vs no scarcity) x 2 (device: fixed vs smartphone) between-subjects design (N = 236). Study one found that in an online shopping context, limited-quantity scarcity messages (e.g. limited stock available) had a negative effect on purchase intention regardless of the consumer's device. Furthermore, a consumer's scepticism of advertising moderated the relationship. Perceived risk of online shopping was found to moderate the relationship between device and purchase intention.

Study two was a 2 (scarcity: limited quantity vs no scarcity) x 2 (popularity: ranking vs no ranking) x 2 (device: fixed vs smartphone) between-subjects design (N = 244). The study showed that a popularity cue had a positive effect on purchase intention. However, scarcity had no effect on purchase intention. Consumers in the smartphone conditions also had lower purchase intentions but this was not impacted by the inclusion of a scarcity message or popularity cue. Interestingly, credibility of the content did not moderate the relationships between scarcity and purchase intention, or popularity ranking and purchase intention.

These findings suggest that online scarcity messages do not increase purchase intention, in contrast to previous offline studies. The moderating role of scepticism on the scarcity message and purchase intention relationship indicates that consumers are suspicious of scarcity messages in an online context. However, it appears popularity cues enhance consumer purchase intentions online. Neither a scarcity message or a popularity cue increased purchase intention on a smartphone. The research demonstrates that scarcity messages are not as effective online as they have been shown to be in an offline context and that further research is required to understand how to increase consumer purchase intentions when shopping on a smartphone.

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Chapter 1: Introduction

There is an increasing number of retail channels for a consumer to interact with (Chatterjee & Kumar, 2016; Verhoef, Kannan, & Inman, 2015), and each channel has the potential to add value to the customer experience (Bendoly, Blocher, Bretthauer, Krishnan, & Venkataramanan, 2005; Berry et al., 2010; Binder, 2014). Depending on the channel they are using, consumers may exhibit different behaviour (Verhoef et al., 2015). Online channels are an important part of consumers' lives, and understanding how consumers use mobile channels compared to other online channels is important for retailers (Thakur, 2016). The integration of mobile devices into the decision-making journey has transformed the shopping experience, as they bridge offline and online environments simultaneously (Groß, 2016; Shankar et al., 2016). Mobile devices, such as smartphones, are distinctly different to laptops and desktop computers because of their portability, smaller screen and keyboard size, and functionality (Ström, Vendel, & Bredican, 2014). One industry report estimated that on a weekly basis 80% of global smartphone users access the internet and 20% make a purchase via their smartphone (Evans, 2017b). In the United Kingdom, which is considered an advanced digital commerce market, retailing is expected to account for 55% of mobile purchases by the end of 2017 (Evans, 2017b) In comparison, transport, foodservices, and entertainment account for 18% of mobile purchases in combination. In New Zealand, mobile internet retailing increased by 71.6% between 2014 and 2015 and was worth NZD$609 million in 2015 (Euromonitor, 2016). While store-based retailing in New Zealand declined by 0.4% over the same period but was worth NZD$43,889 million in 2015 (Euromonitor, 2016).

Although smartphones are not expected to completely replace computers or in-store purchasing, they are an evolving part of the customer experience (Evans, 2017a). In response, the retail environment has changed substantially and retailers are increasing their use of online channels, alongside offline channels (Verhoef et al., 2015). However, more research is required to understand how consumers behaviour is impacted by the use of smartphones during the decision-making process (Holmes, Byrne, & Rowley, 2014; Thakur, 2016).

Persuasion claims are messages commonly used by retailers to increase the desirability of a product and motivate consumers to purchase (Howard, Shu, & Kerin, 2007; Stafford, 1999). The effectiveness of a persuasion claim is influenced by the consumer's environment because it can change how they process the message (Petty & Cacioppo, 1986). For example, consumers use their shopping environment to make inferences about the extent of product scarcity (van Herpen, Pieters, & Zeelenberg, 2009). Scarcity is a persuasion claim based on the idea that consumers prefer products that have limited availability (Cialdini, 2008). In comparison, popularity functions as a persuasion claim by suggesting other consumers have been interested in the product (Dean, 1999; Nelson, 1970). Both techniques are widely used by online retailers, however research has tended to focus on the offline environment, and there are a number of differences between online and physical channels (Jeong, Fiore, Niehm, & Lorenz, 2009).

1.1 Background and Rationale

Previous research on retail channels has studied the adoption of internet channels from both a consumer's (Blázquez, 2014; Lemon & Verhoef, 2016) and a retailer's perspective (Neslin et al., 2006; Verhoef et al., 2015). There is an increase in the use of online touchpoints throughout the consumer decision-making journey (Anderl, Schumann, & Kunz, 2016; Lemon & Verhoef, 2016). For example, consumers can use their computer and smartphone before completing a transaction in-store, or browse a physical store while also looking at an online store on their smartphone. Each channel has the opportunity to add value and benefit the consumer (Bendoly et al., 2005; Binder, 2014). As a channel, mobile devices have the potential to be influential on retailing (Zhang et al., 2010), because of the convenience and on-the-go internet access they provide (Kleijnen, de Ruyter, & Wetzels, 2007; Lee, Kim, & Kim, 2005).

Conversely, mobile conversion rates are low, highlighting that consumers prefer to purchase on fixed devices such as computers (de Haan, Kannan, Verhoef, & Wiesel, 2015). Specifically, consumers' perceived risk has been identified as a barrier to mobile shopping (Groß, 2016; Hubert, Blut, Brock, Backhaus, & Eberhardt, 2017). Despite research identifying differences between computers and mobile devices (de Haan et al., 2015; Ström et al., 2014; Wang, Malthouse, & Krishnamurthi, 2015), studies focusing on consumer behaviour often consider the internet as one channel irrespective of how the consumer

accesses the online store (e.g. Herhausen, Binder, Schoegel, & Herrmann, 2015; Lee & Kim, 2010). Thus, more research is needed to understand consumer behaviour on both mobile and fixed devices within the consumer decision-making process.

Prior literature has proposed that time pressure encourages consumers to purchase using their smartphone because they are convenient for quickly making a purchase decision (Hubert et al., 2017; Ström et al., 2014). To create time pressure, some retailers use scarcity messages (Aggarwal, Jun, & Huh, 2011). Scarcity messages can influence consumer behaviour because consumers perceive a scarce good to be of higher value (Brock, 1968; Cialdini, 2008; Eisend, 2008). Thus, consumers exhibit greater product preference and purchase intention for scarce products (Inman, Peter, & Raghubir, 1997; Jung & Kellaris, 2004; Lee, Oh, & Jung, 2014). Although considerable research has been devoted to scarcity, rather less attention has been paid to scarcity in an online context.

Only two studies have directly examined online scarcity, and neither investigated the impact of a mobile channel. Jeong and Kwon (2012) found a scarcity message had no impact on purchase intention, while Wu and Lee (2016) found a scarcity message positively influenced purchase intention. Consumer's scepticism has been identified as one reason scarcity does not impact purchase intention (Aguirre-Rodriguez, 2013). Conversely, Jeong and Kwon (2012) suggest credibility can improve a consumer's perception of scarcity. Popularity is another form of persuasion that is commonly used online (Griskevicius et al., 2009; Sher & Lee, 2009), and potentially impacts the effectiveness of scarcity (Deval, Mantel, Kardes, & Posavac, 2013; Steinhart, Kamins, Mazursky, & Noy, 2014). Therefore, this research investigated the effect of persuasion claims on purchase intention, in the context of shopping on a mobile and fixed device.

1.2 Research Purpose and Objectives

The purpose of this research is to understand online shopping behaviour on mobile and fixed devices when scarcity and popularity cues are present. Specifically, the research objectives are to:

1. Examine the effect of mobile and fixed devices on purchase intention
2. Compare the impact of scarcity and popularity cues on purchase intention across devices

3. Test the moderating effects of scepticism, credibility, and perceived risk of online shopping on these relationships

1.3 Research Contribution

This research contributes to online channel literature, scarcity theory and online popularity research. The study of consumer behaviour on different online channels is important for marketing academics because of the possible disparities between mobile and other online channels. Specifically, this research directly compares the use of mobile and fixed devices when purchasing online, as more research is needed in this area. Additionally, the research tests the effectiveness of scarcity messages and popularity cues on purchase intention in an online environment. It contributes to the limited knowledge of scarcity theory when applied to online purchasing, as it remains largely unclear whether scarcity messages increase purchase intention online. Furthermore, the investigation of popularity cues contributes to online persuasion claim literature through comparing them to scarcity.

The primary contribution of this research is to develop and empirically test two models within an online shopping context to understand how persuasion claims impact purchase intention and investigate the effect of different devices. This research is different to prior studies because it investigates online persuasion claims and compares their effectiveness across mobile channels and other online channels. This contribution to marketing theory is valuable to academics as it further develops the understanding of scarcity theory in an online context, which is a growing research area. Furthermore, the research compares scarcity messages and popularity claims as two types of online persuasion claims that are commonly used online. These are valuable insights from a practitioner's perspective because they have the potential to affect conversion rates and the profitability of a retailer's online channels.

1.4 Thesis Outline

This thesis is divided into six chapters. This introductory chapter is followed by Chapter 2 which contains the literature review. Existing literature in the areas of online channels and persuasion claims is reviewed to identify key constructs and inform the design of the studies. Chapter 3 details study one and forms the conceptual model, and outlines the measures, sample, and data collection process. The chapter also contains a discussion of

the results. Chapter 4 details study two and develops the conceptual model, outlines the method, measures, sample, and data collection, and provides a discussion of the results. Chapter 5 discusses the overall results in terms of existing knowledge. Lastly, Chapter 6 includes a summary of the conclusions, discussion of contributions, and identification of limitations and opportunities for future research.

Chapter 2: Literature Review

The following chapter outlines the main streams of research from the marketing domains of retailing and persuasion claims. The chapter reviews the principal concepts within retail channel and persuasion claim research. Furthermore, the current understanding of online channels within consumer research is discussed, followed by an overview of persuasion literature with a focus on scarcity and popularity.

2.1 Retail Channels

2.1.1 Retail Channel Innovations

The field of retailing is complex because it involves numerous interrelated topics such as distribution, location, pricing and promotions, merchandising, customer loyalty, e-tailing, and retail branding (Barlow, Siddiqui, & Mannion, 2004; Hart, Doherty, & Ellis-Chadwick, 2000; Kamakura, Kopalle, & Lehmann, 2014). Over the last two decades, many retailing topics have been impacted by the creation of online channels and the ongoing digitalisation of back-end systems and customer touch points (Leeflang, Verhoef, Dahlström, & Freundt, 2014; Verhoef et al., 2015). In some retail markets, the introduction of online channels has been considered a disruptive development because of their impact on the retail mix and consumer behaviour (Christensen, Raynor, & McDonald, 2015; Verhoef et al., 2015). In mature markets especially, retailers need to deliver superior value to consumers by redesigning retail processes and using technology to better meet consumer needs (Reinartz, Dellaert, Krafft, Kumar, & Varadarajan, 2011). Furthermore, major changes have complicated the customer journey, as consumers interact with multiple retail channels (Reinartz et al., 2011) and further research in this area is necessary (Lemon & Verhoef, 2016; Shankar, Inman, Mantrala, Kelley, & Rizley, 2011).

Retailing has been transformed by the internet (Blázquez, 2014; Lewis, Whysall, & Foster, 2014) and the introduction of online marketing channels has also increased the information available to retailers because there are more touchpoints throughout the customer journey (Anderl et al., 2016). Therefore, researchers can perform deeper analysis on individual purchasing decisions than was previously possible (Anderl et al., 2016). The increasing use of technology, by retailers and consumers, contributes to the importance of channel decisions within retailing and is therefore a critical area for academic research and

managers (Watson, Worm, Palmatier, & Ganesan, 2015). Some retailers have experimented with augmented reality, virtual aisles and other emerging technologies to enhance the consumer's experience (Blázquez, 2014; Piotrowicz & Cuthbertson, 2014). Furthermore, the increasing use of internet enabled devices, such as smartphones, means consumers are more flexible about when they make purchasing decisions (Kleijnen et al., 2007). Consequently, retailers must consider technological advancements such as improving the online purchasing environment to enhance the customer journey (Reinartz et al., 2011). In particular, mobile shopping and the integration of smartphones within the customer journey have the potential to transform the way consumers shop online (Shankar et al., 2016; Wagner, 2011).

2.1.2 Customer Journey

Early models of the consumer decision-making process supported a holistic interpretation of the customer experience (Lemon & Verhoef, 2016). The model created by Howard and Sheth (1969) showed how customers progress through multiple stages when buying a product. The authors conceptualise the process within their theory of buyer behaviour as being based upon how much information consumers need to make a decision. Depending on the type of decision consumers are making, their use of channels may vary. Exogenous forces such as the amount of information available, importance of the purchase, and perceived time pressure should also be considered as factors influencing the decision-making process (Pellémans, 1971).

Over time, the customer decision journey has evolved due to changes in the retail environment, for example, consumers increasing use of multiple channels throughout their journey (Lemon & Verhoef, 2016; Neslin et al., 2006). Each interaction between a retailer and customer is known as a touch point and the purchase journey can include multiple touch points throughout (Homburg, Jozić, & Kuehnl, 2015; Verhoef et al., 2009). A key finding from previous studies is that the importance of each touch point is determined by the customer's stage in their decision journey and the nature of the product (de Haan, Wiesel, & Pauwels, 2016; Lemon & Verhoef, 2016). For example, although customer-initiated contact has been found to ultimately generate greater revenue (Li & Kannan, 2014; Shankar & Malthouse, 2007), firm-initiated contact can help consumers recognise a need in order to start the decision journey (de Haan et al., 2016).

Lemon and Verhoef (2016) conceptualize the consumer journey as an iterative and dynamic process which is impacted by consumers' past experiences, in addition to external factors. Furthermore, the introduction of new channels makes the consumer journey even more complex for researchers (Lemon & Verhoef, 2016) because consumers can use them in a variety of orders throughout the consumer journey (Anderl et al., 2016). Consumers are also interacting more with other consumers in digital spaces, such as social media, which creates unique conditions for retailers to navigate (Leeflang, Spring, Van Doorn, & Wansbeek, 2013; Libai et al., 2010). Furthermore, Lemon and Verhoef (2016) suggest that the external environment, where consumers encounter a touch point, has the potential to impact the customer experience. However, consistency and reliability are still an expectation when consumers interact with a brand across multiple channels (Shankar et al., 2011).

The ability to complete a sale at any touch point is becoming more valuable as consumers have more control over their consumer journey (Shankar et al., 2011). The location of a touch point can no longer be assumed to be in a physical place because of the ubiquity of websites and online stores within the customer journey. Consumers can also use multiple touchpoints across different channels to arrive at a purchasing decision (de Haan et al., 2015). Online channels have made it easier for consumers to navigate multiple touchpoints from one device. For example, consumers can move from a firm-initiated email, to a partner-owned social media account, and then to a brand-owned online store with ease using their computer. However, the way consumers interact with an online touchpoint can be dependent on the device they access it through and their stage in the consumer journey. Attributes of smartphones such as their convenience have been identified as beneficial while searching for information (Holmes et al., 2014), but their small size has been acknowledged as a limitation when purchasing, hence computers are preferred for completing transactions online (de Haan et al., 2015).

2.1.3 Multichannel Retailing

Multichannel retailing refers to the way a retailer sells merchandise or services through more than one channel (Zhang et al., 2010). Earlier research in this field investigated strategies for managing 'research shopping', when customers searched through one channel but purchased through another, and recommended retailers focus on achieving

channel lock-in to encourage consumers to only shop through one channel (Verhoef, Neslin, & Vroomen, 2007). However, more recent research has moved away from this perspective and acknowledges that customers use channels for different purposes and each channel can add value and contribute to the overall customer experience (Berry et al., 2010; Binder, 2014). For example, consumers may prefer searching for footwear information online to access a range of websites and reviews but purchase in-store to ensure the right fit. Each channel has advantages and disadvantages that consumers can mitigate by using a combination of channels (Binder, 2014). Retail strategies now recognise multiple channels can be beneficial and additional research should focus on achieving channel synergy (Bendoly et al., 2005; Herhausen et al., 2015). Furthermore, multichannel research not only focuses on channels, it also examines the consumers who use multiple channels for shopping.

Research has suggested there are significant demographic differences between single channel and multichannel shoppers, with multichannel shoppers more likely to be female, have a tertiary education, and higher annual income (Lee & Kim, 2010). Konus, Verhoef, and Neslin (2008) found that multichannel enthusiasts derive pleasure from shopping and are more innovative but less loyal than their single channel counterparts. However, Zhang et al. (2010) propose that most consumers will become multichannel shoppers because of the growth in online retailing. Therefore, retailers will need to provide value through a consumer's preferred channel and ensure cross-channel synergy as the number of multichannel shoppers increases (Oh, Teo, & Sambamurthy, 2012). Kwon and Lennon (2009) suggest in a multichannel context that a consumer's brand beliefs influence their attitude toward the online store because they evaluate the retailer as one entity rather than the channels as distinct stores. Furthermore, it is important to understand how consumer behaviour is impacted by the availability of multiple channels (Verhoef et al., 2015). In order to understand channel choice behaviour, a multichannel perspective can be applied to the customer journey (Lemon & Verhoef, 2016). Throughout the customer journey multiple channels can be employed, and prior multichannel research has focused on offline, online, and direct marketing channels (Verhoef et al., 2015). Previous studies have considered online channels to be a homogenous group (Bendoly et al., 2005; Carlson, O'Cass, & Ahrholdt, 2015; Herhausen et al., 2015). However, to understand the drivers of channel choice, research that investigates the differences between online channels, such as websites, mobile sites, and mobile applications is required (Verhoef et al., 2015).

2.1.4 Channel Selection

In multichannel research, six determinants of customer channel choice have been identified: firm marketing efforts, channel attributes, channel integration, social influence, situational variables, and individual differences (Neslin et al., 2006). Traditionally, marketing activities have been firm-initiated, however the increase in online activity has resulted in more customer-initiated behaviours (Anderl et al., 2016; Shankar & Malthouse, 2007). Ansari, Mela, and Neslin (2008) found that firm-initiated marketing, such as e-mails are an effective communication channel to encourage consumers to use the firm's online channels. Particular channel attributes also have the ability to influence channel selection and their importance can be dependent on the stage of the customer journey (Neslin et al., 2006). In an online context, privacy concerns have been identified as having a strong impact on a consumer's intention to use the Internet over a physical store (Verhoef et al., 2007). Verhoef et al. (2007) also found that channel selection was socially influenced and consumers used reference groups to identify appropriate channels. Furthermore, factors such as the physical setting, task definition, and consumers' temporal and antecedent states have also been identified as determinants of channel choice (Nicholson, Clarke, & Blakemore, 2002).

Product type has also been studied in relation to channel choice. Gupta, Su, and Walter (2004) studied the difference between search goods and experience goods when consumers have the choice to purchase online or in store. A search good is defined as a product where consumers can assess quality before purchasing, while an experience good's quality can only be ascertained after using the product. The authors found that search goods were more likely to be purchased online compared to experience goods because direct experience with the product was not required to evaluate the quality. Inman, Shankar, and Ferraro (2004) found that consumers who had previous experience with a product category also had stronger channel associations. Furthermore, individual differences such as Internet experience impact channel usage (Montoya-Weiss, Voss, & Grewal, 2003). Consumers with prior internet shopping experience focus more on the differences between online retailers compared to those with less experience who focus on the difference between the online store and offline store of the same retailer (Melis, Campo, Breugelmans, & Lamey, 2015).

Channel selection and multichannel literature to date has generally focused on channel migration, integration, and individual purchase behaviours in relation to online and offline channels (Lemon & Verhoef, 2016). However, online channels can be divided further based on the features of shopping on an internet channel compared to a mobile channel.

2.1.5 Internet Channels

Some retailers only operate through the Internet, while other retailers have chosen to operate through traditional channels as well as online stores (Herhausen et al., 2015). Marketing efforts through one channel have the potential to increase sales in another of the retailer's channels, depending on the consumer segment targeted and their tendency towards multichannel shopping (Neslin & Shankar, 2009). Online channels have a number of differences when compared to physical channels, which primarily affect how consumers interact with the retailer and the merchandise (Jeong et al., 2009). Online stores have benefits for retailers such as lower costs, greater reach, and personalisation (Eroglu, Machleit, & Davis, 2001; Ko, Jung, Kim, & Shim, 2004), but the benefits and disadvantages for consumers must also be considered. Online stores are not constrained by opening hours or geographic locations and can also present a larger range of merchandise than physical stores. Thus, providing consumers with greater flexibility (Ko et al., 2004). Additionally, consumers can benefit from reducing the cost of information search when shopping online (Park & Kim, 2003), because navigating multiple websites may be perceived as easier than going to multiple physical stores. However, a consumer's attitude and perceptions of trust and risk have been found to have significant impacts on their intent to shop online (Bruner & Kumar, 2005; Ha & Stoel, 2009; Pavlou, 2003).

2.1.6 Perceived Risk Online

Prior research has studied consumer behaviour and the impact of risk (Jacoby & Kaplan, 1972; Mitchell, 1999). When buying a product, hesitations can arise if consumers are unsure their purchasing goals will be achieved (Roselius, 1971). In addition to the product being purchased, McCorkle (1990) found that risk could be associated to a purchasing situation or context. One of these situations is non-store shopping, when consumers do not go to the physical store to purchase. Online shopping shares some aspects of non-store shopping and therefore has similar perceived risks (Tan, 1999). During online shopping consumers can perceive risks with the financial transaction, delivery, or with the product

itself (Cases, 2002). In earlier research, different dimensions of risk had been identified, such as financial, social, performance, and time risks (Jacoby & Kaplan, 1972; McCorkle, 1990; Roselius, 1971). More recently, technology acceptance research has identified risk as a major barrier to adoption (Pavlou, 2003). Identifying the perceived risks of online shopping is important for retailers in order for them to establish strategies to aid in consumers' risk reduction (Burke, 1997). A risk reliever or risk reduction strategy is any action that a buyer or seller initiates to decrease the perceived risk (Cases, 2002; Derbaix, 1983; Roselius, 1971). Risk relievers that have been identified in the context of online shopping include payment security, website reputation, past experience, and product information (Cases, 2002).

Online shopping research has identified a number of adoption barriers, including consumers' perception of risk (Chiu, Chang, Cheng, & Fang, 2009; Liao, Liu, & Chen, 2011; Pavlou, 2003; Pires, Stanton, & Eckford, 2004; Wu & Ke, 2016). Pavlou (2003) found that perceived risk and trust are antecedents of consumers' intention to purchase from an online store. Specifically, researchers have found evidence of psychological, financial, social, security and performance risk when consumers shopped online (Groß, 2016; Hubert et al., 2017; Kleijnen et al., 2007; Ko et al., 2004; Pires et al., 2004). These risks are consistent with other non-store shopping experiences, where consumers cannot examine goods in person and rely on the information communicated by the retailer (Ko et al., 2004; Wu & Ke, 2016). Park and Kim (2003) found that the quality of information about a product, impacted consumers' beliefs during their search and purchasing phases. The way information is presented can influence how consumers process it, therefore retailers must find a balance between providing enough information to aid decision making without overloading consumers (Mosteller, Donthu, & Eroglu, 2014). Research conducted by Kim and Lennon (2008) found that when more verbal information was provided, alongside visual information, consumers' attitude towards the product were enhanced. In an online context, consumers can browse multiple webpages to increase the amount of information available which can help mitigate the risk of online shopping (Mosteller et al., 2014).

However, research into online channels does not always recognise that mobile devices are different to laptops and desktop computers (Ström et al., 2014), because they are not fixed in the spatial and temporal way consumers can use them (de Haan et al., 2015). As online

channels become more important in consumers' lives, understanding the differences between mobile and other online channels is increasingly important for retailers (Thakur, 2016). Furthermore, internet users and mobile users may have different expectations and preferences when shopping online (Holmes et al., 2014; Laukkanen, 2007).

2.1.7 Mobile Channels

A mobile device is a portable piece of technology, such as a smartphone, that can help consumers make purchasing decisions because it can have audio-visual capabilities, Internet connectivity, and access to applications (Shankar et al., 2016). The adoption of these devices by consumers has created a research area termed 'mobile shopper marketing' as resources are dedicated to learning about the integration of mobile devices into the decision-making process. It is defined as the "planning and execution of mobile-based marketing activities that influence a shopper…from a shopping trigger, to purchase, consumption, repurchase, and recommendation stages" (Shankar et al., 2016, p. 38). Mobile shopping is a complex behaviour for marketers to understand as consumers can interact with both offline and online environments simultaneously (Groß, 2016). However, smartphones have the potential to transform the shopping experience and retailers must understand how they can create opportunities using the technology (Shankar et al., 2016; Wagner, 2011).

The technology acceptance model (Davis, 1989) was the foundation for early research into mobile retailing, as studies focused on consumers adoption of the technology. The model is useful for explaining and predicting the drivers of technology use (Holmes et al., 2014) and revisions to the model have been made for the context of mobile shopping (e.g. Bruner & Kumar, 2005; Ko, Kim, & Lee, 2009; Yang, 2010). Having extensively covered the adoption and acceptance of mobile shopping to date, Holmes et al. (2014) propose that further research needs to empirically study consumers behaviour in relation to smartphones and the consumer decision-making process. For a summary of mobile channel literature refer to Table 2.1.

Table 2.1 Summary Review of Mobile Channel Literature

Authors (Year)	Research Theme	Theory / Constructs	Method	Findings
Bruner & Kumar (2005)	Consumer acceptance of mobile devices	Technology Acceptance Model: Usefulness, ease of use, fun, attitude toward the act, behavioural intention, consumer visual orientation, device	Online Experiment	The hedonic aspect of fun contributes more to consumer adoption of Internet devices than their perceived usefulness. Consumers who are visually orientated are more likely to adopt Internet devices.
Lee, Kim, & Kim (2005)	Contexts for using mobile internet	Emotion, time, movement, location, distraction, crowding, interaction, privacy	Longitudinal study	Mobile devices were most likely to be used in public spaces during shorter breaks. Consumers used their devices for more utilitarian services (e.g. news) during these times. When consumers had more time available they used more hedonic services (e.g. games).
Wu & Wang (2005)	Understanding mobile commerce acceptance using a revised technology acceptance model	Technology Acceptance Model: Perceived usefulness, perceived ease of use, behavioural intention to use, perceived risk, cost, compatibility	Online Survey	Adoption of mobile commerce is influenced by perceived risk, cost, compatibility and perceived usefulness. The compatibility of mobile commerce with the consumer's lifestyle was found to have the most significant influence on behavioural intent. Perceived risk had a positive influence on the intent to use mobile commerce.
Shankar, Venkatesh, Hofacker, & Naik (2010)	The use of mobile marketing in the retail environment		Conceptual	Focused on mobile as a communication medium. Proposed a conceptual framework that has three key parts; the consumer, the mobile, and the retailer. Addressed mobile consumer activities, mobile marketing strategies, and customer and retailer challenges.

Holmes, Byrne, & Rowley (2014)	Mobile shopping behaviour during the consumer decision making process	Descriptive measures	Online Survey	Consumers are more positive about using their computer for online shopping than their mobile. They value their mobile for convenience and accessibility, and use it more for information search than purchasing. Mobile devices are more likely to be used within the decision-making process for high involvement products.
Wang, Malthouse, & Krishnamurthi (2015)	The effect of mobile shopping on purchase behaviour	Habitual purchasing, order size, order rate, prior spending	Secondary data	In the context of a grocery retailer, as consumers become accustomed to mobile shopping they place more orders per year. Habitual products that have been purchased before are also more likely to be purchased on a mobile device.
de Haan, Kannan, Verhoef, & Wiesel (2015)	The role mobile devices have in the online customer journey	Conversion rate, customer experience, product type, time, price	Secondary data	When consumers switch from a less mobile to a more mobile device the conversion rate decreases. Consumers with greater experience with an online retailer switch between devices less. Over time consumers switch between devices less as they become more experienced with their devices.
Groß (2016)	Barriers to mobile shopping	Trust, perceived risk, continued usage intention	Online Survey	Trust in the retailer motivates mobile shopping acceptance. It also helps to reduce the uncertainty and risk associated with mobile shopping.

Mobile devices provide opportunities for brands to build more personal relationships with consumers because they are used more frequently and are not bound by space availability (Wang et al., 2015). Mobile devices can be considered 'cultural objects' because of their influence on a consumer's lifestyle (Shankar, Venkatesh, Hofacker, & Naik, 2010). Furthermore, research has found that although mobile devices have limited functionality compared to computers, their convenience is useful for consumers when they want to purchase a habitual product or achieve a specific shopping goal (Wang et al., 2015). Consumers use mobile phones more frequently when they are moving through public spaces and the outdoors (Lee et al., 2005) and mobile devices are used more often than fixed devices but for shorter durations (de Haan et al., 2015). Consumers who use mobile channels are more likely to be filling spare time, travelling, or consuming traditional media (Peters, Amato, & Hollenbeck, 2007). Holmes et al. (2014) found that the location where consumers used mobile shopping was dependent on the product category but contrary to previous findings suggests the consumer's home was the most common place for mobile shopping.

Wang et al. (2015) found that when a mobile device was used to place a grocery order online, the size of the order and intent to reorder was increased. However, research using data from a department store website showed people switched from mobile devices to more fixed devices for the purchasing stage of the consumer journey (de Haan et al., 2015). Therefore, mobile devices had lower conversion rates than fixed devices, indicating that consumers used them for earlier stages of the journey but chose not to purchase on them. One reason is the small screen size of a mobile device can make it more difficult to fill out the payment information (Shankar et al., 2010). Groß (2016) also suggests perceived risk is a major barrier to consumers adopting mobile shopping. Consumers have little control over their surrounding environment during mobile shopping (Banerjee & Dholakia, 2013) and may be cautious of people closely watching them while shopping (Lee & Park, 2006). Additionally, consumers may experience greater perceived risk when mobile shopping and find it difficult to employ risk reduction strategies (Groß, 2016).

2.1.8 Information Search Channels

When choosing between channels a consumer's selection tends to be based on the balance between the benefits and costs of each channel (Keeney, 1999; Shih, 2004). Physical

channels have constraints such as opening hours and their geographic location which may impede a consumer's information search due to having to visit multiple stores (Kollmann, Kuckertz, & Kayser, 2012). However, if consumers value tangible search aspects then a physical channel is preferred (Gupta et al., 2004).

Online information channels can reduce the amount of effort required during the search process (Gupta et al., 2004) and they also make it easier for consumers to compare product and price information (Kollmann et al., 2012). Conversely, consumers perceive online channels to be riskier (Ko et al., 2004; Pires et al., 2004) which may stop consumers completing their decision-making process online. Research by Häubl and Trifts (2000) found that helping consumers manage the amount of information presented online can decrease the perceived effort of searching for information. Although there is a large amount of information available online to help consumers make purchase decisions, this can have the inverse effect if consumers are unable to process the information effectively. However, on a mobile device it is a challenging to provide an adequate amount of information without overloading consumers, because it is harder to browse multiple resources (Mosteller et al., 2014). Peters et al. (2007) suggested that mobile phones are useful to search for information when consumers are away from their computer. In this situation, mobile phones have the ability to provide utilitarian benefits such as convenience and efficiency (Laukkanen, 2007). Furthermore, Holmes et al. (2014) identified mobile devices as important when searching for information and reviewing alternatives for high involvement products.

Most consumer behaviour theories suggest that consumers who exhibit higher product involvement, seek out more information (Beatty & Smith, 1987; Bloch, Sherrell, & Ridgway, 1986; Mittal, 1989). Consumers will exert different amounts of effort during the decision process depending on their reason for purchasing a product and the inherent involvement they have with the product (Clarke & Belk, 1979). Prior literature on external information search has studied the reasons consumers seek information such as risk and uncertainty reduction (e.g. Locander & Hermann, 1979; Mitchell, 1999). For important products, consumers perceive greater risk, therefore consumers engage in further information search as a risk-reduction strategy (Cases, 2002; Chaudhuri, 2000; Hubert et al., 2017). Additionally, the channel that consumers experiences a message through can influence how they process the information (Chaiken & Eagly, 1983; Krugman, 1965).

2.1.9 Information Processing Theory

The foundation of information processing theory is the capacity model of attention (Kahneman, 1973). It proposes that an individual has a limited amount of cognitive resources and must therefore selectively allocate resources to stimuli. Allocation of resources requires the individual to pay attention to the stimulus, thus allowing them to further process and form an attitude toward it. In order to allocate attention to stimuli consumers use an allocation policy that is influenced by their goals, level of arousal, and disposition to the stimuli (Kahneman, 1973). This model influenced the development of the Elaboration Likelihood Model (ELM) (Petty & Cacioppo, 1986) which has subsequently been used to understand information processing online (Liu & Shrum, 2009; Shankar & Balasubramanian, 2009). The ELM posits that when processing message-relevant information an individual will use one of two routes to form an attitude; the central or peripheral route (Petty & Cacioppo, 1986). The route taken is informed by the individual's motivation, ability to process the information, and how new thoughts are generated because of the processing. It is assumed that if consumers are motivated and have the ability to process the information then they will. The central route is taken when an individual's motivation and ability are both sufficient to process the information. Conversely, the peripheral route is taken when consumer are not motivated or do not have the ability to process the stimulus, therefore they elaborate less on the message (Petty & Cacioppo, 1986).

Consumers who take the central route are more persuaded by strong, information-based messages, in comparison to those who take the peripheral route, and rely on cues or heuristics to reduce the amount of effort required (Kitchen, Kerr, Schultz, McColl, & Pals, 2014; Petty, Cacioppo, & Schumann, 1983). The central route to persuasion is based on intrinsic characteristics of the product, often functional features, that consumers can scrutinise (Bezes, 2015; Sher & Lee, 2009). While the peripheral route is motivated by extrinsic features such as the variety of colours (Petty et al., 1983), or price (Suri, Kohli, & Monroe, 2007). Furthermore, consumers use peripheral cues such as source credibility, scarcity, and popularity to decrease the effort required to make a decision (Kitchen et al., 2014; Shen, 2013).

2.2 Persuasion Claims

Persuasive messages motivate consumers to engage with brands, and when correctly applied, compel consumers to choose an offering (Stafford, 1999). Previous research has investigated approaches to make a message more persuasive. For example, Tybout (1978) found that messages from a more credible source were generally more persuasive, and Howard et al. (2007) suggest that framing the message as a loss rather than a gain is also more persuasive. Additionally, Shu and Carlson (2014) found that the optimal number of persuasion claims was three as this was more effective than including four or more. The environment that consumers receive a message in can also influence the persuasiveness, based on whether they focus on the central message or the peripheral content (Petty & Cacioppo, 1986). Furthermore, when a message is easier to process it has been shown to be more persuasive (Reber, Schwarz, & Winkielman, 2004). Seminal research by Cialdini (2008) identified multiple psychological principles that can impact how a person is influenced by a message. Two of these principles are scarcity, and social validation. Scarcity is the notion that people find goods more attractive when they have limited availability. Social validation refers to the idea that people are more likely to do something if they see evidence that numerous other people have done it (Cialdini, 2008). Within a retail setting, scarcity is considered to be one of the most common persuasion techniques (Howard et al., 2007).

2.2.1 Scarcity Theory

Scarcity is a ubiquitous phenomenon that emphasises the limited nature of resources and products (Roux, Goldsmith, & Bonezzi, 2015). It has the potential to impact consumer behaviour because of the influence it has on decision making and the evaluation of goods. The scarcity principle suggests that when the availability of a good is restricted then people assign a higher value to it (Bozzolo & Brock, 1992; Cialdini, 2008; Worchel, Lee, & Adewole, 1975). For a good to be considered scarce it must be desirable to people and it must be possible for them to possess the object (Eisend, 2008). Commodity theory is central to explaining the psychological effects of the scarcity principle (Brock, 1968; Lynn, 1991). The theory outlines that when a commodity is hard to acquire then people value it more (Brock, 1968). This infers that goods that are hard to attain are more valuable, therefore consumers use scarcity as a heuristic cue to ascertain the quality of a good (Cialdini, 2008; Inman et al., 1997). This is supported by the theory of psychological reactance which

suggests that consumers respond to the loss of freedoms by desiring the freedom more than beforehand (Cialdini, 2008). The scarcity principle has two optimising conditions; the value of a good is increased when it has recently become scarce, compared to a good that is always restricted, and consumers are more attracted to scarce resources when they compete with other consumers for them (Cialdini, 2008). Consumer competition has been shown to mediate the relationship between scarcity and purchase intention (Aggarwal et al., 2011). Lee and Seidle (2012) suggest this is because when many other customers are purchasing the product, the consumer infers the product is valuable.

Prior research has shown a consumer's perception of the cause of scarcity can also influence their product preference and evaluation (Eisend, 2008; Inman et al., 1997; Jung & Kellaris, 2004; Verhallen, 1982; Worchel et al., 1975). A consumer's preference for a scarce product was found to be dependent on whether the cause of the scarcity was natural, such as popularity, or non-natural, such as a stock level error (Verhallen, 1982). Retailers can also generate scarcity by restricting the amount of stock that is provided to retail stores. Thus, creating a limited quantity of the product which can lead consumers to perceive the product as scarce. In turn, consumers view the product as more desirable which increases their evaluation of the product (Lee et al., 2014; Lee, Oh, & Jung, 2016). Some scarcity messages may not be based on the actual demand for a product, instead they may be an arbitrary statement created by the retailer to motivate consumer interest (Lee et al., 2014; Mukherjee & Lee, 2016).

2.2.2 Scarcity Messages

Scarcity messages are promotional messages that highlight the limited availability of a product (Aggarwal et al., 2011). The messages are often used in marketing because they can create a sense of urgency within consumers that encourages them to purchase increased quantities and can lead to greater satisfaction post-purchase (Aggarwal et al., 2011). Scarcity can be due to either limited supply or high demand (Gierl, Plantsch, & Schweidler, 2008). In particular, there are two common types of supply related scarcity messages: limited-time and limited-quantity (Cialdini, 2008; Inman et al., 1997). A limited-time scarcity (LTS) offer is only available for a predefined period compared to a limited-quantity scarcity (LQS) message which is only available for a select quantity of a product. Retailers use both strategies to increase the desirability of a product although how

consumers perceive the strategy can impact their response to it (Ku, Kuo, Yang, & Chung, 2013).

2.2.2.1 Supply Scarcity

LTS and LQS are fundamentally different because of how consumers experience the scarcity message. A LTS message implies the consumer must purchase the product before the deadline set by the retailer. In comparison, a LQS message indicates the retailer has a limited number available, which means the consumer must purchase before the product sells out (Aggarwal et al., 2011). Therefore, consumers who benefit from a LQS offer may feel unique because other consumers were not able to benefit from the deal (Aggarwal et al., 2011). In contrast, consumers motived by conformity are more likely to be motivated when a product is scarce due to excess demand (Ku et al., 2013). When consumers have a need for uniqueness they may express it through their consumption behaviour (Aggarwal et al., 2011; Wu, Lu, Wu, & Fu, 2012). Tian, Bearden, and Hunter (2001) suggest consumers who seek to differentiate themselves use consumer goods to develop and enhance their self-image and social-image. Scarce deals can enhance the feeling of uniqueness for consumers because they believe that other people will be unable to take advantage of the same deal (Aggarwal et al., 2011).

2.2.2.2 Processing of Scarcity

There are two opposing theories about the effect of scarcity appeals on processing. One theory argues that scarcity appeals are heuristic cues that signal a products quality and value to consumers (Cialdini, 2008; Ditto & Jemmott, 1989; Folger, 1992). Considering the Elaboration Likelihood Model (Petty & Cacioppo, 1986), it can be theorised that greater scarcity results in higher purchase intention than low scarcity, when consumers have low motivation to process the message (Lynn, 1992). In contrast, motivation-enhancement theory (Bozzolo & Brock, 1992) suggests that high scarcity motivates consumers to be more critical of the scarcity appeal and therefore make a decision after considering the true quality of the product (Brannon & Brock, 2001). From this perspective, consumers are more motivated to allocate cognitive resources when scarcity is present (Inman et al., 1997). Bozzolo and Brock (1992) similarly suggests that the perceived unavailability of the product motivates consumers to comprehend the message.

Research by Shen (2013) found evidence that scarcity operates as a heuristic cue. As Cialdini (2008) suggested, scarcity tactics provide shortcuts for decision making when consumers are under pressure. When consumers perceive a product is scarce, persuasion works via the peripheral route as consumers do not have time to extensively process the message (Worchel et al., 1975). However, research by Suri et al. (2007) showed that the relationship was moderated by the consumers motivation to process the information. The authors results suggest scarcity was processed systematically when motivation was low, but suggest when motivation was high then heuristic processing was used. Therefore, the research supports the interfering effect (Cialdini, 2008) as well as the motivating effect (Brannon & Brock, 2001; Inman et al., 1997) of scarcity on consumers processing of information.

Subsequent research has found that specific scarcity messages, compared to nonspecific, stimulate consumers to process the message more which encourages consumers to evaluate the credibility of the message (Aguirre-Rodriguez, 2013). This is because vaguely worded statements such as 'limited stock available' are more likely to be perceived as a persuasion attempt thus reducing the credibility of the message (Tan & Chua, 2004). Scarcity that is supply-related is perceived as less credible by consumers when the message is stated in specific terms because consumers focus on product-related information instead (Aguirre-Rodriguez, 2013).

2.2.2.3 Scepticism of Scarcity

The effect of a scarcity message can be impacted by a consumer's scepticism. Research has shown, when consumers are more sceptical of advertising, they are more likely to evaluate the credibility of the message (Aguirre-Rodriguez, 2013; Lee et al., 2014). Scepticism is related to consumers becoming more aware of marketing strategies, such as retailers communicating limited quantities in order to encourage a false sense of urgency (Aguirre-Rodriguez, 2013). In turn, sceptical consumers may have a negative cognitive reaction (Lee et al., 2014). Persuasion knowledge literature supports this view as research has shown consumers are becoming increasingly aware of the persuasion techniques used in marketing (Campbell & Kirmani, 2000; Darke & Ritchie, 2007; Friestad & Wright, 1994). Hence, the effectiveness of the message depends on whether consumers perceive it as informative and trustworthy (Aguirre-Rodriguez, 2013). If consumers believe scarcity

messages are overused they may attempt to understand the motives of the advertiser and try to differentiate between true scarcity and false scarcity (Aguirre-Rodriguez, 2013; Lee et al., 2014). Furthermore, persuasion knowledge has been found to decrease perceived credibility and behavioural intentions (Campbell, 1995; Kirmani & Zhu, 2007; Pechmann & Wang, 2010). Aguirre-Rodriguez (2013) found that supply related scarcity produced less persuasion knowledge activation than demand related scarcity however the wording specificity of the message moderated the relationship.

2.2.2.4 Contextual Effects

Situational contexts can also influence how consumers respond to scarcity messages. When consumers are under time pressure, like that created by scarcity, they may process information differently (Suri & Monroe, 2003). The consumer's capacity to process information is constrained and they rely more on heuristic processing than systematic processing (Chaiken & Eagly, 1983; Suri & Monroe, 2003). The findings of Suri et al. (2007) suggest that when scarcity is present and the motivation to process information is high, the information was processed less carefully. Conversely, the study also showed that when motivation was low, consumers processed the information more carefully. The first finding is consistent with the conclusion of Cialdini (2008) that scarcity hinders the consumer's capacity to think and therefore the ability to process information. However, research has also shown that the limitation of freedoms imposed by scarcity leads to consumers paying greater attention and devoting cognitive resources to make a judgement about the offer (Brannon & Brock, 2001; Inman et al., 1997; Worchel et al., 1975). Time pressure can mean consumers have less time to process information, which is a risk reduction strategy, and this can impact their decision making behaviour (Hubert et al., 2017).

Prior studies have also looked at scarcity from the perspective of the context of the decision. Wu and Lee (2016) studied the impact of scarcity when consumers were purchasing for themselves compared to when purchasing for others. Their results showed that when purchasing for themselves consumers valued uniqueness and responded more favourably to 'limited edition' products but when purchasing for others the risk of purchasing an inappropriate product meant they preferred purchasing a popular product. Ku et al. (2013) researched self-monitoring behaviour and found that when consumers were concerned

about how their purchase would be seen by others they were more likely to purchase a product that was scarce due to demand than supply. The authors also observed for consumers with high self-monitoring behaviour, that if they knew a third-party was not observing their decision then scarcity had no effect on purchase intention.

2.2.3 Scarcity and Products

The scarcity effect has been shown to be robust and has been applied to a wide range of products such as toothpaste, sunglasses, wine, soup and washing powder (Lee et al., 2014; Parker & Lehmann, 2011; Verhallen, 1982; Worchel et al., 1975). Research has also studied the effect of scarcity across categories and found that the product category impacts how consumers draw inferences about shelf-based scarcity (Parker & Lehmann, 2011). Food products were preferred when they were abundant rather than scarce. Parker and Lehmann (2011) suggest this is because when there are few units to choose from, consumers perceive them to be old or leftover. This finding is consistent with Gierl and Huettl (2010) who found that for non-conspicuous products, consumers ignored scarcity messages such as 'limited edition'. In contrast, a consumer's attitude towards a conspicuous good was found to increase when scarcity was caused by high demand, which is consistent with the idea of conformity (Ku et al., 2013). In particular, Gupta and Gentry (2016) focused on the conspicuous product category of fast fashion and found that for some consumers, the limited supply of clothing led to in-store hoarding and hiding behaviours due to the threat of not being able to spend more time making a decision. Despite these findings, product familiarity has been found to moderate the relationship between scarcity and purchase intention for frequently purchased goods because if consumers are familiar with the product they tend to spend less effort making a purchase decision (Parker & Lehmann, 2011).

2.2.4 Scarcity in Retail Channels

Scarcity is communicated differently depending on the type of channel consumers are purchasing from. In-store consumers can view the number of items available and make inferences about the stock levels compared to alternatives (Mukherjee & Lee, 2016; Parker & Lehmann, 2011). Consumers may assume empty shelf space indicates high demand for a product but it could be due to a supply issue. Additionally, the stock levels at one store may not be reflective of the stock levels at another store (van Herpen et al., 2009). For

example, a product may become temporarily scarce because of high demand but reallocation from another store achieves stock balance again. In a physical store salespeople can also apply persuasive techniques such as scarcity which can impact how the consumers behave (Jeong & Kwon, 2012; Kaptein & Eckles, 2012). However, if consumers have strong prior brand or product preferences, or if there is a price promotion, then scarcity cues have been found to have little impact on purchase intention (Parker & Lehmann, 2011).

In comparison to physical stores, online stores communicate demand and supply differently because consumers cannot observe it for themselves (Aggarwal et al., 2011; Griskevicius et al., 2009). For example, a website could include features such as a top-selling list, or stock availability figures. In particular, online stores often use scarcity messages about the limited availability of a product (Griskevicius et al., 2009). These scarcity messages require consumers to evaluate the trustworthiness of the claim because stock levels are not observable (Mukherjee & Lee, 2016). When shopping online consumers are unable to experience the product directly (Lee & Kozar, 2006; Wang, Beatty, & Foxx, 2004), therefore marketers must find other ways of signalling the desirability of the product, such as through heuristic cues like scarcity. Few studies have investigated scarcity in an online context. Jeong and Kwon (2012) found that scarcity messages did not impact purchase intention in an online context and suggest this was because consumers doubted the credibility of the online scarcity messages. In contrast, Wu and Lee (2016) found a scarcity message positively influenced purchase intention. Scarcity is one type of persuasion claim communicated by online stores, alternatively retailers can use product popularity.

2.2.5 Product Popularity in Retail Channels

Popularity is a form of social validation, as it provides an indication of what previous consumers have purchased (Cialdini, 2008). Dean (1999) defines perceived popularity as an extrinsic cue that can influence consumers to evaluate popular products as superior to others. Retailers use product popularity to persuade consumers that other consumers were satisfied with the product and reduce uncertainty (Dean, 1999; Nelson, 1970; Tucker & Zhang, 2011). In physical stores, consumers often use other consumers as an information source (Tucker & Zhang, 2011) and supplying popularity symbols is another way for marketers to communicate this (Gurrea, Chang Lee, Orús, & Flavián, 2013). van Herpen

et al. (2009) found that even if consumers could not observe high demand, the inferences they made about product popularity from the information available impacted their behaviour. For example, if a book is described as a 'best seller' then consumers may assume many other consumers have indicated a preference for that title.

For online stores, consumers use observable online persuasion claims to make subjective judgements about unobservable product attributes (Jeong & Kwon, 2012). Therefore, consumers may see a popularity cue and conclude that the product must be of good quality to be preferred by other consumers. Information that can be communicated on websites, such as popular purchases and product reviews, have been shown to have a positive effect on consumers evaluation of the product (Kurata & Bonifield, 2007). Sher and Lee (2009) found that some consumers were persuaded by the quantity of online reviews because they perceived the product to be more popular. Furthermore, prior studies have shown that exhibiting product popularity information affects consumers' information processing and their purchase decision (Horcajo, Petty, & Brinol, 2010; Huang & Chen, 2006). However, if consumers are aware of persuasion techniques, such as popularity, they evaluate the credibility of the message more (Aguirre-Rodriguez, 2013).

2.3 Research Gap

Although considerable research has been devoted to consumer adoption of online channels (Jeong et al., 2009; Ko et al., 2004; Park & Kim, 2003; Wu & Ke, 2016), less attention has been dedicated to comparing consumer behaviour on specific online channels. Previous research has investigated the distinct features of mobile shopping, such as use contexts (Holmes et al., 2014; Lee et al., 2005; Wagner, 2011), and conversion rates (de Haan et al., 2015; Ström et al., 2014; Wang et al., 2015). However, there has been little empirical research investigating consumer behaviour, and more specifically purchase intention, that directly compares results based on the device the consumer is shopping on. Hence, Thakur (2016) advocated for more research to understand how mobile is different from other online channels, and Holmes et al. (2014) suggested future research should focus on the impact of smartphones on consumer behaviour. Within online channel literature, perceived risk has been identified as an antecedent of purchasing online (Ko et al., 2004; Pavlou, 2003; Wu & Ke, 2016), and on a mobile device (Groß, 2016; Hubert et al., 2017). It would thus

be of interest to further explore how perceived risk of online shopping effects the relationship between the device used and purchase intention.

In comparison to fixed devices, mobile devices have traditionally had low conversion rates because many consumers move from mobile devices to more fixed devices as they go through the consumer journey (de Haan et al., 2015). However, research has also posited that mobile shopping is valuable for consumers when making an urgent purchase (Holmes et al., 2014; Kleijnen et al., 2007; Lee et al., 2005). For example, when a product is scarce consumers feel pressured to make a quick decision (Aggarwal et al., 2011; Cialdini, 2008). Scarcity messages have been found to impact consumer behaviour and increase purchase intention (Aggarwal et al., 2011; Eisend, 2008; Jang, Ko, Morris, & Chang, 2015; Parker & Lehmann, 2011). Therefore, the time constraint created by scarcity could increase a consumer's purchase intention on their mobile device (Ström et al., 2014).

Persuasion claims, and scarcity specifically, have been widely studied in an offline context. However, in an online context, testing the effect of scarcity has produced contradictory results. Wu and Lee (2016) maintain that scarcity is an effective persuasion claim online, while Jeong and Kwon (2012) found that a scarcity message did not increase purchase intention. Given that, to the best of the authors knowledge, only two studies directly examined the effect of scarcity in an online context, it appears more research is needed in this area. Additionally, a consumer's scepticism has been shown to decrease the effectiveness of a scarcity message, and lead them to evaluate the credibility of the message (Aguirre-Rodriguez, 2013; Lee et al., 2014). However, it remains unclear whether scarcity is impacted by scepticism in an online context.

Popularity is another type of persuasion claim, which influences consumers by indicating the preferences of other consumers (Cialdini, 2008). Prior research of online popularity has investigated the use of online reviews (Kurata & Bonifield, 2007; Sher & Lee, 2009), and the inclusion of a popularity statement (Jeong & Kwon, 2012). However, it remains unclear as to how a popularity cue may influence the credibility of a scarcity message. Scarcity and popularity are not mutually exclusive (Wu & Lee, 2016), and using multiple persuasion claims in retailing is a common practice (Shu & Carlson, 2014). Therefore, this research investigates online shopping behaviour on mobile and fixed devices when scarcity and popularity cues are present.

Chapter 3: Study One

Prior literature has identified relationships between the device used for online shopping and purchase intention (de Haan et al., 2015; Groß, 2016; Ko et al., 2004), and between scarcity and purchase intention (Eisend, 2008; Jang et al., 2015; Jeong & Kwon, 2012; Parker & Lehmann, 2011; Wu & Lee, 2016). However, it was identified that further research could investigate how consumer behaviour on mobile and fixed devices was impacted by the inclusion of a persuasion claim. With this foundation, this chapter outlines the conceptual development to be tested, methodology, results, and discussion for study one.

3.1 Conceptual Development

This section contains the research problem and research objectives for the overall research. It then explains the proposed relationships which will be tested in study one. The constructs and hypotheses of the study are detailed.

3.1.1 Research Problem and Objectives

As discussed previously, the mobile channel is distinctly different to other online channels (de Haan et al., 2015; Groß, 2016; Shankar et al., 2016). However, prior empirical research has considered online channels as a homogenous group when investigating consumer behaviour (e.g. Herhausen et al., 2015; Ko et al., 2004; Pires et al., 2004). Thus, more research is required to understand how consumer behaviour differs between mobile shopping and general online shopping (Holmes et al., 2014; Shankar et al., 2016). In particular, consumers perceive greater risk when shopping online which results in lower purchase intention compared to when shopping offline (de Haan et al., 2015; Jeong & Kwon, 2012; Ko et al., 2004; Tan, 1999). Furthermore, the effect of risk is greater when shopping on a mobile device (Groß, 2016; Kleijnen et al., 2007; Wang et al., 2015) because of impediments, such as a smaller screen size reducing the amount of visible content (Banerjee & Dholakia, 2013).

Online consumer behaviour is not only impacted by the device consumers are using, but also by the information that retailers communicate to consumers. Although considerable research has investigated scarcity in an offline setting (e.g. Cialdini, 2008; Eisend, 2008;

Jang et al., 2015; Parker & Lehmann, 2011), few studies have investigated scarcity messages online. Two studies have directly examined online scarcity, Wu and Lee (2016) maintain that scarcity messages are effective online, while Jeong and Kwon (2012) did not find support for this conclusion. Furthermore, scepticism and credibility have been identified as impacting the effectiveness of persuasion claims (Aguirre-Rodriguez, 2013; Bloch et al., 1986; Lee et al., 2014). Therefore, the question remains of whether scarcity messages are effective as a persuasion claim when used online, and if other persuasive information is more effective, such as popularity.

Thus, the purpose of this research is to understand online shopping behaviour on mobile and fixed devices when scarcity and popularity cues are present. Specifically, the research objectives are to:

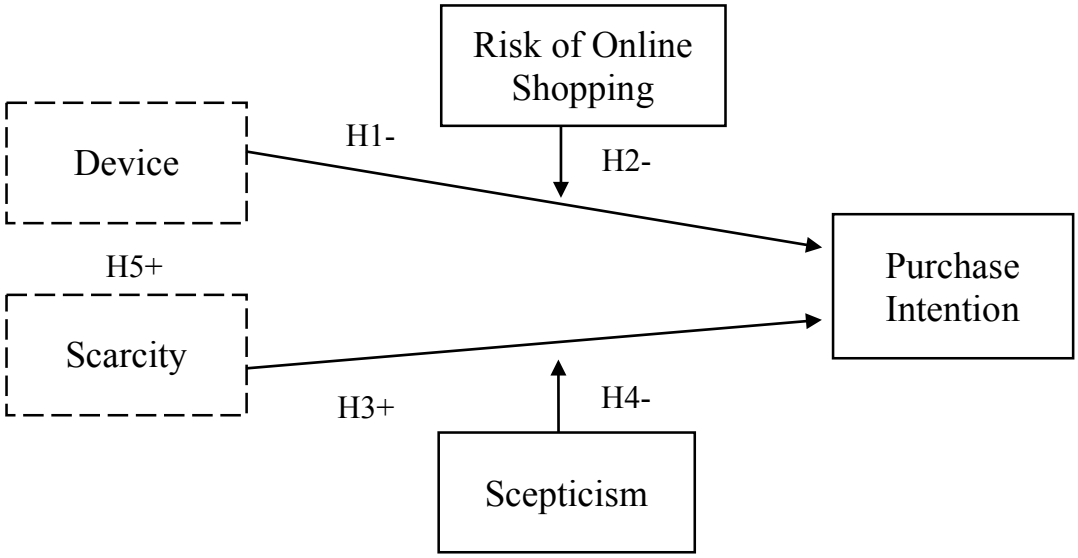
1. Examine the effect of mobile and fixed devices on purchase intention
2. Compare the impact of scarcity and popularity cues on purchase intention across devices
3. Test the moderating effects of scepticism, credibility, and perceived risk of online shopping on these relationships

By addressing these objectives, the research will add to the understanding of how consumer behaviour is impacted by mobile devices compared to fixed devices, and explore the moderating impact of risk. Additionally, the research will provide further evidence as to how scarcity messages and popularity cues effect purchase intention when consumers are shopping online.

3.1.2 Hypothesis Development

Study one investigates whether the device a consumer is using impacts their purchase intention and also studies the effect of a scarcity message on purchase intention (see Figure 3.1). Many recent studies have focused on mobile shopping (e.g. Groß, 2016; Hubert et al., 2017; Thakur, 2016; Wang et al., 2015), but less attention has been paid to how the type of device influences consumer behaviour in a specific situation. Furthermore, considerable research has been devoted to scarcity in an offline context (e.g. Cialdini, 2008; Eisend, 2008; Jang et al., 2015; Parker & Lehmann, 2011) but it remains unclear whether the previous findings about scarcity messages apply to online retailing.

Figure 3.1 Study One Experiment Model



3.1.2.1 Device Hypotheses

Online channels are distinctly different to physical channels because of the way consumers interact with the retailer and merchandise (Jeong et al., 2009). The benefits of shopping online include an increased amount of information available and the convenience of 24-hour access (Ko et al., 2004; Mosteller et al., 2014; Park & Kim, 2003). Some of the advantages of shopping online are not consistent across all devices, and depend on the device the consumer is using. For example, searching through multiple webpages is more suited to computers (Mosteller et al., 2014) as mobile devices have smaller screens which limits the consumer's ability to search (Kleijnen et al., 2007; Wang et al., 2015). In contrast, mobile devices are used more often but for shorter periods of time compared to fixed devices (de Haan et al., 2015). However, there are unique barriers to shopping on a mobile. Barriers to mobile shopping include external factors, such as having access to Wi-Fi (Banerjee & Dholakia, 2013), and the level of crowding (Lee & Park, 2006). Despite these limitations, some consumers engage in mobile shopping because smartphones provide the ability to shop online at anytime and anywhere (Kleijnen et al., 2007).

Wang et al. (2015) suggest consumers who buy through mobile devices may exhibit different behaviour than consumers who use more fixed devices. For example, purchasing may be less frequent on a mobile but other decision-making factors such as creating shopping lists, searching for prices, and post-purchase activities can be completed on a mobile device (Thakur, 2016). This is supported by Holmes et al. (2014) who found that

purchasing products on a mobile device was significantly less frequent than on a computer. Kumar and Mukherjee (2013) also found that consumers who browsed products on their mobile did not exhibit a greater intention to purchase on their mobile device. Overall, mobile phones have lower conversion rates because people choose to wait and complete the purchase on a fixed device (de Haan et al., 2015). Therefore, it is hypothesised:

H1: Purchase intention will be lower for a smartphone than a fixed device

In general, online shopping is perceived by consumers to be riskier than shopping offline (Ko et al., 2004; Pavlou, 2003; Pires et al., 2004). One reason is because it is difficult for consumers to directly evaluate products which can increase the risk of not being satisfied with the final product (Jeong & Kwon, 2012; Ko et al., 2004). Furthermore, fixed devices are preferred over smartphones because of privacy and security concerns (Kumar & Mukherjee, 2013; Yang, Chen, & Wei, 2015). Hence, consumers have indicated a preference for online shopping on a computer because they have larger screens which can show greater product detail, make it easier to enter personal details, and simplify the transaction process (Laukkanen, 2007; Okazaki & Romero, 2010). Other types of risk such as performance risk, which refers to issues such as the website not working as intended, have been directly linked to mobile shopping (Hubert et al., 2017). Additionally, financial risk and security risk have been identified as relevant to mobile shopping (Kleijnen et al., 2007) which is consistent with the findings of Bahli and Benslimane (2004) that consumers perceive greater risk in the mobile environment because it can be difficult to allocate blame when a problem occurs. Therefore, it is hypothesised:

H2: The effect of device on purchase intention will be greater when the perceived risk of online shopping is higher

3.1.2.2 Scarcity Hypotheses

Scarcity is based on the notion that when goods have a limited availability consumers perceive them as more desirable (Cialdini, 2008). Restricting product availability leads to consumers making purchasing judgements based on heuristic evidence rather than rational thought (Cialdini, 2008; Jang et al., 2015). Prior studies have found that, in general, scarce products are preferable to non-scarce products thus leading to greater purchase intention

(Eisend, 2008; Jang et al., 2015; Jeong & Kwon, 2012; Parker & Lehmann, 2011; Wu & Lee, 2016). Scarcity can be caused by supply or demand and a consumer's perception of the reason for scarcity influences their preference and evaluation of a product (Verhallen, 1982). The different types of scarcity can generate different consumer behaviour outcomes depending on the individual because consumers process the message differently (Gierl et al., 2008; Ku et al., 2013).

Demand-based scarcity is often associated with conformity and risk mitigation because consumers can infer popularity and product quality when making a purchase decision (Gierl et al., 2008; Ku et al., 2013). Supply scarcity is more easily controlled by retailers and can be used to create a sense of urgency thus increasing purchase intention (Aggarwal et al., 2011). In an online context, consumers rely on marketing communications and website features to infer supply or demand based scarcity (Griskevicius et al., 2009; Mukherjee & Lee, 2016). When supply is the cause of the scarcity two types of restriction can occur, limited-time and limited-quantity (Cialdini, 2008). Previous research has focused on limited-time and limited-quantity scarcity with context-specific results (Aggarwal et al., 2011; Cialdini, 2008; Jang et al., 2015). Aggarwal et al. (2011) suggest that while both types of supply scarcity can increase purchase intentions, limited-quantity has a greater impact compared to limited-time because consumers perceive competition with other shoppers. Jang et al. (2015) also found support for limited-quantity messages when the product is conspicuous as purchase intention was higher compared to when there was a limited-time message. Although the effect of scarcity on purchase intention is different depending on the cause of the scarcity and product type, the overall hypotheses can be stated as:

H3a: Limited-quantity scarcity will have a positive effect on purchase intention
H3b: Limited-time scarcity will have a positive effect on purchase intention

As consumers learn more about persuasion tactics used in their everyday lives they become cautious of marketing tactics that may manipulate them (Campbell & Kirmani, 2000; Darke & Ritchie, 2007; Friestad & Wright, 1994; Lee et al., 2014). Although research continues to find that scarcity appeals positively impact attitude and purchase intent, some consumers are sceptical of advertising and marketing tactics (Aguirre-Rodriguez, 2013; Lee et al., 2014). For consumers to be influenced by a scarcity message, they must accept the

information presented to them as reliable. However, if the scarcity message is perceived as a form of persuasion then this leads to lower behavioural intentions (Campbell, 1995; Kirmani & Zhu, 2007). Scarcity messages are a common tactic online because of a retailer's inability to physically show supply or demand (Aggarwal et al., 2011; Griskevicius et al., 2009). However, if they are overused consumers may become sceptical of their sincerity. Therefore, it is hypothesised:

H4: The relationship between scarcity and purchase intention will be stronger when consumers are less sceptical

3.1.2.3 Interaction Hypothesis

Scarcity implies that at a certain point the product or offer will no longer be available to the consumer. Therefore, consumers feel a sense of urgency about making a purchasing decision and spend less time analysing the situation which can lead to an impulse purchase (Aggarwal et al., 2011; Cialdini, 2008). Scarcity messages encourage consumers to use heuristic information to make quicker judgements (Cialdini, 2008; Inman et al., 1997; Jang et al., 2015). Suri et al. (2007) found that when motivation to process information was high and scarcity was present consumers processed information less carefully in order to make a faster decision. Although mobile devices have lower conversion rates than fixed devices some consumers still use them for online shopping (de Haan et al., 2015). Peters et al. (2007) suggest consumers are more likely to purchase on a mobile device when they do not have access to their PC. For example, when they away from their homes, in transit between places, or filling spare time (Lee et al., 2005). Smartphones have the ability to connect consumers with retailer offerings anytime and anywhere because of their internet connection (Kim & Sundar, 2016). Therefore, consumers who receive a scarcity message about the limited availability of a product on their smartphone may indicate greater purchase intention so they do not miss out. Thus, it is hypothesised:

H5: The effect of scarcity on purchase intention will be stronger for a mobile device compared to a fixed device

3.2 Methodology

This section provides justifications for the paradigm choice that was applied to the overall research. An experimental design methodology was chosen for both studies based on the objectives of the research. The section also outlines the questionnaire development, experimental conditions, collection of data and sample frame for study one.

3.2.1 Research Approach

A research paradigm underlies the way a researcher views the process of interpreting problems and finding solutions and (Kuhn, 1996). A paradigm is a set of linked philosophical assumptions about the world and how knowledge is understood (Creswell, 2014; Deshpande, 1983) The positivist paradigm is based on the belief that there is a single reality which can be objectively measured (Lincoln, Lynham, & Guba, 2011). In comparison, the constructivist paradigm considers co-constructed realities which are subjectively understood based on the individual's experience (Lincoln et al., 2011). Furthermore, the constructivist paradigm seeks a holistic understanding, while the positivist paradigm commonly focuses on quantitative and experimental research methods (Deshpande, 1983; Hirschman, 1986; Lincoln et al., 2011). However, positivism has been criticised because it is not possible to universally verify results with a finite number of results and the approach does not consider that people are naturally biased (Hudson & Ozanne, 1988; Wildemuth, 1993).

Therefore, this study is situated within the post-positivist research paradigm which is a modified form of positivism. A post-positivist perspective advocates that a method for research should be chosen based on the research questions and objectives to be addressed (Patton, 2002). The ontology of post-positivism recognises that it may not be possible to fully understand the single reality because of unknown variables. Post-positivism implies that reality exists but research results can only be understood as imperfect and based on probability (Hunt, 1990; Lincoln et al., 2011). The epistemological assumptions of this paradigm acknowledge that it may not be possible to absolutely prove findings however it is possible through triangulation to say they are plausible claims (Patton, 2002). In post-positivist research the researcher should aim for objectivity and attempt to minimise researcher influence (Lincoln et al., 2011). The objectives and research questions of this study are suitable for a post-positivism approach (Hunt, 1990; Perry, 1998).

3.2.2 Research Methodology

Research that is conducted from a post-positivist approach should choose a methodology based on the objectives of the research (Patton, 2002). The objectives of this research support a quantitative approach due to the established theories and relationships to be tested. Therefore, a deductive research approach is used because the study is testing hypotheses that add to developed theories (Creswell, 2014). A benefit of deductive research is the generalizability of the findings that provide a basis for decision making (Saunders, Lewis, & Thornhill, 2009) which is important for marketing managers and future academic research.

Prior studies based on scarcity theory have used an experimental design (e.g. Jang et al., 2015; Mukherjee & Lee, 2016; Wu et al., 2012), because an experimental research design permits the researcher to manipulate the independent variables. Thus, the researcher can understand the effect of the independent variable on the dependent variable while holding all other potential independent variables constant (Kuhfeld, Tobias, & Garratt, 1994; Zikmund, Babin, Carr, & Griffin, 2013). Furthermore, experiments allow the researcher to test a cause and effect relationship through manipulation of the independent variable. Thus if differences to the dependent variable are observed it is because of the experiment's manipulation (Khan, 2011).

Experiments can be conducted in the field, in laboratories, or increasingly on the internet (Mutz, 2011). Compared to conducting an experiment in a laboratory, online experiments have less control over the subject's environment (Reips, 2002). Particularly on the internet as screen size, internet quality and the subjects web browser can impact how the experiment is displayed (Birnbaum, 2004; Couper, 2008). Despite these limitations, some argue that online experiments have more generalisable findings, less impact of the experimenter, and greater ease of access for subjects (Mutz, 2011; Reips, 2002). Additionally, Krantz and Dalal (2000) found that the results of online experiments and laboratory experiments were comparable. Although experimental errors can occur if there are issues with the manipulation, variable measurement, selection of experiment subjects, or the control of extraneous variables (Zikmund et al., 2013).

3.2.3 Research Design

The method for data collection was an online experimental questionnaire, which is considered appropriate when the researcher seeks to test hypotheses based on relationships that have been previously identified (Creswell, 2014; Sale, Lohfeld, & Brazil, 2002). Furthermore, prior research investigating scarcity and online shopping has used online experiments for data collection (Jeong & Kwon, 2012; Wu & Lee, 2016). This research is interested in online shopping on internet-enabled devices so the sample should be users of the internet. Additionally, Hair, Bush, and Ortinau (2009) suggest online questionnaires are advantageous because they allow measurement of factors that are not directly observable, such as attitudes and preferences. This is important given this research tested constructs such as purchase intention and perceived risk of online shopping. Online surveys can also provide information from a larger sample of respondents, at relatively lower costs and with shorter response times, compared to offline data collection methods (Evans & Mathur, 2005; Ilieva, Baron, & Healey, 2002). The use of social networks allows for easier dissemination of the survey to particular segments given the existence of specialist groups and pages (Hair, Black, Babin, Anderson, & Tatham, 2010). Using online software also aids in the accessibility of the survey because it allows respondents to access the survey from smartphones, tablets, and laptops.

Limitations of online questionnaires include research errors that can impact the accuracy and quality of the collected data. Online sampling methods have been criticised for increasing bias because the sample may not be representative of the population (Hair et al., 2010). However, with over 80% of New Zealand homes having Internet access (Statistics New Zealand, 2012a), an online questionnaire has the potential to reach a large portion of the sample population. To reduce sampling error, links were posted on multiple websites to encourage a greater number of people to complete it. Online self-administered questionnaires also require respondents to opt-in which can increase nonresponse error because some of the sample may not have access to the survey. Nevertheless, the high adoption of the internet by New Zealanders reduces the likelihood of this error for an online questionnaire.

3.2.4 Experimental Design

The experiment was tested in a 3 (scarcity: limited quantity vs limited time vs no scarcity) x 2 (device: smartphone vs fixed device) between-subject design. Respondents were randomly assigned to a condition (see Table 3.1). The manipulations were designed to test the difference between device and the inclusion of a scarcity message while controlling for other variables such as setting, price, and product type. The stimulus was provided as a scenario description that manipulated the scarcity message and device. It was important to control for price as previous research suggests it can influence the effectiveness of a scarcity appeal (Inman et al., 1997; Mukherjee & Lee, 2016), therefore specific price information was excluded from the scenario and subjects were informed that they perceived the price as being 'reasonable'.

Table 3.1 Study One Conditions

Device	**Scarcity**		
	Limited-quantity scarcity	Limited-time scarcity	No Scarcity
Fixed Device	1	2	3
Smartphone	4	5	6

3.2.4.1 Pre-test

Hunt, Sparkman, and Wilcox (1982) suggest that a pre-test is an essential part of the research process. A pre-test can help inform the final design when developing an experimental design questionnaire (Hunt et al., 1982; Zikmund et al., 2013). A pre-test was conducted to identify a product for the scenario and then a pre-test of the whole questionnaire was conducted in order to identify any issues with experimental design.

Product Pre-test

A pre-test was conducted to ensure the product used in the experiment was appropriate in an online shopping context. The product category needed to be gender neutral and accessible to a wide range of people because the target population was diverse. Subjects were presented with nine products and asked to rank how likely they would be to purchase each product from an online store. Products that were not likely to be purchased online were not used as this could have impacted subjects' answers. A total of 60 responses were

collected, and watches were chosen as the product for study one. Watches have also been used in several scarcity studies because of their wide appeal (Aggarwal et al., 2011; Gierl et al., 2008; Jang et al., 2015; Lee et al., 2016; Mukherjee & Lee, 2016). Furthermore, watches are considered a moderate to high involvement (Bauer, Sauer, & Becker, 2006; Martin, 1998; Traylor & Joseph, 1984) which was favourable because consumers are more likely to use their mobile device during the decision-making process for high involvement products (Holmes et al., 2014). Watches are also widely available from retailers online, which means consumers are more likely to be familiar with an online watch stockist.

Questionnaire Pre-test

The pre-test was important for testing the manipulations on the target population. A total of 93 completed responses were collected over the six experimental conditions. After analysing the results of the pre-test, revisions were made to the wording and formatting of the scenario as the scarcity manipulation check was inconclusive. For example, the LQS message was changed from '*there is a limited quantity available'* to '*there is a limited amount of stock available'* and was emphasised within the paragraph.

3.2.4.2 Design and Measures

This section outlines the manipulations, and the previously validated items used for measurement of the dependent variable, manipulation check, and independent variables in the questionnaire. See Table 3.2 for the original items and adapted versions. Please see Appendix A for a full copy of the questionnaire.

Table 3.2 Study One Scales

Scale / Source	Original Items	Adapted Items
Purchase Intention on Device (Chandran & Morwitz, 2005)	• How likely are you are you to buy the product on offer (highly unlikely to highly likely) • How probable it is that you will purchase the product on offer (highly improbable to highly probable) • How certain it is that you that you will purchase this product (highly uncertain to highly certain) • What chance there is that you will buy this product (no chance at all to very good chance)	• I am likely to buy one of the watches on offer on my [device] • It is probable that I will purchase one of the watches on my [device] • It is certain that I will purchase one of the watches on my [device] • There is a good chance that I will buy one of the watches on my [device]
Scarcity Manipulation Check (Eisend, 2008)	How available do you think the advertised products are? • Rather insufficient – rather sufficient *(7 point bipolar scale)*	How available do you think the advertised watches are? • Insufficient availability – sufficient availability • Very limited – not very limited • Very restricted – not at all restricted *(7 point bipolar scale)*
Attitude to Online Shopping (Hasan, 2010)	• I do not like to shop online* • Online shopping makes me feel happy • I feel excited when I shop online • Online shopping is a wise way to shop • Online shopping is useful to people • Online shopping is an effective way to shop	
Perceived Risk of Online Shopping (van der Heijden, Verhagen, & Creemers, 2003)	• How would you characterise the decision to buy a product through this website? (a very small risk – a very big risk) • How would you characterise the decision to buy a product through this website? (high potential for loss – high potential for gain)*	• There is a good chance I will make a mistake if I purchase products online • Purchasing products online is a big risk • Purchasing products online creates a high potential for loss • Purchasing products online could be a very negative situation

	• How would you characterise the decision to buy a product through this website? (a very negative situation – a very positive situation)* • What is the likelihood of your making a good bargain by buying from this store through the Internet? (very unlikely – very likely)*	
Scepticism of Advertising (Obermiller & Spangenberg, 1998)	• We can depend on getting the truth in most advertising. Advertising's aim is to inform the consumer • I believe advertising is informative • Advertising is generally truthful • Advertising is a reliable source of information about the quality and performance of products • Advertising is truth well told • In general, advertising presents a true picture of the product being advertised • I feel I've been accurately informed after viewing most advertisements • Most advertising provides consumers with essential information	• We can depend on getting the truth in most advertising • I believe advertising is informative • Advertising is generally truthful • Advertising is a reliable source of information about the quality and performance of products • In general, advertising presents a true picture of the product being advertised • I feel I've been accurately informed after viewing most advertisements

*reversed item

Manipulated Variables

The two variables manipulated were the scarcity message and the device the subject was shopping on. To manipulate scarcity, each scenario included a message about the availability of the product. The scenario also manipulated whether a subject was told they were using their smartphone or their fixed device. To account for subjects' preferences, their choice of either a tablet, laptop, or desktop computer was used in the fixed device scenario. The following sections provide more detail about the manipulations, and the scenario text is included below:

> Imagine that you need to buy a new watch. You are at home on your [device] when you notice that you have a new email. You go to your inbox and see the email is from [store name] and has the subject line 'Explore our new watch styles.'
>
> You open the email which includes pictures and some information about the store's attractive new watch selection. They have a range of brands and styles available that you think are appealing. The email says, "[scarcity message] so check out our online store." You notice that the watches appear to be made of quality materials and you think the advertised prices are reasonable.

Scarcity Message

Prior research has manipulated scarcity based on the specificity of the message (Aggarwal et al., 2011), the reason for scarcity to occur (Aguirre-Rodriguez, 2013; Wu & Lee, 2016), or to test variables that moderate the effect of scarcity (Eisend, 2008; Gierl & Huettl, 2010; Ku, Kuo, & Kuo, 2012; Mukherjee & Lee, 2016). These studies manipulated scarcity by adapting the wording to reflect the presence of scarcity. For example, '*first 100 customers only'* vs '*for six days only'* (Aggarwal et al., 2011) or, '*because of the limited edition, supplies are only available for a short time'* vs '*presently there are sufficient items in stock'* (Eisend, 2008). For the present study, the scarcity message was manipulated by the inclusion of a statement about the availability of the product. The limited quantity message was, *'there is a limited amount of stock available'*, the limited time message was, '*only available for a limited amount of time*', and the no scarcity message was '*there are many watches in stock'*.

Type of Device

Existing literature suggests that mobile devices are fundamentally different to other internet-enabled devices (de Haan et al., 2015; Okazaki & Romero, 2010; Ström et al., 2014), therefore device was manipulated in this study. Prior research manipulated device on computer dispalys, because mobile phones were not widely available at the time (Bruner & Kumar, 2005). However, for this study the type of device was manipulated by stating whether the subject was using their smartphone or fixed device. It was assumed all subjects had adequate experience with the devices because owning a smartphone and fixed device was one of the sampling criterion. If the subject received a fixed device condition their preference between a laptop, desktop computer or tablet was input into the stimuli so that the scenario was more realistic.

Retailer Question

To create a more authentic scenario, subjects supplied the name of a store that sold watches they would consider purchasing from. Subjects were then told the email in the scenario was from the retailer. Consumers have a more positive perception of email advertising when they receive emails from a company they trust (Cases, Fournier, Dubois, & Tanner, 2010; Dufrene, Engelland, Lehman, & Pearson, 2005). Therefore, it was important the subject was familiar with the retailer sending the email. Allowing respondents to answer questions in relation to a brand they supplied has been used in prior research by Lee and Kim (2010) when examining the relationship between retailers and loyalty.

Dependent Variable

For this research, purchase intention was the dependent variable because persuasion claims can result in short-term motivation to purchase (Cialdini, 2008). To measure purchase intention on a device, a scale developed by Chandran and Morwitz (2005) to measure the subject's likelihood of purchasing a particular product was adapted. The scale consists of four items and was measured using a seven-point Likert scale. The items were adapted from questions into statements that could be measured on a scale from *strongly disagree* to *strongly agree*. Additionally, the items were adapted based on the condition the subject was assigned e.g. *I am likely to buy one of the watches on offer on my [device]*. The original scale had a reported Cronbach's alpha of .89 which is above the acceptable minimum of .7 (Hair et al., 2010).

Manipulation Check

In order to assess that scarcity had been manipulated correctly, a scale from Eisend (2008) was adapted into a three-item scale. The study used a seven-point bipolar scale and indicated the manipulation check successfully worked. The additional bipolar points were *very limited* to *not very limited* and *very restricted* to *not at all restricted*.

Moderating Variables

The following moderating variables have been included because prior literature has identified perceived risk of online shopping (Kumar & Mukherjee, 2013; Pavlou, 2003; Pires et al., 2004) and scepticism of advertising (Aguirre-Rodriguez, 2013; Lee et al., 2014) as potentially impacting the relationship between the independent variables and purchase intent.

Perceived Risk of Online Shopping

Perceived risk of online shopping was measured on a scale developed by van der Heijden et al. (2003). The original scale consisted of four items measured on bipolar scales. The Cronbach's alpha was reported as .80 and the authors also stated that the scale was unidimensional and reliable. For this study, the items were adapted from bipolar to Likert and generalised to shopping online, rather than on a specific website, to fit within the context of the study. For example, the statement '*How would you characterise the decision to buy a product through this website?'* measured from *a very small risk* to *a very big risk* was adapted to '*Purchasing products online is a big risk'*.

Scepticism of Advertising

To measure the subject's scepticism of advertising, which is the tendency to disbelieve advertising claims, a scale developed by Obermiller and Spangenberg (1998) was included. The scale has nine items that are measured on a seven-point Likert scale from *strongly disagree* to *strongly agree.* The original scale had an acceptable Cronbach's alpha of .86 (Hair et al., 2010). For this study, six of the items fit the context and were included in their original wording.

Control Variable

Attitude to online shopping been shown to have an effect on online shopping behaviour (Ahn, Ryu, & Han, 2007; Lin, 2007; Pavlou & Fygenson, 2006). Therefore, the subject's attitude to online shopping was controlled for in this study. The construct was measured on a scale developed by Hasan (2010). The scale measures the affective, cognitive, and behavioural components of an online shopping attitude. The scale consists of nine items, three for each component, and was measured on a seven-point Likert scale. The affective and cognitive items were used in this study however the behavioural items were not included because they refer to purchase intention which was measured separately as a dependent variable. For the original scales the affective component had a Cronbach's alpha of .93 and the cognitive component had a Cronbach's alpha of .94 (Hasan, 2010). Furthermore, all reported items had acceptable factor loadings above .751 (Hair et al., 2010).

3.2.4.3 Sampling Frame

The sample comprised of New Zealand consumers who had purchased online in the past 12 months, owned a smartphone, and owned at least a laptop, or tablet, or desktop computer. This ensured the subjects had recent experience shopping online and could be allocated to either a smartphone or fixed device condition. More than 2.8 million New Zealanders have access to the internet, and 66% of these people have shopped online (Boyte, 2016; Statistics New Zealand, 2012b). Furthermore, 70% of New Zealanders own a smartphone and 64% of New Zealanders own at least three personal devices (Research New Zealand, 2015). As the research focused on online shopping and devices, it was necessary that the sample met this selection criteria.

Sample Selection

The sample for this study was recruited via social media and Internet forums. Compared to conventional online research, collecting through social media is a less expensive alternative (Baltar & Brunet, 2012). By posting the link to *Facebook* communities and on New Zealand focused forums purposive sampling is being deployed. This sampling method has been criticized for not providing a true representation of the population given the self-selection nature of the method (Hair et al., 2010). However, the high use of the internet by the target population should help mitigate this. Over 80% of the New Zealand population

has access to the internet (Statistics New Zealand, 2012a). Furthermore, the questionnaire was shared on a range of local and national forums to attract a wider range of people. Due to the time and cost restrictions of this study this method was considered appropriate and the limitations of a purposive sample were taken into consideration.

Subjects were asked to share the survey with friends and family in order to extend beyond the researchers own network. Baltar and Brunet (2012) suggest snowball sampling is suitable for social media networks due to the convenience of sharing links. Snowball sampling is also beneficial because of the reduction in costs and time required to collect responses (Hair et al., 2010). However, Hair et al. (2010) note that this method can create bias if the study is shared within social circles that are not representative of the population. Therefore, the questionnaire was posted on a number of pages within the anonymous internet forum *Reddit* and local forum *Neighbourly* to help collect more diverse responses.

Sample Size

Hair et al. (2010) recommend at least 30 subjects per cell to ensure the sample size was not too small. Therefore, a minimum of 180 responses was required. In total, 236 usable responses were collected. The response rate for this study could not be determined due to the distribution method applied.

3.2.4.4 Procedure

The online experiment was distributed to subjects by posting a web link on to social media pages and New Zealand forums, as per the discussion above. After viewing a Participant Information page which assured their anonymity, subjects could accept to participate in the research. Subjects were then randomly assigned to one of the six experimental conditions after answering qualifying questions. These ensured the subjects had experience with online shopping and owned smartphone and at least one other device. Next, subjects were asked about their attitude to online shopping and perceived risk of shopping online. Subsequently, there was a question about the subject's perceived risk of shopping on the specific device. The next question asked the subject to imagine they needed to buy a new watch and required them to type in the name of store that sells watches online that they would consider purchasing from. The following section contained the experiment scenario. Subjects were asked to imagine they had received an email from the store they identified.

The scenario also stated what device the subject was using and included the sentence which manipulated the level of scarcity. A scarcity manipulation check was then included. Finally, the dependent variable of purchase intention was shown, followed by the scale for scepticism towards advertising, and then a range of demographic questions. Following these questions subjects were given the opportunity to go in the draw to win a $20 voucher, if they entered the draw their contact information was collected separately to ensure anonymity.

3.2.5 Ethics Approval

This research was granted ethics approval (application #24400) from the Pipitea Ethics Committee at Victoria University of Wellington. Participant anonymity was maintained through the use of survey software Qualtrics. The software collected responses but did not provide personal information that would identify a respondent, and thus the data cannot be associated with any specific person. Data has not been reported in regard to any single participant, but rather through the use of aggregated statistical analyses.

3.3 Results

This section outlines how the data for study one was prepared for analysis and the procedure for analysing it. It addresses the required assumptions, the validity of the data, and the hypothesis test results.

3.3.1 Response Analysis

Of the 356 respondents who began the questionnaire, 250 provided completed responses. Responses which were not complete were removed as well as responses which had unsuitable answers in the text entry field. Answers were deemed unusable if they did not provide the name of a legitimate store e.g. “I don’t know” or if the store name provided was not a watch retailer, such as a supermarket, because the respondent would not be able to meaningfully answer the subsequent questions. After cleaning the data, a total of 236 usable responses were left. For each of the six conditions there were between 38 and 40 usable responses, which is above the 30 per condition recommended by Hair et al. (2010).

Table 3.3 shows the descriptive statistics for the study one sample. The study had a higher percentage of subjects in the 18-24 and 25-34 age brackets, and lower in the other reported age brackets, compared to the population of New Zealanders who use the internet (Statistics New Zealand, 2012a). However, smartphone ownership is higher for 18-34 year olds with 91% of this age bracket owning a smartphone compared to 78% of 35-54 year olds and 45% of those aged 55 and above (Research New Zealand, 2015). The table also indicates that the sample has less males and more females than the population of New Zealanders who use the internet.

Table 3.3 Descriptive Statistics – Demographics

	Frequency	Percentage of Sample	Percentage of NZ Internet Users[1]
Age			
Under 18	3	1.3%	
18-24	112	47.5%	20.5%[2]
25-34	75	31.8%	18.8%
35-44	23	9.7%	18.8%
45-54	13	5.5%	18.4%
55-64	9	3.8%	13.5%
65+	1	0.4%	10%
Total	236	100%	100%
Gender			
Male	70	29.7%	48%
Female	160	67.8%	52%
Gender diverse	4	1.7%	-
Prefer not to say	2	0.8%	-
Total	236	100%	100%

Table 3.4 shows the percentage of the sample who owned each of the device options. Compared to New Zealand smartphone users, the sample had a lower ownership of tablets and desktop computers but similar ownership of laptops.

Table 3.4 Descriptive Statistics – Device

Device	Frequency	Percentage of Sample	Percentage of NZ smartphone users[3]
Tablet/iPad	102	43.2%	63%
Laptop	208	88.1%	84%
Desktop Computer	84	35.6%	60%
Total	394		

3.3.2 Common Method Variance

Common method variance is "variance that is attributable to the measurement method rather than to the constructs the measures represent" (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003, p. 879). If present it can result in incorrect assumptions of a scale's reliability and convergent validity and impact intercorrelations through artificial inflation or biased estimates (MacKenzie & Podsakoff, 2012).

[1] (Statistics New Zealand, 2012a)
[2] The 2012 survey had an age range of 15-24
[3] (Research New Zealand, 2015)

A single factor test developed by Harman (1960) is a simple method of establishing the presence of common method variance (Malhotra, Kim, & Patil, 2006; Podsakoff et al., 2003; Podsakoff & Organ, 1986). To conduct the test, an exploratory factor analysis is run on all items and common method variance is assumed if a single factor accounts for 50% or more of the variance in the variables (Mattila & Enz, 2002; Podsakoff & Organ, 1986). Table 3.5 shows the results of the test for the items used in the study. Five factors with Eigenvalues greater than 1 were extracted which account for 75.83% of the total variance. Factor 1 accounted for the highest percent of variance explained which was 30.78%. As no single factor accounted for more than 50% of the variance then the test suggests that common method variance has not greatly impacted the results of this study.

Table 3.5 Harman's Single Factor Test

	Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %
1	6.156	30.782	30.782
2	3.476	17.379	48.160
3	2.601	13.004	61.165
4	1.782	8.909	70.074
5	1.152	5.759	75.833

3.3.3 Validity and Reliability Tests

Validity and reliability were tested to ensure the items and scales accurately measured their intended constructs (Field, 2009). Validity was evaluated by considering face validity and construct validity.

3.3.3.1 Face Validity

To determine face validity, all of the items used for each construct should be regarded as understandable to the "lay person" (Bryman & Bell, 2015). Face validity was assessed through discussion with academic experts to identify items that were ambiguous, and consider the general readability of the content. Subsequently, the questionnaire was shown to potential subjects for further clarification that items measured the intended constructs as applicable to the context of the study. All items were deemed appropriate and no changes were required.

3.3.3.2 Construct Validity

Construct validity refers to the degree that a measure provides empirical evidence consistent with the purported theory (Zikmund, D'Alessandro, Winzar, Lowe, & Babin, 2014). There are two components of construct validity; convergent validity, and discriminant validity (Hair et al., 2010), which are both discussed below. Table 3.6 contains the convergent validity results.

Table 3.6 Convergent Validity and Reliability Results

Construct	Item	Loading	Communality	α
Attitude to Online Shopping KMO = .706	1	.636	.555	.819
	2	.929	.888	
	3	.898	.824	
	4	.800	.712	
	5	.790	.636	
	6	.866	.793	
Perceived Risk of Online Shopping KMO = .740	1	.722	.522	.845
	2	.883	.780	
	3	.915	.836	
	4	.790	.624	
Scepticism towards Advertising KMO = .904	1	.834	.834	.921
	2	.715	.715	
	3	.836	.836	
	4	.896	.896	
	5	.886	.886	
	6	.907	.907	
Perceived Scarcity KMO = .754	1	.927	.859	.926
	2	.950	.902	
	3	.928	.861	
Purchase Intention KMO = .832	1	.947	.897	.956
	2	.968	.936	
	3	.873	.762	
	4	.971	.943	

Convergent Validity

Convergent validity is established when an item converges, or correlates, on a common point with the other theoretical items of the construct. This is commonly tested through factor analysis, which determines the extent that each item appropriately measures the construct. First, the Kaiser-Meyer-Okin (KMO) and Bartlett's Test of Sphericity were

inspected to check the factorability of the data. The KMO score assesses the sampling adequacy, and Bartlett's Test of Sphericity tests the null hypothesis that the variables are uncorrelated in the population. An acceptable KMO score is above the threshold of .6 (Kaiser, 1974), and Bartlett's significance value must be less than .05. All scales were found to have met these criteria, and the data was deemed factorable.

Next, the total variance statistic and Eigenvalues were examined to see how many factors the items of each scale loaded on. According to the Kaiser criteria, Eigenvalues above one indicate a loading on a single particular factor (Field, 2009). Each scale loaded on one factor, except for Attitude to Online Shopping. The scale is multidimensional, with the first three items measuring the subject's affective component and the last three items measuring the cognitive component. The items were correctly distributed over the two factors as expected.

Communalities are a measure of the amount of variance each item shares with the construct it is intended to measure (Field, 2009) and were assessed next. Hair et al. (2010) suggest the minimum threshold for communalities is .5, and all items exceeded this threshold. Finally, the factor loadings were examined. Factor loadings indicate the degree to which items correlate with the factors they load upon (Field, 2009). Factor loadings should be above .5 (Cavana, Delahaye, & Sekaran, 2001; Hair et al., 2010), and all items met this criteria.

Discriminant Validity

Discriminant validity was examined to verify the measures for the different constructs did not correlate too strongly with each other (Field, 2009). The VIF figures, which are traditionally used for measuring multicollinearity, can be used as a proxy for assessing discriminant validity. VIF figures below 10 are reflective of discriminant validity (Field, 2009). Table 3.7 shows that all figures were less than 10, establishing discriminant validity.

Table 3.7 VIF Figures

Predictor	VIF
Device	1.070
Scarcity	1.014
Attitude to Online Shopping	1.226
Scepticism	1.151
Risk of Online Shopping	1.212

3.3.3.3 Reliability Analysis

Reliability measures the scale's ability to consistently provide stable results through multiple iterations (Cavana et al., 2001). Traditionally, Cronbach's Alpha is used to determine the reliability of a scale. Allen, Bennett, and Heritage (2014) suggest than an Alpha score should be above .7 for an existing scale to reflect scale reliability and be adequate for research purposes. Each of the measures exceeded this criteria and reliability was established.

3.3.4 Non-response Bias

To check for non-response bias, an independent samples *t* test was conducted based on the notion that late responses simulate non-responders (Armstrong & Overton, 1977). The test compared purchase intention for the first half of the responses (n = 118) to the purchase intention for the second half of the responses (n = 118). The Levene's test was non-significant therefore equal variances can be assumed. The *t* test was not statistically significant, with the first responses ($M = 2.88$) having a similar purchase intent to the later responses ($M = 2.86$), $t(234) = .132$, $p = .895$. Therefore, it is assumed that no bias exists.

3.3.5 Scarcity Manipulation Check

A scarcity manipulation check was conducted before hypothesis testing. To check if the manipulation of scarcity was successful, a one-way between groups analysis of variance (ANOVA) was conducted to compare the perceived scarcity of subjects in the scarce conditions (LQS n = 79, LTS n = 79) to the perceived scarcity of subjects in the non-scarce condition (n = 78). Inspection of the skewness and kurtosis indicated that the assumption of normality was supported for each of the three conditions. The Levene's test was non-significant therefore equal variances can be assumed. The ANOVA was statistically significant, indicating that the subjects perceived scarcity was different between the groups, $p = 0.038$.

Post hoc analyses with Tukey's HSD (using an α of .05) revealed that subjects in the limited-quantity scarcity condition (M = 4.48, SD = 1.44) perceived significantly greater scarcity than subjects in the no scarcity condition (M = 5.07, SD = 1.45). However, there was no significant difference between subjects in the limited-time scarcity condition (M = 4.66, SD = 1.55) and the subjects in the no scarcity condition. As no significant difference between limited-time scarcity and no scarcity conditions was identified, they could not be treated as different levels of scarcity. Subsequently, only limited-quantity scarcity was considered in the final analysis and H3b was not tested.

3.3.6 Hypotheses Testing

Multiple regression analysis was used for analysing the data because the research is testing the effect of the experimental conditions in the presence of the moderating variables, perceived risk and scepticism, and the control variable, attitude to online shopping. The regression was conducted using dummy variables based on the indicator coding approach (Hair et al., 2010). In order to measure the experimental manipulation of scarcity conditions if a respondent was presented with a limited-quantity scarcity message it was coded as a 1. The conditions where a respondent received a non-limited-quantity scarcity message were coded as zero to create a base case. For the device manipulation, respondents in the smartphone conditions were coded as 1 and respondents in the fixed device conditions were coded as zero.

3.3.6.1 Multiple Regression Assumptions

After ensuring all items met the factor analysis and reliability thresholds, the items were averaged to create a single measure for each construct. Each scale was then tested for normality, which is a requirement when conducting parametric tests such as regression (Field, 2009). Normality was determined by examining the skewness and kurtosis of the data, which indicates how much the distribution deviates from the normal distribution. Acceptable figures for skewness are between two and negative two, and for kurtosis are between three and negative three (Bai & Ng, 2001). All of the constructs were within the acceptable range (see Table 3.8).

Table 3.8 Normality Statistics – Skewness and Kurtosis Figures

	Mean	Std. Dev	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Attitude to Online Shopping	5.52	.84	-.523	.158	-.191	.316
Risk of Online Shopping	4.49	1.25	-.376	.158	-.429	.316
Scepticism towards Advertising	4.68	1.22	.011	.158	-.760	.316
Purchase Intention	2.87	1.48	.306	.158	-1.170	.316

Further assumptions of regression are the absence of multicollinearity and the normal distribution of residuals (Field, 2009). The VIF figures, which indicate strong correlation of two or more predictors, were evaluated to determine the absence of multicollinearity in the model. The VIF figures were all below 10 hence it was assumed there was no multicollinearity (Myers, 1990).

Additionally, graphical methods were used to test the normality of residuals (Field, 2009). The normal probability plot of standardised residuals was inspected (see Appendix B). The data appeared to follow the line of best fit and it was assumed the residuals were normally distributed.

Finally, it is assumed that residuals are independent of each other. This was assessed through examination of the Durbin-Watson figure. Field (2009) suggest the number should be between one and three. For this regression the figure was 1.987, which meets the requirements. Therefore, it was appropriate to conduct multiple regression analysis to test the identified hypotheses.

3.3.6.2 Multiple Regression

In combination, the predictor variables accounted for a significant 26.3% of the variability in purchase intention $R^2 = .263$, adjusted $R^2 = .227$, $F\ (11, 224) = 7.284$, $p < .000$. Unstandardised (B) and standardised (β) regression coefficients, and the standard error for each predictor in the regression model are reported in Table 3.9.

Table 3.9 Summary of Multiple Regression Analysis

Variable	*B*	Std. Error	β
Scarcity	-5.542	1.741	-1.776**
Device	-.126	.694	-.043
Risk of Online Shopping	.200	.183	.169
Scepticism	-.372	.089	-.307**
Attitude to Online Shopping	.160	.131	.091
Scarcity x Device	-.326	.371	-.082
Scarcity x Scepticism	.350	.167	.564*
Scarcity x Attitude to OS	.630	.239	1.145**
Device x Risk of OS	-.632	.225	-1.020**

Note. $N = 236$.
* $p < .05$ ** $p < .01$

Table 3.10 summaries the hypotheses that were tested and indicates which hypotheses were supported according to the multiple regression results.

Table 3.10 Summary of Hypothesis Outcomes

Hypothesis	Significance	Direction	Hypothesis Supported
H1: Purchase intention will be lower for a smartphone than a fixed device	$p = .856$	Negative	Not Supported
H2: The effect of device on purchase intention will be greater when the perceived risk of online shopping is higher	$p = .005$	Negative	Supported
H3: Scarcity will have a positive effect on purchase intention	$p = .002$	Negative	Not Supported
H4: The relationship between scarcity and purchase intention will be stronger when consumers are less sceptical	$p = .037$	Positive	Supported
H5: The effect of scarcity on purchase intention will be stronger for a mobile device compared to a fixed device	$p = .380$	Negative	Not supported

Consumers on a fixed device did not have a greater purchase intention than consumers on a smartphone hence H1 was not supported. However, H2 was supported, consumers' perceived risk of shopping online moderated the relationship between device and purchase intention. The main effect of scarcity on purchase intention was significant, however the direction was negative, therefore H3 was not supported. H4 was supported which demonstrates that a consumer's scepticism impacts the relationship between scarcity and

purchase intent. Finally, H5 was not supported, the interaction between scarcity and device did not lead to greater purchase intention on a mobile device.

3.4 Discussion

This section explains the results of study one and also discusses how the insights from the study relate to prior research.

3.4.1 Device and Purchase Intention

This study addressed the lack of research directly comparing mobile and fixed devices in the same purchasing situation. The results of the analysis provided insights into the relationship between device and purchase intention. An interesting finding from the present study was that contrary to hypothesis one, the device a consumer used did not directly affect their purchase intention. This contradicts previous findings that consumers were less likely to purchase on a smartphone compared to a computer (de Haan et al., 2015; Holmes et al., 2014; Kumar & Mukherjee, 2013). The prior studies that have investigated purchase intentions on mobile and fixed devices have used surveys and secondary data to test the relationship. Furthermore, they tended to focus on consumers' demographics and transaction information, such as time of transaction and price of products (de Haan et al., 2015), or the consumers' perceptions of shopping on the device (Holmes et al., 2014). However, these studies did not specifically include perceived risk of online shopping within their models.

In this study, hypothesis two was supported as perceived risk of online shopping moderated the relationship between device and purchase intention. This is consistent with prior research which has identified a consumer's perception of risk as a barrier to online shopping (Park & Kim, 2003; Pavlou, 2003; Pires et al., 2004; Wu & Ke, 2016). These results indicate that when consumers perceive a higher level of risk when shopping online they have a lower purchase intention on a mobile device. Thus, the findings of this study suggest that perceived risk has a significant impact on purchase intention. As Pavlou (2003) found, perceived risk of online shopping is an antecedent of purchase intention. If a consumer's perceived risk is not decreased when shopping online then they are hesitant to complete transactions. Within online channels, mobile devices are perceived to be riskier for online purchases because of their smaller screens and keyboards which impact performance risk (Hubert et al., 2017), security risk, and financial risk (Kleijnen et al., 2007; Kumar & Mukherjee, 2013; Yang et al., 2015). In general, perceived risk has a significant impact on purchase intention and is an important construct when comparing

devices as it accounts for some of the difference in purchase intention. A subsequent regression was conducted without perceived risk of online shopping (see Appendix C for results) which showed a significant difference between mobile and fixed devices on purchase intention. Overall, these results indicate that perceived risk is a key factor when comparing mobile and fixed devices.

3.4.2 Scarcity and Purchase Intention

The study also tested the relationship between a scarcity message and purchase intention in an online context. Hypothesis three outlined the expected effect of scarcity on purchase intention as identified in prior offline studies (Aggarwal et al., 2011; Jang et al., 2015; Parker & Lehmann, 2011), but it was not observed in the current study. In contrast, scarcity had a negative effect on purchase intention. However, as hypothesis four proposed, this relationship was moderated by the consumer's scepticism of advertising. When consumers were more sceptical of advertising, they had lower purchase intentions when the email contained a scarcity message.

The effect of online scarcity messages on purchase intention has been reported with conflicting results. While Wu and Lee (2016) found that consumers who received a '*limited edition'* scarcity message had greater purchase intention, research conducted by Jeong and Kwon (2012) found that a scarcity message did not have a significant impact on purchase intent. In comparison, the current study showed that scarcity actually had a negative effect on purchase intention. An explanation for the differing results is the potential impact of product involvement on the effect of a scarcity message. Suri et al. (2007) showed that a consumer's product involvement affected how carefully they processed a scarcity message. For example, consumers processed the information for a high involvement product less carefully in order to make a quick decision based on heuristic cues. Wu and Lee (2016) used low involvement products such as a coffee mug and bobble heads, in contrast Jeong and Kwon (2012) used a USB, which the sample considered moderately involving but low risk. The current study also used a moderately involving product, watches, and found scarcity had a negative effect on purchase intention. Therefore, in an online context, product involvement may affect the relationship between scarcity and purchase intention. It appears scarcity is less effective when products have higher involvement, in contrast to the findings of Suri et al. (2007).

The negative effect of scarcity on purchase intention can be explained by the moderating role of scepticism towards advertising, as proposed by hypothesis four. The relationship between scarcity and purchase intention was stronger when consumers were more trusting of advertising. In contrast, consumers that were more sceptical of advertising had a lower purchase intention. This finding is consistent with prior research that found if consumers were more sceptical of marketing, they doubted the reliability of the scarcity message (Aguirre-Rodriguez, 2013). Furthermore, this result is supported by persuasion knowledge literature which suggests that if consumers are aware of persuasion tactics it can result in a negative cognitive reaction and decreased behavioural intentions (Campbell, 1995; Kirmani & Zhu, 2007; Lee et al., 2014). Scarcity messages are often used by online retailers to create a sense of urgency (Aggarwal et al., 2011; Griskevicius et al., 2009; Lee et al., 2014) but in an online context these messages may be less effective due to consumers' scepticism.

The findings of the current study indicate that a scarcity message resulted in lower purchase intention. Specifically, this study investigated the effect of scarcity due to supply in the form of a limited-quantity message. Gierl et al. (2008) suggest that when scarcity is caused by supply, rather than demand, consumers cannot infer the purchasing behaviour of other consumers. Instead, the communication of scarcity due to supply is controlled by the retailer. For a scarcity message to impact purchase intention, consumers must believe the information is reliable (Aguirre-Rodriguez, 2013) and this research suggests consumers are sceptical of limited quantity scarcity messages.

The present study communicated the scarcity message in an email, which is a common way for retailers to distribute promotional messages (Hartemo, 2016; Kumar, Zhang, & Luo, 2014; Martin, Van Durme, Raulas, & Merisavo, 2003). Emails are beneficial for retailers because they include hyperlinks which consumers can easily click to visit a retailer's website (Ansari & Mela, 2003). However, prior research found that the more marketing emails consumers receive, the less likely they are to open the emails (Martin et al., 2003), especially if they are unsolicited and intrusive emails (Hartemo, 2016; Kumar et al., 2014). Furthermore, Pavlov, Melville, and Plice (2008) suggested that consumers feel overloaded with information when they receive more marketing emails. In this study consumers may have had a lower purchase intention in the scarcity conditions because they perceived the email to be intrusive or unnecessary. Although prior research has suggested including time

limits in an email can increase motivation to visit the website (Hanna, Berger, & Abendroth, 2004), consumers are becoming more aware of persuasive marketing strategies (Campbell & Kirmani, 2000; Darke & Ritchie, 2007). If consumers perceive the scarcity message as a marketing tactic, they may be sceptical of the marketer's motives in sending the email.

3.4.3 Interaction between Device and Scarcity

Hypothesis five suggested that when a consumer received a scarcity message while on their smartphone it would increase their purchase intention. However, this hypothesis was not supported. It was assumed that the scarcity message would create urgency and the consumer would feel they needed to make an immediate decision resulting in an increased purchase intention on their smartphone. The results indicate that the scarcity message did not increase purchase intention on a smartphone through creating pressure to make a quick decision. An explanation for this outcome is that the time pressure to make a decision increased the consumer's risk of shopping on their mobile. Hubert et al. (2017) suggest that when consumers are under pressure they have less time to engage in risk reduction strategies. Therefore, they are more sensitive to technology related risks, including performance risk and financial risk. For example, consumers may have to navigate the website successfully, and enter purchasing information quickly, to ensure they secure their chosen product before it becomes unavailable. As previously discussed, perceived risk had a moderating effect on the relationship between device and purchase intention. Although this study only tested the results of the limited-quantity scarcity message, time pressure is inherent in this type of scarcity because if consumers want to purchase the scarce product they must do so before it sells out.

The results of the first study indicate that some consumers are sceptical of scarcity messages, and that consumers' perceived risk influences the relationship between device and purchase intention. However, it is common practice for retailers to use multiple persuasion claims at once, and when more than one claim is present it can alter how consumers react to the content (Shu & Carlson, 2014). Popularity is another type of persuasion claim that is commonly used by online retailers (Jeong & Kwon, 2012; Sher & Lee, 2009) to suggest that numerous other consumers have endorsed the product. Popularity can also reduce uncertainty and risk if consumers evaluate the product as

superior to others (Dean, 1999; Nelson, 1970; Tucker & Zhang, 2011). Furthermore, popularity and scarcity are not mutually exclusive, as a product may be scarce because of high demand (van Herpen et al., 2009). Therefore, study two will investigate how scarcity messages and popularity cues impact purchase intention, in addition to further testing the relationship between device and purchase intention. The study will also test the relationships in a new context. Rather than receiving an email containing a scarcity message, consumers will already be shopping on a retailer's website, in order to examine the effectiveness of the persuasion claims in a different online context.

Chapter 4: Study Two

The results of study one indicated that the relationship between device and purchase intention was moderated by perceived risk of online shopping, and that scarcity had a negative effect on purchase intention, which was moderated by scepticism. Retailers often use multiple persuasion claims in combination (Shu & Carlson, 2014), and the second study was designed to test the addition of a popularity cue. Prior literature has identified a relationship between popularity and purchase intention (Horcajo et al., 2010; Huang & Chen, 2006; Jeong & Kwon, 2012). Therefore, this study investigated how consumer behaviour on mobile and fixed devices was impacted by the inclusion of scarcity and popularity. With this foundation, this chapter outlines the conceptual development to be tested, methodology, results, and discussion for study two.

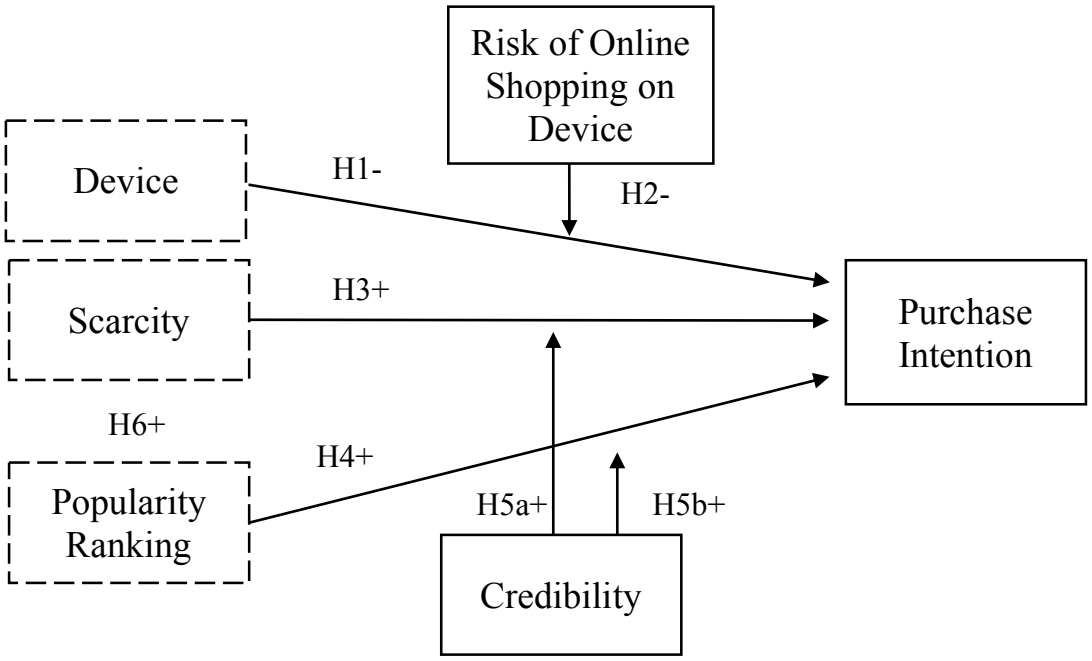
4.1 Conceptual Development

This section explains the proposed relationships which will be tested in study two. The constructs and hypotheses of the study are detailed based on prior literature.

4.1.1 Hypothesis Development

Study two also examines whether the device a consumer is using impacts their purchase intention. Furthermore, this study investigates the effect of a scarcity message, and the effect of a popularity ranking, on purchase intention. Building on study one, this study tests the relationships in a new situation and tests the inclusion of a popularity ranking as an additional persuasion claim to scarcity (see Figure 4.1). Popularity claims indicate that other consumers have been satisfied with a product (Amir & Levav, 2008; Kardes, Posavac, & Cronley, 2004; Tucker & Zhang, 2011), in contrast to scarcity, where consumers infer the reason for reduced availability (Cialdini, 2008; Ku et al., 2013; Lee et al., 2014). Therefore, this study compares the different types of persuasion claims in an online context to further understand consumer behaviour.

Figure 4.1 Study Two Experiment Model



4.1.1.1 Device Hypotheses

As discussed for study one, the specific device consumers use to access the internet can influence their behaviour online (de Haan et al., 2015; Kleijnen et al., 2007; Wang et al., 2015). Although consumers use their smartphone more frequently throughout the day, they prefer to purchase and complete transactions on more fixed devices, such as laptops and desktop computers (de Haan et al., 2015; Holmes et al., 2014; Kumar & Mukherjee, 2013). Therefore, it is hypothesised:

H1: Purchase intention will be lower for a smartphone than a fixed device

Consumers perceive online shopping as riskier than shopping offline because they cannot directly evaluate products (Jeong & Kwon, 2012; Ko et al., 2004). Consumers rely on product images and product descriptions when shopping online and therefore prefer fixed devices because they have larger screens which help mitigate the risks (Laukkanen, 2007; Okazaki & Romero, 2010). Privacy concerns have also been identified when shopping online because some consumers are cautious about entering personal information and completing transactions (Kleijnen et al., 2007; Kumar & Mukherjee, 2013; Yang et al., 2015). In general, mobile devices are perceived to be riskier than fixed devices (Bahli & Benslimane, 2004). Therefore, it is hypothesised:

H2: Perceived risk of online shopping will moderate the relationship between device and purchase intention

4.1.1.2 Scarcity Hypothesis

In order to make an informed decision consumers require information (Bettman, 1979; Engel & Blackwell, 1982; Howard & Sheth, 1969). Searching for information has been found to reduce the risk and uncertainty of purchasing a product (Locander & Hermann, 1979; Mitchell, 1999). Online information channels benefit consumers because they are more convenient for information search (Montoya-Weiss et al., 2003) and have a large amount of information available (Gupta et al., 2004; Kollmann et al., 2012). Although it is important not to overload consumers with information while still meeting the necessary requirements (Mosteller et al., 2014). Scarcity messages are one way of communicating persuasive information online (Griskevicius et al., 2009; Jeong & Kwon, 2012). Consumers cannot directly observe scarcity online so their preferences are influenced by the information supplied by the retailer (van Herpen et al., 2009). Retailers use scarcity messages because they operate as heuristic cues that can signal a products quality and value (Cialdini, 2008; Ditto & Jemmott, 1989; Folger, 1992). In turn, consumers indicate greater purchase intention for the scarce products (Eisend, 2008; Jang et al., 2015; Parker & Lehmann, 2011; Wu & Lee, 2016). Therefore, it is hypothesised:

H3: Scarcity will have a positive effect on purchase intention

4.1.1.3 Popularity Ranking Hypothesis

Product popularity rankings are also an example of an online persuasion claim that can be easily communicated on a website (Jeong & Kwon, 2012; Wu & Lee, 2016). Consumers can infer product quality from a popularity claim because of the assumption that if others are satisfied with the product then it must be good (Nelson, 1970; Tucker & Zhang, 2011). When shopping online, consumers cannot directly see what other consumers are purchasing, but a popularity claim can act as a heuristic cue of a product's demand (van Herpen et al., 2009). Some websites also use popularity symbols which have been shown to be effective heuristic cues for product quality (Gurrea et al., 2013; Khare, Labrecque, & Asare, 2011; Parker & Lehmann, 2011). Prior research has also shown that providing information about product popularity positively impacts consumers purchasing decisions

(Horcajo et al., 2010; Huang & Chen, 2006). Therefore, this research suggests that a high popularity ranking indicates a general endorsement of the product and will subsequently increase a consumer's purchase intention. Consequently, it is hypothesised:

H4: The inclusion of a high popularity ranking will have a positive effect on purchase intention

4.1.1.4 Credibility Hypotheses

In contrast to consumer scepticism which was tested in study one, a retailer can influence perceived credibility through their website features and formatting of information (Flanagin & Metzger, 2007; Metzger & Flanagin, 2013). If consumers are aware of persuasion techniques used online, they may evaluate the credibility of the message and motives of the marketer more (Aguirre-Rodriguez, 2013). Furthermore, the use of persuasion claims can result in a negative cognitive reaction if consumers believe the information is false or misleading (Lee et al., 2014). When consumers are aware that a message is trying to persuade them, the credibility of the message decreases as well as their behavioural intentions (Campbell, 1995; Pechmann & Wang, 2010). Jeong and Kwon (2012) found that credibility was important in an online context because consumers cannot make inferences based on in-store factors such as other customers and shop assistants. Therefore, they evaluate the marketing messages they are shown more closely. The hypotheses can be stated as:

H5a: Credibility will moderate the relationship between scarcity and purchase intention

H5b: Credibility will moderate the relationship between popularity ranking and purchase intention

4.1.1.5 Scarcity and Popularity Ranking Hypothesis

When factors such as time pressure are present, it limits the amount of information search that can be conducted and therefore consumers use heuristic cues such as popularity to make a decision (Cialdini, 2008; Inman et al., 1997; Pellémans, 1971). Scarcity creates time pressure by implying that if a consumer does not make a decision they will miss out on the opportunity (Aggarwal et al., 2011). Jeong and Kwon (2012) found that popularity

claims were more effective than scarcity claims at increasing purchase intention, but did not consider how the claims could work together. However, popularity and scarcity are not mutually exclusive (Wu & Lee, 2016), as a product may be scarce due to its popularity. van Herpen et al. (2009) found that consumers in-store chose a product that was popular and scarce, over a product that was popular yet abundant. Hence, popularity may legitimise a scarcity claim because consumers could infer the reasons why the product was less available. The use of both persuasion claims may also mitigate the risk of shopping online if consumers believe the product is scarce because other consumers have been satisfied with the product (Gierl et al., 2008; Jeong & Kwon, 2012; Ku et al., 2013). Therefore, it is hypothesised:

H6: The effect of scarcity on purchase intention will be stronger when popularity ranking is also present

4.2 Methodology

This section details the method for testing the conceptual model of study two. The following chapter discusses the experimental design, and outlines the questionnaire development, experimental conditions, collection of data and sample frame.

4.2.1 Experimental Design

The experiment was tested in a 2 (device: smartphone vs fixed device) x 2 (scarcity: scarcity vs no scarcity) x 2 (popularity ranking: ranking vs no ranking) between-subject design. As in the first experiment, subjects were randomly assigned to a condition (see Table 4.1). The manipulations were designed to test the difference between device, the inclusion of a scarcity message, and the inclusion of a product popularity ranking. The stimulus was provided as an image that manipulated the device, scarcity message, and popularity ranking, while controlling for price, product design, and brand. To control for price all products were identically priced ($89.99) and subjects were told they had a budget of $100 for the purchase.

Table 4.1 Study Two Conditions

Device	Scarcity		Ranking
	Scarcity	No Scarcity	
Fixed Device	1	2	Ranking
	3	4	No Ranking
Smartphone	5	6	Ranking
	7	8	No Ranking

Based on the product pre-test that was conducted for study one, wireless headphones were selected as the product for this study. Wireless headphones are similar to watches in that they are gender neutral and used by a wide range of people. Furthermore, headphones are widely available from online retailers and prior research has shown they are a moderately involving product (Lichters, Bengart, Sarstedt, & Vogt, 2015; Lichters, Brunnlieb, Nave, Sarstedt, & Vogt, 2016).

4.2.1.1 Pre-test

As in study one, a questionnaire pre-test was conducted to inform the final questionnaire design (Hunt et al., 1982; Zikmund et al., 2013). A total of 114 completed responses were

collected across the eight experimental conditions. The pre-test was important for testing the manipulations on the target population and the results indicated that the scarcity manipulation was successful.

4.2.1.2 Design and Measures

This section describes the manipulations, and outlines the items used for the measurement of the dependent variable, manipulation check, and independent variables. All scales were based on previously validated items, see Table 4.2 for the original items and adapted versions. Please see Appendix D for a full copy of the questionnaire.

Table 4.2 Study Two Scales

Scale / Source	Original Items	Adapted Items
Purchase Intention on Device (Chandran & Morwitz, 2005)	• How likely are you are you to buy the product on offer (highly unlikely to highly likely) • How probable it is that you will purchase the product on offer (highly improbable to highly probable) • How certain it is that you that you will purchase this product (highly uncertain to highly certain) • What chance there is that you will buy this product (no chance at all to very good chance)	• I am likely to buy a pair of the headphones on offer on my [device] • It is probable that I will purchase a pair of the headphones on my [device] • It is certain that I will purchase a pair of the headphones on my [device] • There is a good chance that I will buy a pair of the headphones on my [device]
Scarcity Manipulation Check (Eisend, 2008)	How available do you think the advertised products are? • Rather insufficient – rather sufficient	How available do you think the advertised headphones are? • Very limited – not very limited *(7 point bipolar scale)*
Attitude to Online Shopping (Hasan, 2010)	• I do not like to shop online* • Online shopping makes me feel happy • I feel excited when I shop online • Online shopping is a wise way to shop • Online shopping is useful to people • Online shopping is an effective way to shop	
Attitude Toward the Product (Tybout, Sternthal, Malaviya, Bakamitsos, & Park, 2005)	• Dislike – like • Unfavourable – favourable • Unreliable – reliable • Low quality – high quality • Not valuable – valuable • Bad – good • Undesirable – desirable • Poor performance – good performance • Common – advanced • Outdated technology – cutting edge technology • Not durable – durable	Please indicate your attitude toward the headphones shown above. • Dislike – like • Unfavourable – favourable • Low quality – high quality • Not valuable – valuable • Undesirable – desirable *(7 point bipolar scale)*

	• Not impressive – impressive • Simple – sophisticated	
Product Involvement (Chandrashekaran, 2004)	• I am particularly interested in the advertised product • Given my personal interests, this product is not very relevant to me* • Overall, I am quite involved when I am purchasing [product] for personal use	• I am particularly interested in wireless headphones • Given my personal interests, wireless headphones are not very relevant to me* • Overall, I am quite invested when I am purchasing wireless headphones for personal use
Perceived Risk of Online Shopping (van der Heijden et al., 2003)	• How would you characterise the decision to buy a product through this website? (a very small risk – a very big risk) • How would you characterise the decision to buy a product through this website? (high potential for loss – high potential for gain)* • How would you characterise the decision to buy a product through this website? (a very negative situation – a very positive situation)* • What is the likelihood of your making a good bargain by buying from this store through the Internet? (very unlikely – very likely)*	• There is a good chance I will make a mistake if I purchase products on my [device] • Purchasing products on my [device] is a big risk • Purchasing products on my [device] creates a high potential for loss • Purchasing products on my [device] could be a very negative situation
Credibility of the Website Content (Rodgers, 2003)	• Untrustworthy – trustworthy • Not credible – credible • Biased – unbiased • Not believable – believable • Not reputable – reputable • Not experienced – experienced • Not knowledgeable – knowledgeable • Not qualified – qualified • Compromising – uncompromising • Unethical – ethical • Not objective - objective	Please indicate your attitude toward the website content you viewed. • Untrustworthy – trustworthy • Not credible – credible • Not believable – believable • Unreliable – reliable *(7 point bipolar scale)*

*reversed item

Manipulated Variables

The three variables manipulated in the image shown to the subjects were the device they shopping on, the scarcity message, and the popularity cue. To manipulate the scarcity message, each condition either had all three products with a generic stock statement, or one of the three products had a scarcity message. The popularity cue was manipulated by including a ranking of *'most wanted headphones'* with each product given a 1, 2, or 3. Device was manipulated by telling subjects they were using their smartphone or preferred fixed device. Two examples of the images used are included below (see Appendix E for all versions) and the following sections detail the manipulation further.

Figure 4.2 Fixed Device Manipulation Example

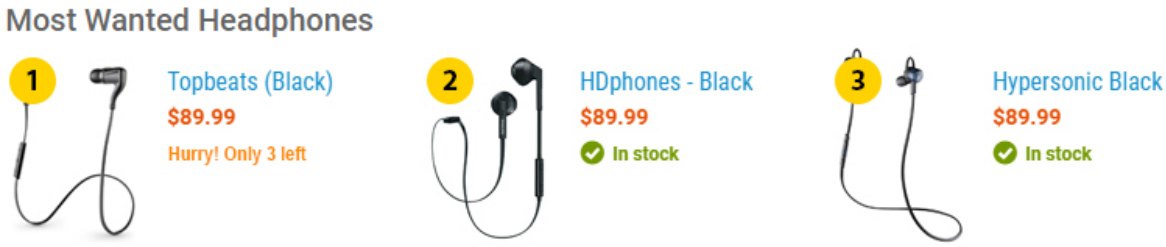
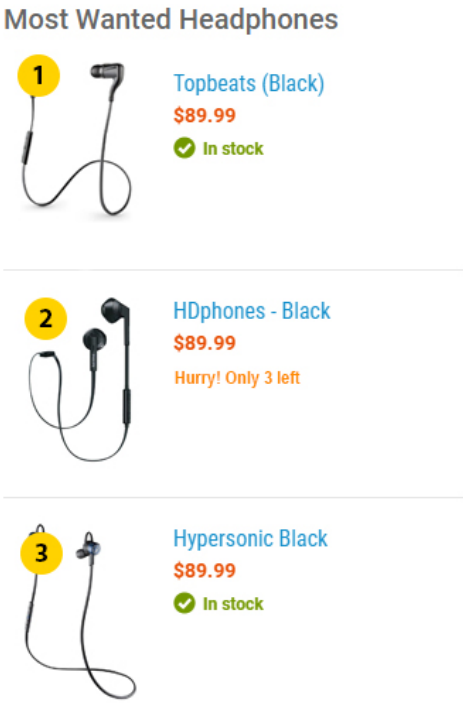


Figure 4.3 Mobile Device Manipulation Example



Type of Device

As in study one, this research manipulated the type of device by stating whether the subject was using their smartphone or fixed device to view the website. The sampling criterion confirmed each subject owned a smartphone and a fixed device. Subjects assigned to a fixed device condition were told they were using their device preference (tablet, laptop, or desktop computer) so it was more realistic.

Scarcity Message

The scarcity message was manipulated by the inclusion of the statement *'Hurry! Only 3 left'* about the availability of the product. This type of statement is consistent with prior research that has manipulated scarcity. These studies manipulated scarcity by applying wording to indicate scarcity, as was done for this study. For example, '*first 100 customers only'* (Aggarwal et al., 2011), *'only 100,000 units available'* (Gierl et al., 2008), *'only 3 items left in stock now'* (Jeong & Kwon, 2012), or *'hurry, limited quantities. Only 20 units in stock'* (Mukherjee & Lee, 2016). For this study, the product which had the scarcity message was randomised so that it was either the first, second, or third product to reduce potential bias.

Popularity Cue

The popularity message was manipulated by the inclusion of the heading *'most wanted headphones'* and numbers indicating the popularity rank of the product (either 1, 2, or 3). Prior studies have manipulated popularity through wording such as '*What do customers ultimately buy after viewing this item? 94% buy X USB flash drive'* (Jeong & Kwon, 2012), or stating that 65% of those who saw the product purchased it (Steinhart et al., 2014). However, in an online context, retailers often use symbols as heuristic cues (Gurrea et al., 2013). As an alternative to a longer statement, this study used a heading and numbering to indicate the popularity of the products, which is technique used by real online stores.

Dependent Variables

As per study one, the scale developed by Chandran and Morwitz (2005) was used to measure purchase intention on device.

Manipulation Check

The manipulation check was measured on the same scale by Eisend (2008) as in study one.

Moderating Variables

The subsequent moderating variables have been included based on prior literature. Perceived risk of online shopping on device (Groß, 2016; Kumar & Mukherjee, 2013; Shankar et al., 2010) and credibility of the content (Aguirre-Rodriguez, 2013; Jeong & Kwon, 2012; Lee et al., 2014) have been identified as potentially impacting the relationship between the independent variables and purchase intention.

Perceived Risk of Online Shopping

As per study one, perceived risk of online shopping measured on a scale developed by van der Heijden et al. (2003).

Credibility of Website Content

To measure the credibility of the website content, a scale used by Rodgers (2003) was included. The original scale had 11 items measured on seven-point bipolar scales. The Cronbach's alpha from the original study was .89 which is satisfactory (Hair et al., 2010). The current study used four of the items which referred to the general credibility of the website content rather than the specific information the website contained.

Control Variables

Attitude to Online Shopping

Previous research has identified that a consumer's attitude to online shopping effects their online shopping behaviour (Ahn et al., 2007; Lin, 2007; Pavlou & Fygenson, 2006). Therefore, the subject's attitude to online shopping was controlled for. The scale developed by Hasan (2010) and adapted for study one was also used for this study.

Attitude Toward the Product

The purpose of the research was not to investigate the subject's attitude toward the product, but to understand their purchase intention when the product had added cues. Therefore, the subject's attitude toward the product was controlled for. A scale created by Tybout et al. (2005) to measure a consumer's attitude toward a technology product was used. The scale had 13 items in the bipolar scale and the Cronbach's alpha was an acceptable .93. Tybout et al. (2005) did not report on the scales validity. Five of the items that referred to the consumer's general attitude toward the product were used. Some items were not included, such as *not durable* to *durable* and *simple* to *sophisticated* because the subjects were only

shown images of the headphones and were not supplied with a product description which made more specific judgements difficult.

Product Involvement

The results of two prior online scarcity studies had differing results (Jeong & Kwon, 2012; Wu & Lee, 2016) and product involvement was identified as one possible reason for the contrasting results. Furthermore, Suri et al. (2007) identified product involvement as impacting how consumers process scarcity messages. Therefore, the subject's perceived product involvement was controlled in this study using a three-item scale developed by Chandrashekaran (2004). The scale was measured on a five-point Likert scale and had a Cronbach's alpha of .91 which is adequate (Hair et al., 2010).

4.2.1.3 Sampling Frame

The sample contained New Zealand consumers who had purchased online in the past 12 months, owned a smartphone, and owned at least one of a laptop, tablet, or desktop computer. Therefore, the sample had recent experience shopping online and was familiar with smartphones and fixed devices.

Sample Selection

An external panel company provided the sample based on the aforementioned requirements. Prior scarcity experiments have used this method (Mukherjee & Lee, 2016; Parker & Lehmann, 2011; van Herpen et al., 2009) as it is an effective way to collect a sample of Internet users without requiring emails or contact details (Roster, Rogers, Hozier, Baker, & Albaum, 2007). There is the potential for self-selection error when using a panel (Zikmund et al., 2013), however this is a consistent limitation of online data collection methods (Hair et al., 2010).

Sample Size

As in study one, sample size was calculated based on the number of subjects required per experimental condition. A minimum of 30 subjects per cell was required to ensure the sample size was not small (Hair et al., 2010). Therefore, 240 responses were required, and in total 244 usable responses were collected. The response rate for this study could not be determined due to the distribution method applied.

4.2.1.4 Procedure

The online experiment was distributed to subjects via a web link sent to panel members by a market research company. After viewing a participant information page which assured anonymity, subjects could accept to participate in the research. After answering qualifying questions, they were then randomly assigned to one of the eight experimental conditions. Next, subjects were asked about their attitude to online shopping and perceived risk of shopping on the specific device. Subsequently, subjects were asked to indicate their product involvement with wireless headphones. Subjects were then asked to imagine they needed to purchase new wireless headphones and had a budget of $100. The following section contained the experiment images and stated what device the subject was using. Then subjects were asked their attitude toward the product, purchase intention and the scarcity manipulation check for each product. Finally, subjects indicated how credible they thought the website content was followed by a range of demographic questions.

4.3 Results

This section outlines how the data for study two was prepared for analysis and the procedure for analysing it. It addresses the required assumptions, the validity of the data, and the hypothesis test results.

4.3.1 Response Analysis

288 respondents started the questionnaire, of which 244 met the qualification requirements and completed the questionnaire. Each condition had between 30 and 31 usable responses, thus the sample size is not too small (Hair et al., 2010).

Table 4.3 shows the descriptive statistics for the study two sample. The study had a lower percentage of subjects in the 18-24 and 65+ age ranges, and higher in the other reported age ranges, compared to the population of New Zealanders who use the internet (Statistics New Zealand, 2012a). The table also indicates that the sample had a similar number of males and females as the population of New Zealanders who use the internet.

Table 4.3 Descriptive Statistics – Demographics

	Frequency	Percentage of Sample	Percentage of NZ Internet Users[4]
Age			
Under 18	1	0.4%	
18-24	39	16%	20.5%[5]
25-34	55	22.5%	18.8%
35-44	58	23.8%	18.8%
45-54	55	22.5%	18.4%
55-64	36	14.8%	13.5%
65+	0	0%	10%
Total	244	100%	100%
Gender			
Male	115	47.1%	48%
Female	125	51.2%	52%
Gender diverse	3	1.2%	-
Prefer not to say	1	0.4%	-
Total	244	100%	100%

[4] (Statistics New Zealand, 2012a)
[5] The 2012 survey had an age range of 15-24

Table 4.4 shows the percentage of the sample who owned each of device options. Compared to New Zealand smartphone users the sample had a slightly lower ownership of tablets and desktop computers but similar ownership of laptops.

Table 4.4 Descriptive Statistics – Device

Device	Frequency	Percentage of Sample	Percentage of NZ smartphone users[6]
Tablet/iPad	136	55.7%	63%
Laptop	202	82.8%	84%
Desktop Computer	125	51.2%	60%
Total	463		

4.3.2 Common Method Variance

Harman's (1960) single factor test was used to establish whether common method variance was present. Table 4.5 shows the results of the test, of which six factors with Eigenvalues greater than 1 were extracted which account for 82.35% of the total variance. No one factor accounted for more than 50% of the variance which suggests that common method variance did not have a large impact on the results of this study (Mattila & Enz, 2002; Podsakoff & Organ, 1986).

Table 4.5 Harman's Single Factor Test

	Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %
1	7.430	29.721	29.721
2	4.250	17.000	46.721
3	2.831	11.323	58.044
4	2.527	10.106	68.150
5	2.001	8.005	76.155
6	1.548	6.190	82.345

4.3.3 Validity and Reliability Tests

Validity and reliability were tested to ensure the items and scales accurately measured their intended constructs (Field, 2009). Validity was evaluated by considering face validity and construct validity.

4.3.3.1 Face Validity

Discussion with academic experts identified a product involvement item that was unclear; '*overall, I am quite involved when I am purchasing a [product] for personal use'*. It was

[6] (Research New Zealand, 2015)

decided the term 'involved' could be interpreted as the physical action of purchasing the item. Therefore, the item was changed to '*overall, I am quite invested when I am purchasing a [product] for personal use'*. Subsequently, the questionnaire was shown to potential subjects to ensure the items measured the intended constructs within the context of the study, and no further changes were made.

4.3.3.2 Construct Validity

The two components of construct validity; convergent validity, and discriminant validity (Hair et al., 2010), are both discussed below. Table 4.6 contains the convergent validity results.

Convergent Validity

Convergent validity was tested through factor analysis to determine the extent that each item appropriately measures the construct. First, the Kaiser-Meyer-Okin (KMO) and Bartlett's Test of Sphericity were inspected to check the factorability of the data. All scales were found to have met these criteria, and the data was deemed factorable.

Next, the total variance statistic and Eigenvalues were examined. Each scale loaded on one factor, including Attitude to Online Shopping. Whilst the scale is considered multidimensional, both dimensions loaded on one factor. Therefore, the scale was treated as a broader measure of attitude to online shopping.

Communalities were then assessed, Hair et al. (2010) suggest the minimum threshold for communalities is .5. The second product involvement item was marginally below this threshold but was retained because Costello and Osborne (2005) suggest communalities can be as low as .4, particularly when removal would create a two item scale which is considered weak and unstable (Costello & Osborne, 2005). The first item of the attitude to online shopping scale did not meet this lower communality threshold and was removed.

Finally, the factor loadings were examined. Factor loadings should be above .5 (Cavana et al., 2001; Hair et al., 2010), and all items met this criteria.

Table 4.6 Convergent Validity and Reliability Results

Construct	Item	Loading	Communality	α
Attitude to Online Shopping KMO = .792	1	.584	.342	.893
	2	.831	.691	
	3	.834	.696	
	4	.801	.641	
	5	.871	.759	
	6	.881	.776	
Attitude to Product KMO = .853	1	.930	.865	.951
	2	.934	.873	
	3	.886	.785	
	4	.905	.819	
	5	.920	.847	
Perceived Risk of Online Shopping on Device KMO = .840	1	.828	.686	.929
	2	.946	.895	
	3	.952	.907	
	4	.911	.829	
Credibility of Website Content KMO = .800	1	.932	.869	.953
	2	.947	.897	
	3	.935	.874	
	4	.931	.867	
Product Involvement KMO = .615	1	.912	.831	.779
	2	.701	.491	
	3	.881	.777	
Purchase Intention KMO = .868	1	.929	.864	.972
	2	.979	.959	
	3	.962	.925	
	4	.971	.943	

The highlighted figure did not meet the communalities criteria. The item was removed and all other figures have been calculated without the item.

Discriminant Validity

VIF figures were used as a proxy for assessing discriminant validity. VIF figures below 10 are reflective of discriminant validity (Field, 2009). Table 4.7 shows that all figures were less than 10, establishing discriminant validity.

Table 4.7 VIF Figures

Predictor	VIF
Device	1.066
Scarcity	1.008
Ranking	1.007
Attitude to Online Shopping	1.113
Attitude to Product	1.110
Product Involvement	1.081
Credibility	1.141
Risk of Online Shopping on Device	1.167

4.3.3.3 Reliability Analysis

Cronbach's Alpha was used to determine the reliability of the scales. Allen et al. (2014) suggest than an Alpha score should be above .7 and each of the measures exceeded this criterion establishing reliability.

4.3.4 Non-response Bias

To check for non-response bias, an independent samples *t* test was conducted to compare purchase intent for the first half of the responses (n = 366) to the purchase intent for the second half of the responses (n = 366). The Levene's test was significant therefore equal variances could not be assumed. The *t* test was not statistically significant, with the first responses (M = 3.43) having a similar purchase intent to the later responses (M = 3.39), $t(725.73) = .344$, $p = .731$.

4.3.5 Scarcity Manipulation Check

A scarcity manipulation check was conducted before hypothesis testing. To check if the manipulation of scarcity was successful, a *t* test was conducted to compare the perception of scarcity for the scarce products (n = 122) to the perception of scarcity for the non-scarce products (n = 610). The Levene's test was significant therefore equal variances could not be assumed. The *t* test was statistically significant, with the scarce products (M = 3.34) being perceived as less available than the non-scarce products (M = 4.91), $t(157.152) = 8.883$, $p = .000$. Therefore, the manipulation of scarcity was successful.

4.3.6 Product Order

To check if the order the products were displayed influenced purchase intention a one-way between groups analysis of variance (ANOVA) was conducted to compare the purchase intention for the product presented first (n = 244), to those presented second (n = 244), and

third (n = 244). The Levene's test was non-significant therefore equal variances can be assumed. The ANOVA was not statistically significant, indicating that the purchase intent was not significantly different between the groups, $p = 0.362$. Therefore, the ordering of the products did not have a significant influence on the respondents purchase intent.

4.3.7 Hypotheses Testing

As for study one, multiple regression analysis was used for analysing the data. The regression was conducted using dummy variables based on the indicator coding approach (Hair et al., 2010). In order to measure the experimental manipulation of scarcity, if a product was presented with a scarcity message it was coded as a 1 while the products without a scarcity message were coded as zero to create a base case. For the manipulation of popularity ranking, conditions where the products were ranked were coded as 1 and conditions without ranking were coded as zero. Finally, for the device manipulation, respondents in the smartphone conditions were coded as 1 and respondents in the fixed device conditions were coded as zero. In order to create the dummy variables each of the 244 responses was divided into the three products presented, resulting in 732 rows of data.

4.3.7.1 Multiple Regression Assumptions

After ensuring all items met the factor analysis and reliability thresholds, the items were averaged to create a single measure for each construct. Normality was determined by examining the skewness and kurtosis of the data. All of the constructs were within the acceptable range of between two and negative two for skewness and between three and negative three for kurtosis (Bai & Ng, 2001) (see Table 4.8).

Table 4.8 Normality Statistics – Skewness and Kurtosis Figures

	Mean	Std. Dev	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Attitude to Online Shopping	5.29	.99	-.636	.090	.429	.180
Attitude to the Product	4.27	1.31	-.251	.090	.162	.180
Product Involvement	4.11	.889	-.224	.090	1.826	.180
Risk of Online Shopping on Device	3.61	1.33	.046	.090	-.544	.180
Credibility of the Website Content	4.42	1.24	-.150	.090	.403	.180
Purchase Intention	3.41	1.56	.086	.090	-.811	.180

Further assumptions of regression are the absence of multicollinearity and the normal distribution of residuals (Field, 2009). The VIF figures were all below 10 hence it was assumed there was no multicollinearity (Myers, 1990).

Additionally, graphical methods were used to test the normality of residuals (Field, 2009). The normal probability plot of standardised residuals was inspected (see Appendix F). The data appeared to follow the line of best fit and it was assumed the residuals were normally distributed. Finally, it was assumed that the residuals are independent of each other. The Durbin-Watson figure was 1.069 and met the requirement of being between one and three (Field, 2009).

4.3.7.2 Multiple Regression

In combination, the predictor variables (including controls) accounted for a significant 48.1% of the variability in purchase intention $R^2 = .481$, adjusted $R^2 = .469$, F (16, 715) = 41.384, $p < .000$. Unstandardised (B) and standardised (β) regression coefficients, and the standard error for each predictor in the regression model are reported in Table 4.9.

Table 4.9 Summary of Multiple Regression Analysis

Variable	*B*	Std. Error	β
Scarcity	.105	.664	.025
Popularity Ranking	1.987	.504	.639**
Device	.161	.271	.052
Attitude to Online Shopping	.126	.045	.081**
Attitude to Product	.619	.034	.523**
Product Involvement	.487	.071	.278**
Credibility	.219	.049	.174**
Risk of Online Shopping on Device	.077	.047	.066
Scarcity x Popularity Ranking	-.279	.228	-.049
Device x Popularity Ranking	.021	.173	.006
Device x Scarcity	.139	.227	.025
Scarcity x Credibility	-.146	.094	-.156
Popularity Ranking x Credibility	-.035	.072	-.053
Scarcity x Product Involvement	.142	.125	.147
Popularity Ranking x Product Involvement	-.362	.096	-.490**
Device x Risk of Online Shopping on Device	-.165	.067	-.238*

Note. $N = 244$.
* $p < .05$ ** $p < .01$

Table 4.10 summaries the hypotheses that were tested and indicates which hypotheses were supported according to the multiple regression results.

Table 4.10 Summary of Hypothesis Outcomes

Hypothesis	Significance	Direction	Hypothesis Supported
H1: Purchase intention will be lower for a smartphone than a fixed device	p = .552	Positive	Not Supported
H2: Perceived risk of online shopping will moderate the relationship between device and purchase intention	p = .014	Negative	Supported
H3: Scarcity will have a positive effect on purchase intention	p = .875	Positive	Not Supported
H4: The inclusion of a high popularity ranking will have a positive effect on purchase intention	p = .000	Positive	Supported
H5a: Credibility will moderate the relationship between scarcity and purchase intention	p = .123	Negative	Not Supported
H5b: Credibility will moderate the relationship between popularity ranking and purchase intention	p = .623	Negative	Not Supported
H6: The effect of scarcity on purchase intention will be stronger when popularity ranking is also present	p = .222	Negative	Not supported

The main effect of device on purchase intent on device was non-significant, therefore H1 was not supported. However, H2 was supported as a consumer's perceived risk of shopping online moderated the relationship between device and purchase intention. Scarcity did not have a significant impact on purchase intention, hence H3 was not supported. The influence of popularity ranking on purchase intention was significant and H4 was supported. H5a was not supported as the credibility of the website content did not moderate the relationship between scarcity and purchase intention. Furthermore, H5b was not supported because the relationship between popularity ranking and purchase intention was not moderated by the credibility of the website content. Finally, H6 was not supported, the interaction of popularity ranking and scarcity on purchase intention was not significant.

4.4 Discussion

This section explains the results of study two and discusses how the device, scarcity, and popularity findings relate to previous literature.

4.4.1 Device and Purchase Intention

The results of the second study provided further insights into the relationship between device and purchase intention, and the moderating effect of perceived risk. As in study one, hypothesis one proposed that the device the consumer was using would influence their purchase intention. Although this hypothesis was not supported, hypothesis two was supported. The relationship between device and purchase intention was moderated by the consumer's perceived risk of shopping online on the device. The findings reiterate those of study one and further suggest that when consumers perceive greater risk, there is a stronger relationship between device and purchase intention. This is consistent with prior research that has shown perceived risk impacts consumers purchase intention on mobile devices (Groß, 2016; Kleijnen et al., 2007; Yang et al., 2015). These findings indicate that consumers who use a smartphone for online shopping perceive online shopping to be less risky. Research by Kumar and Mukherjee (2013) supported this, they found that individuals who were more innovative found mobile shopping easier to use. Therefore, consumers who choose to use smartphones for online shopping may perceive less risk when using their device because they are comfortable with the technology. Furthermore, when a regression was conducted without perceived risk of online shopping (see Appendix G), a significant difference was shown between mobile and fixed devices on purchase intention. This result indicates that perceived risk of online shopping is a key factor in the behavioural intentions of consumers when comparing mobile and fixed devices.

4.4.2 Scarcity and Purchase Intention

The hypothesised relationship between scarcity and purchase intention was not supported. This is consistent with the findings of Jeong and Kwon (2012) who found that in an online context scarcity did not significantly increase consumers' purchase intention. This finding suggests consumers may perceive scarcity differently in an online context compared to an offline context. Research conducted in an offline setting has found that the presence of a scarcity message increases consumers' purchase intention towards a product (Aggarwal et al., 2011; Jang et al., 2015; Parker & Lehmann, 2011). To the best of the researcher's

knowledge, these findings have only been replicated in an online setting with low involvement products (Wu & Lee, 2016). When shopping online, consumers cannot observe scarcity first-hand and rely on the retailer to accurately communicate this type of information (van Herpen et al., 2009). However, some consumers may believe that scarcity is an arbitrary statement used as a sales tactic to motivate consumer interest (Lee et al., 2014; Mukherjee & Lee, 2016). Thus, some consumers who observe scarcity messages may use scarcity as a heuristic cue because they cannot be sure the messages are reliable (Aguirre-Rodriguez, 2013).

The current study also used a specific scarcity message *'hurry, only 3 left'* which Aguirre-Rodriguez (2013) suggest could affect the persuasiveness of a scarcity message. Specific messages can stimulate consumers to process the central argument of the message rather than the peripheral cues (Petty et al., 1983). Therefore, a specific scarcity message could decrease the credibility of the message (Aguirre-Rodriguez, 2013). Hypothesis five proposed, the perceived credibility of the website content would impact the relationship between scarcity and purchase intention. However, this hypothesis was not supported. This contradicts prior offline research which found that the perceived credibility of the scarcity message impacted consumers' behavioural intentions (Aguirre-Rodriguez, 2013). Credibility research has noted that consumers use different strategies to determine credibility online, compared to offline, and when online prefer strategies that require the least time and effort (Flanagin & Metzger, 2007; Metzger, 2007). This suggests that the role of credibility in determining the reliability of a scarcity message may be different in an online context because consumers rely on other cues, such as the visual design of website, rather than the content information (Metzger, Flanagin, & Medders, 2010).

4.4.3 Popularity Ranking and Purchase Intention

As hypothesis three suggested, popularity rankings had a positive effect on a consumer's purchase intention. This is consistent with previous studies that have shown that including information about a product's popularity has a positive impact on consumer purchase intentions (Horcajo et al., 2010; Huang & Chen, 2006). The bandwagon effect, when consumers follow the behaviour of others, has been identified as a reason for consumers to prefer popular products (van Herpen et al., 2009). Popularity claims suggest that other consumers have been satisfied with the product (Nelson, 1970; Tucker & Zhang, 2011) and

consumers may infer this is a general endorsement of the product's quality. Furthermore, when consumers cannot directly observe the behaviours of other consumers, they use strategies such as choosing the most popular product to inform their decision (Amir & Levav, 2008). This explains, in part, why popularity rankings have a positive impact on a consumer's purchase intention. Another reason consumers prefer popular products is their need for conformity, as products can be used to establish their place within a social group (Berger & Heath, 2007; Escalas & Bettman, 2005). Alternatively, popular products may be preferred because popularity is believed to signal quality (Kardes et al., 2004; Nelson, 1970; Tucker & Zhang, 2011), which can reduce the perceived risk of purchasing online (Tan, 1999; Wu & Lee, 2016). Therefore, in an online context where consumers cannot observe the behaviour of others, popularity rankings appear to have a positive influence on purchase intention.

In contrast to hypothesis five, the credibility of the website content did not have a significant effect on the relationship between popularity ranking and purchase intention. This result indicates that consumers may not question the credibility of popularity information because they perceive it as inherently more trustworthy. For example, popularity is considered a heuristic cue of other consumers' demand for a product (van Herpen et al., 2009), unlike supply scarcity which can be controlled by the retailer. Online marketers have access to large amounts of easily-accessible purchasing information (Metzger & Flanagin, 2013) and consumers may expect retailers to communicate the popularity of products. Consumers may perceive popularity information to be more reliable because it is based on customer data, regardless of the perceived credibility of the website content.

Interestingly, whilst not hypothesised, the control variable product involvement was found to negatively moderate the relationship between popularity ranking and purchase intention. If consumers perceived higher involvement with wireless headphones, the effect of popularity on purchase intention was less. A possible explanation for this result is that consumers with higher involvement are not necessarily swayed by what other consumers are purchasing. Prior research has shown that consumers who exhibit higher product involvement seek more information (Beatty & Smith, 1987; Bloch et al., 1986; Mittal, 1989). Beatty and Smith (1987) found a positive relationship between product involvement and consumers total search effort. For example, in research about online reviews, Park,

Lee, and Han (2007) found that high-involvement consumers were more interested in the product information contained within the reviews than the product's popularity. Furthermore, Park and Lee (2008) suggest that high involvement consumers process online reviews for additional information rather than use them as a signal of product popularity. These consumers may require more information to make a decision and are not satisfied with relying on a general endorsement from other consumers.

4.4.4 Interaction between Scarcity and Popularity Ranking

The final hypothesis suggested that scarcity would have a stronger effect on purchase intention when the products also had a popularity ranking. However, this hypothesis was not supported indicating that in combination the two types of persuasion claims do not increase a consumer's purchase intention. While a product may be scarce because it is popular, leading to a situation where demand outpaces supply, the results of this study suggest that this conclusion does not make a scarcity message more effective. This could be due to incompatible naïve theories, which are common-sense explanations people use when making purchasing decisions (Deval et al., 2013; Steinhart et al., 2014). When consumers have incomplete information, they use inferential strategies to compensate for gaps in their product knowledge to make decisions (Deval et al., 2013; Kardes et al., 2004). Deval et al. (2013) showed that popularity affected consumers' product judgement differently to a scarcity message.

While popularity suggests that the purchasing behaviours of others are an appropriate guide (Deval et al., 2013), scarcity messages can activate a need for uniqueness and distinction from other consumers (Tian et al., 2001). Furthermore, Steinhart et al. (2014) found that when considering a functional product, consumers were more likely to produce the popularity naïve theory. Conversely, when considering a self-expressive product, consumers used the naïve theory of exclusivity. The current research used wireless headphones which could be considered to be a functional product. Hence, the findings of Steinhart et al. (2014) support the significant effect popularity ranking had on purchase intention and the nonsignificant effect of scarcity on purchase intention. These findings suggest scarcity messages and popularity cues may not work in combination because they appeal to different consumer traits. Furthermore, the type of product may also influence the effectiveness of scarcity messages and popularity cues.

Chapter 5: General Discussion

This chapter explains the combined results of the two studies, considering the device, persuasion claim, and moderation findings. It also discusses the insights produced by this research in relation to previous literature.

5.1 Device and Purchase Intention

The results of both studies suggest that the device a consumer is shopping on does not directly affect their purchase intention. However, a consumer's perception of risk when shopping online moderated the relationship in both studies. Online shopping includes these types of risks, financial risk, product risk, and delivery risk because completing transactions online means that consumers cannot physically assess the product, and must pay the retailer before being able to decide if the product is satisfactory for their needs (Cases, 2002; Kleijnen et al., 2007; Pires et al., 2004). Both studies suggest these risks significantly affected consumers' purchase intention. In general, Pavlou (2003) suggests that consumers perceive a lack of control when shopping online because elements of the transaction are controlled by the website and retailer. These risks would be consistent regardless of which device a consumer was shopping on, however there are also risks specific to mobile. For example, the risk of entering incorrect information due the small keyboard, or the risk of the website not being easy to navigate on a smartphone (Groß, 2016; Hubert et al., 2017). When the consumer's perceived risk of online shopping was not included in the regression model, purchase intention was lower for consumers using their mobile. Therefore, this research suggests that perceived risk can help explain the difference between consumers' purchase intention when shopping on a mobile device, compared to a fixed device.

5.2 Persuasion Claims and Purchase Intention

Persuasions claims in an offline context have been widely studied (Howard et al., 2007; Reber et al., 2004; Shu & Carlson, 2014; Tybout, 1978). Scarcity messages and popularity rankings are two common persuasion claims that are also used in an online context (Griskevicius et al., 2009; Jeong & Kwon, 2012). The results of the current studies indicate that consumers do not have the same reaction to scarcity messages in an online context as they do in an offline context. Neither study supported the hypothesis that a scarcity message

would have a positive effect on purchase intention. As suggested by Aguirre-Rodriguez (2013), consumers' scepticism of advertising moderated the relationship between scarcity and purchase intention in the first study. When consumers are shopping in a physical store they can observe other consumers' behaviour (van Herpen et al., 2009), make inferences about the products (Parker & Lehmann, 2011), and talk to shop assistants (Kaptein & Eckles, 2012). These interactions have all been identified as providing information to help consumers make a decision. However, in an online context, consumers must trust the retailer to accurately communicate information about scarcity, popularity, and quality because they cannot observe it for themselves. Hence, scepticism of advertising impacts how consumers perceive scarcity messages.

The second study showed that the credibility of the website content did not moderate the relationship between a scarcity message and purchase intention. This suggests that a more credible website does not mean a scarcity message has a more positive impact on purchase intention. In other words, if consumers are unconvinced by a scarcity message, then the credibility of the website does not impact their purchase intention. This is supported by prior research which investigated the effectiveness of online reviews as persuasion claims. Sher and Lee (2009) found that consumers who were sceptical of online reviews tended to disbelieve the information presented regardless of the source credibility, or argument quality. If consumers have a general disbelief of scarcity messages then they form their attitude irrespective of the credibility of the website content. Sher and Lee (2009) suggest this is because these consumers base their attitudes on intrinsic beliefs rather than extrinsic factors, therefore they are biased against particular types of information.

The products used in the current research were watches and wireless headphones. Both of these products are considered to be conspicuous, moderately involving products that can be purchased from a range of retailers online. These products were more involving in comparison to the two previous studies investigating online scarcity (Jeong & Kwon, 2012; Wu & Lee, 2016). Suri et al. (2007) found in their offline research that when high involvement products had scarcity messages, consumers processed the information less carefully, in order to make a quick decision based on heuristic cues. However, the results of the current research suggest that consumers in an online context do not use scarcity as a heuristic cue to make a faster purchasing decision. This research also showed that when consumers viewed the product as having higher involvement, popularity ranking had less

of an impact on purchase intention. In contrast to the offline findings of Suri et al. (2007), it appears when products are more involving, consumers who shop online do not necessarily use scarcity as a heuristic cue for decision making.

Study two introduced popularity as a second type of persuasion claim to investigate if it was more effective or interacted with the scarcity message. Unlike the scarcity message, the popularity ranking had a significant positive effect on purchase intention. Product popularity is a form of social validation (Cialdini, 2008) that communicates information about other consumers purchasing choices (Tucker & Zhang, 2011). The positive effect of the popularity ranking indicates that consumers may still use some heuristic cues during decision making, and scarcity may be an exception to this.

The online decision-making process has evolved due to the introduction of online channels (Lemon & Verhoef, 2016), and become more complex as consumers use multiple channels simultaneously (Anderl et al., 2016; Shankar et al., 2016). In particular, online channels help consumers make more informed decisions because it is easier to find and compare product information (Kollmann et al., 2012). Therefore, scarcity may be less effective online as a heuristic cue for fast decision making because consumers can research the product and make an informed decision using additional information. In comparison, it appears consumers view popularity claims as a reliable source of information about the suitability of the product.

Chapter 6: Conclusions and Implications

This chapter concludes the research and synthesises the findings. The theoretical and managerial implications are presented, followed by the limitations and directions for future research.

6.1 Overall Conclusions

The overall purpose of this research was *to understand online shopping behaviour on mobile and fixed devices when scarcity and popularity cues were present*. Specifically, the research objectives were to:

1. Examine the effect of mobile and fixed devices on purchase intention
2. Compare the impact of scarcity and popularity cues on purchase intention across devices
3. Test the moderating effects of scepticism, credibility, and perceived risk of online shopping on these relationships

Two studies were conducted to investigate the objectives of this research. In regard to objective one, no difference was found between consumers' purchase intention on a mobile device, compared to a fixed device, when consumers' perceived risk of online shopping was included in the model. Objective two was satisfied, the research showed that scarcity did not increase consumers' purchase intention online. In comparison, popularity cues had a positive impact on consumers' purchase intention online. Finally, objective three was interested in the moderating effects of scepticism, credibility and perceived risk of online shopping. Study one supported the moderation of scepticism on the relationship between scarcity and purchase intention. However, study two did not support the moderation of credibility on scarcity or popularity ranking's relationship with purchase intention. Both studies supported that the relationship between device and purchase intention was moderated by consumers' perceived risk of online shopping.

6.2 Theoretical Implications

Notwithstanding its limitations, this research contributes to the existing marketing research through two streams of literature. Firstly, the research offers some insight into consumer behaviour on both mobile and fixed devices by directly comparing device type in an

experimental design. Prior mobile literature had focused on the acceptance of mobile shopping (Bruner & Kumar, 2005; Groß, 2016; Ko et al., 2009; Wu & Wang, 2005; Yang, 2010), the contexts of mobile shopping (Lee et al., 2005; Wang et al., 2015), and the role of mobile devices within the customer journey (de Haan et al., 2015; Holmes et al., 2014). However, smartphones have the potential to transform the consumer shopping experience because of their ubiquity in consumers' lives (Shankar et al., 2016; Wagner, 2011), and further research was needed to understand how consumer behaviour is impacted by the type of online channel (Holmes et al., 2014; Thakur, 2016). Therefore, this research examined online shopping behaviour and compared purchase intention for consumers on mobile devices and fixed devices.

Furthermore, this research supported the inclusion of perceived risk of online shopping as a moderator of device and purchase intention. Consumers who perceived greater risk when shopping online had a weaker purchase intention on their smartphone. This is consistent with the findings of Groß (2016), who found that perceived risk had a negative effect on consumers' intention to continue shopping on their mobile. Perceived risk is a barrier to online shopping on mobile because their small screen size makes websites more difficult to navigate, and entering transaction information harder (Shankar et al., 2010). This research demonstrates that perceived risk of online shopping is an important consideration when investigating consumers' purchase intention on mobile and fixed devices.

Secondly, the research findings would seem to indicate that scarcity messages online are less effective at increasing purchase intention. This finding contradicts prior research that was conducted in an offline setting, suggesting scarcity was a heuristic cue for quality (Cialdini, 2008; Inman et al., 1997). When shopping in a physical store consumers can infer scarcity based on cues such as shelf space (Parker & Lehmann, 2011), other consumers' behaviour (Aggarwal et al., 2011), and through interacting with salespeople (Kaptein & Eckles, 2012). However, when consumers cannot view scarcity directly, such as when shopping online, they rely on the information communicated by the retailer to make an informed decision (van Herpen et al., 2009). This finding contributes to scarcity theory literature by suggesting that prior findings may not be consistent when examined in an online context.

Overall, this research indicates that scarcity is less effective online, in part because consumers are sceptical of scarcity messages. Only two previous studies had researched online scarcity. Jeong and Kwon (2012) found that scarcity messages were not effective in an online context, while Wu and Lee (2016) demonstrated that scarcity messages increased purchase intention. Interestingly, Jeong and Kwon (2012) suggested scarcity messages did not increase purchase because they were not perceived as credible. In contrast, this study suggests consumers are sceptical of scarcity messages and the credibility of the website content did not affect purchase intention. This contributes to scarcity theory as it suggests that consumers may not process scarcity as a heuristic cue when shopping online, contrasting the results of offline studies (Suri et al., 2007). However, this research does support the motivation-enhancement theory (Bozzolo & Brock, 1992) which proposes that scarcity motivates consumers to be more critical of a scarcity appeal, thus decreasing its effect. Furthermore, consumers are becoming more informed about the use of persuasion tactics which can also decrease their effectiveness (Aguirre-Rodriguez, 2013; Lee et al., 2014).

In addition, the findings of this research supported the use of popularity rankings to increase purchase intentions for consumers with lower product involvement. Prior literature has found consumers use popularity as a naïve theory to infer a product is suitable because of other consumers' choices (Deval et al., 2013; Steinhart et al., 2014). Some retailers communicate popularity through the number of online reviews (Sher & Lee, 2009), however symbols can also be used to imply popularity (Gurrea et al., 2013). This research suggests that popularity rankings can operate as a persuasion claim that increases purchase intention online. While online reviews are generally posted by customers, popularity rankings and symbols could be considered more subjective based on how retailers calculate a products popularity. Despite not being able to observe other consumers in an online environment, popularity can still affect consumer behaviour, contrasting the effect of scarcity online.

6.3 Managerial Implications

This research also provides valuable insights for marketing practitioners and online retailers because of the prevalence of scarcity messages and popularity cues. Firstly, the findings seem to indicate that scarcity messages do not increase purchase intention in an

online setting. Therefore, retailers should consider using other types of persuasion claims, such as popularity rankings, which may be more effective online. Additionally, this research highlighted the different naïve theories that persuasion claims can evoke. Although prior research has suggested that three persuasion claims is an ideal number (Shu & Carlson, 2014), retailers should also consider whether their naïve theories work effectively together, as this has the potential to influence their effectiveness if they have conflicting assumptions. For example, this research suggested that purchase intention does not significantly increase when scarcity messages and popularity cues are used in combination. Therefore, the findings indicate that online retailers may be better to focus on using popularity cues, rather than combining the persuasion claims.

In the online retail environment, consumers cannot directly observe scarcity, so retailers control how scarcity is communicated. However, consumers may become sceptical that the messages are inaccurate if they believe they are overused or misleading (Lee et al., 2014). Hence, retailers could be more selective about how they use scarcity, such as only including it on individual product webpages, or limiting the number of scarcity messages that are viewed by consumers. Although, if consumers are highly sceptical, they may not believe that the messages are credible regardless of the actions taken by the retailer (Sher & Lee, 2009).

The findings of this research encourage retailers to continue supporting mobile shopping. Consumers that perceive lower risk when online shopping are more likely to use their mobile device than consumers who perceive higher risk. Research has indicated that shoppers using their mobile spend more per transaction (Wang et al., 2015), perhaps because they perceive less risk of shopping online. Therefore, retailers could emphasise their risk reduction strategies, such as the ability to return a product, to decrease consumers' perceived risk. Alternatively, retailers could encourage consumers to trial shopping on their mobile device to help consumers become familiar with the experience.

6.4 Limitations of Research and Future Research

It is important to note the limitations of this research. Firstly, this research used watches and headphones as the product categories for the experimental studies. These products are not overly expensive which may influence consumers' perceptions of risk when purchasing

them online. Financial risk has been identified as a critical risk when shopping online, and consumers may be more risk averse when products are expensive (Groß, 2016; Kleijnen et al., 2007; Pires et al., 2004). Hence, future research could investigate products across multiple price levels to understand the impact of financial risk.

Furthermore, both of the products were considered moderately involving, in addition to being conspicuous. Prior research has found that scarcity messages have different effects on conspicuous and non-conspicuous products (Gierl & Huettl, 2010; Jang et al., 2015; Ku et al., 2013). Future research could investigate the impact of scarcity on conspicuous and non-conspicuous products in an online context. In relation to the product category, research has also shown that prior experience with the product category moderates the effect of scarcity on purchase intention (Parker & Lehmann, 2011). Therefore, further research could consider the moderating effects of product experience.

The product category is also an important consideration because some products are more suited to being purchased online. Intangible products such as tickets and flights are more suitable because consumers do not need to directly evaluate these types of products before purchasing (Jeong & Kwon, 2012; Ko et al., 2004). Scarcity may also affect these types of products differently because high demand for products such as concert tickets are expected by consumers. Mukherjee and Lee (2016) found that the expectation of scarcity increases the effect of scarcity on product evaluation for both demand and supply scarcity. Therefore, research could also investigate how device and scarcity interact when consumers expect a product to be scarce.

Additionally, this research did not specifically identify a retailer that was selling the products. Consumers who perceive more risk when shopping online prefer to shop from retailers that they trust (van der Heijden et al., 2003; Yang et al., 2015). Therefore, including moderating variables such as trust in the retailer would be insightful for future research. Groß (2016) found that when consumers trusted the retailer they perceived less risk during mobile shopping and were more likely to engage in mobile shopping with that retailer again.

A final limitation was that subjects could have been assigned to a device condition that was incongruent with the device they were using to complete the questionnaire. For example, a

subject in the fixed device condition could have been using their smartphone to complete the questionnaire. This could have influenced their perceptions of the device manipulation. Further research could use the device a consumer was completing the questionnaire on as a proxy for manipulating device.

Subsequent future research could also investigate the facets of risk which have been identified in prior literature. For example, privacy, security, financial, and performance risk have all been shown to impact online shopping behaviour (Groß, 2016; Hubert et al., 2017; Kleijnen et al., 2007; Ko et al., 2004; Pires et al., 2004). Consumers perceive mobile devices and fixed devices to have different types of risk (Groß, 2016; Hubert et al., 2017). Thus, future research could look at the specific aspects of risk in more detail rather than consumers' overall perceived risk.

Finally, this research offers some insight into how consumers behaviour is impacted by persuasion claims in an online context. Future research could provide a greater understanding by testing how consumers process persuasion claims online. Despite prior research showing that consumers used scarcity as a heuristic cue (Suri et al., 2007), this research suggested that consumers are sceptical of scarcity messages, which is consistent with the theory of motivation-enhancement by Bozzolo and Brock (1992). Therefore, future research could seek to understand if consumers process scarcity, and other persuasion claims, differently when the information is presented online.

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Appendices

Appendix A: Study One Questionnaire

VICTORIA UNIVERSITY OF WELLINGTON
Te Whare Wānanga o te Ūpoko o te Ika a Māui

PARTICIPANT INFORMATION SHEET

Research: Online Shopping

Thank you for showing an interest in this project. My name is Tessa Hoffman and I am currently a Masters student at Victoria University of Wellington. I would like to invite you to take part in my research project but you are under no obligation to participate. Before you decide whether you want to take part in this research, you should understand what is involved. This form provides you with information about the project.

WHAT IS THE PURPOSE OF THIS PROJECT?
This study is interested in online shopping. This activity has been reviewed and approved by Victoria University's Pipitea Human Ethics Committee (#24400).

WHAT WILL HAPPEN TO THE INFORMATION YOU GIVE?
This survey is completely voluntary and it is not possible for any respondent to be identified personally in conjunction with this survey. The survey should take around 10 minutes to complete. Please only complete this survey once. This is a secure website and all responses collected will remain anonymous. All of the material related to survey responses will only be viewed by the researcher and the supervisors. All printed information will be kept in a locked file with access restricted to the researcher. All electronic data will be kept in a password protected file only accessible by the researcher. Data collected in this survey will be destroyed after 5 years.

OUTPUTS OF THE PROJECT
The results may be published in academic journals and/or conference papers and/or reported to retailers in a non-attributable form. The final thesis will also be held at Victoria University of Wellington's library.

IF YOU HAVE ANY QUESTIONS OR PROBLEMS WHOM CAN YOU CONTACT?

Student researcher:
Tessa Hoffman
hoffmatess@myvuw.ac.nz

Supervisors:
Dr Micael-Lee Johnstone
Senior Lecturer
School of Marketing & International Business
PO Box 600
Wellington 6140
+64 4 463 6933
micael-lee.johnstone@vuw.ac.nz

Dr Aaron Gazley
Senior Lecturer
School of Marketing & International Business
PO Box 600
Wellington 6140
+64 4 463 5725
aaron.gazley@vuw.ac.nz

Human Ethics Committee Convener:
Associate Professor Susan Corbett
+64 4 463 5480

Have you purchased products online in the last 12 months?

- ○ Yes
- ○ No

How often do you purchase products online?

- ○ Daily
- ○ 2-3 times a week
- ○ Once a week
- ○ 2-3 times a month
- ○ Once a month
- ○ 4-6 times a year
- ○ 1-3 times a year

Please indicate which devices you own (tick all that apply)

- ☐ Tablet/iPad
- ☐ Laptop
- ☐ Desktop Computer
- ☐ None

Of these options what is your preferred device for shopping online?

- ○ Tablet/iPad
- ○ Laptop
- ○ Desktop computer

Do you own a smartphone?

- ○ Yes
- ○ No

Please indicate your agreement with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I do not like to shop online	○	○	○	○	○	○	○
Online shopping makes me feel happy	○	○	○	○	○	○	○
I feel excited when I shop online	○	○	○	○	○	○	○
Online shopping is a wise way to shop	○	○	○	○	○	○	○
Online shopping is useful to people	○	○	○	○	○	○	○
Online shopping is an effective way to shop	○	○	○	○	○	○	○

Please indicate your agreement with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
There is a good chance I will make a mistake if I purchase products online	○	○	○	○	○	○	○
Purchasing products online is a big risk	○	○	○	○	○	○	○
Purchasing products online creates a high potential for loss	○	○	○	○	○	○	○
Purchasing products online could be a very negative situation	○	○	○	○	○	○	○

Have you purchased products on your smartphone in the last 12 months?

- ○ Yes
- ○ No

How often do you purchase online using your smartphone?

- ○ Daily
- ○ 2-3 times a week
- ○ Once a week
- ○ 2-3 times a month
- Once a month
- ○ 4-6 times a year
- ○ 1-3 times a year

Please indicate your agreement with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
There is a good chance I will make a mistake if I purchase products on my smartphone	○	○	○	○	○	○	○
Purchasing products on my smartphone is a big risk	○	○	○	○	○	○	○
Purchasing products on my smartphone creates a high potential for loss	○	○	○	○	○	○	○
Purchasing products on my smartphone could be a very negative situation	○	○	○	○	○	○	○

The following questions require you to **imagine** that you need to buy a new **watch**.

Please think of a store that sells **watches online that you would consider buying from**. The store can sell other products but it must sell multiple watch brands and offer a range of styles.

What store are you thinking of?

Store Name:

Please carefully read the following scenario.

> Imagine that you need to buy a new watch. You are at home on your ${q://QID6/ChoiceGroup/SelectedChoices} when you notice that you have a new email. You go to your inbox and see the email is from ${q://QID138/ChoiceGroup/AllChoicesTextEntry} and has the subject line ***'Explore our new watch styles.'***
>
> You open the email which includes pictures and some information about the store's attractive new watch selection. They have a range of brands and styles available that you think are appealing. The email says, **"only available for a limited amount of time so check out our online store."** You notice that the watches appear to be made of quality materials and you think the advertised prices are reasonable.

Based on the scenario you have just read, please answer the following question.

Considering the scenario you read, please indicate your agreement with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I am likely to buy one of the watches on offer on my smartphone	○	○	○	○	○	○	○
It is probable that I will purchase one of the watches on my smartphone	○	○	○	○	○	○	○
It is certain that I will purchase one of the watches on my smartphone	○	○	○	○	○	○	○
There is a good chance that I will buy one of the watches on my smartphone	○	○	○	○	○	○	○

Considering the scenario you read, how available do you think the advertised watches are?

Very limited	○ ○ ○ ○ ○ ○ ○	Not very limited
Very restricted	○ ○ ○ ○ ○ ○ ○	Not at all restricted
Insufficient availability	○ ○ ○ ○ ○ ○ ○	Sufficient availability

Please indicate your agreement with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
We can depend on getting the truth in most advertising.	○	○	○	○	○	○	○
I believe advertising is informative.	○	○	○	○	○	○	○
Advertising is generally truthful.	○	○	○	○	○	○	○
Advertising is a reliable source of information about the quality and performance of products.	○	○	○	○	○	○	○
In general, advertising presents a true picture of the product being advertised.	○	○	○	○	○	○	○
I feel I've been accurately informed after viewing most advertisements.	○	○	○	○	○	○	○

How old are you?

- Under 18
- 18 - 24
- 25 - 34
- 35 - 44
- 45 - 54
- 55 - 64
- 65 - 74
- 75 - 84
- 85 or older

What is your gender?

- Male
- Female
- Gender diverse
- Prefer not to say

What country do you currently live in?

What is your highest qualification?

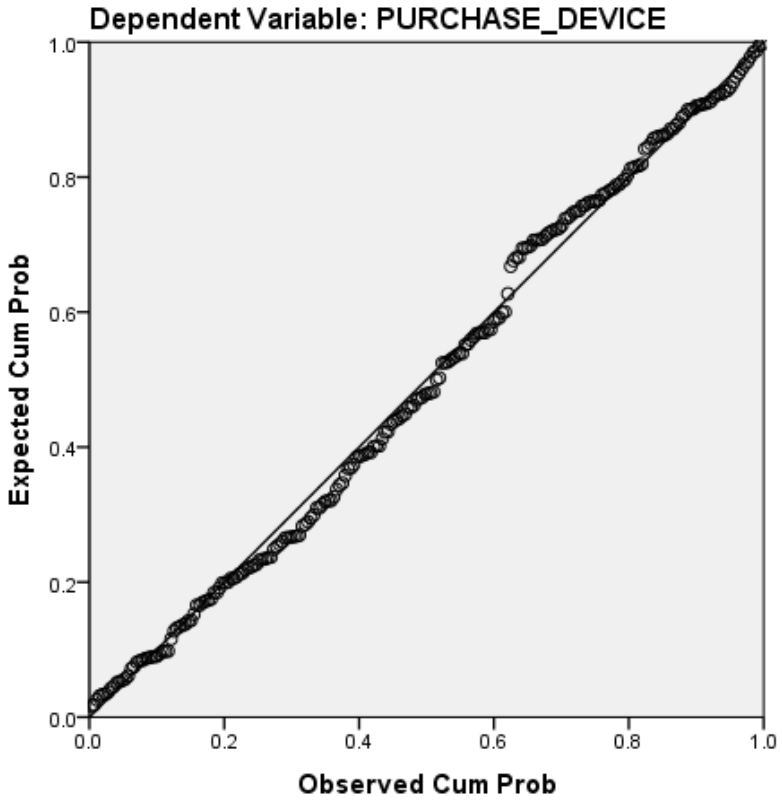
- No qualification
- Some high school
- High school graduate
- Diploma or Certificate
- Bachelors Degree
- Post-graduate or Honours Degree
- Masters Degree
- Doctorate Degree

What is your employment status?

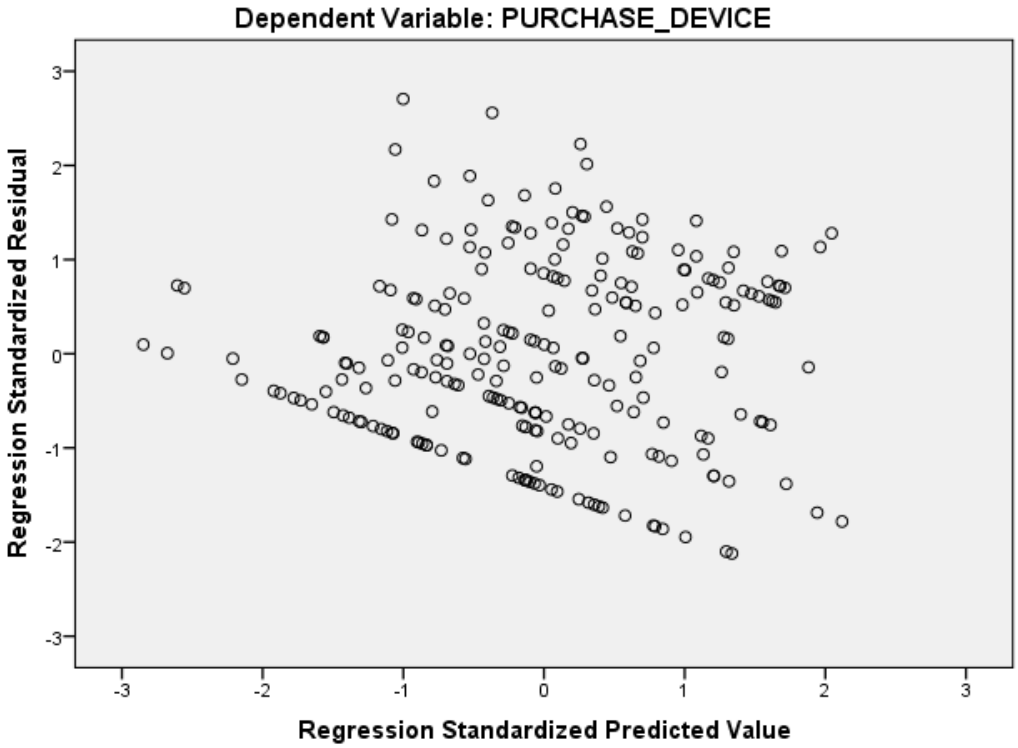
- Employed full-time
- Employed part-time
- Unemployed (seeking work)
- Unemployed (not seeking work)
- Retired

Appendix B: Study One Regression Outputs

Normal P-P Plot of Regression Standardised Residual



Scatterplot



Appendix C: Study One Additional Testing

To further investigate the effect of perceived risk of online shopping on device, the multiple regression analysis was conducted without the moderating variable.

In combination, the predictor variables accounted for a significant 19.2% of the variability in purchase intention on device $R^2 = .192$, adjusted $R^2 = .171$, $F(6, 229) = 9.071$, $p < .000$. Unstandardised (B) and standardised (β) regression coefficients, and the standard error for each predictor in the regression model are reported in Table 5.9.

Multiple Regression Results

Variable	*B*	Std. Error	β
Scarcity	-1.560	.777	-.500*
Device	-.432	.221	-.147*
Scepticism	-.384	.089	-.317**
Attitude to Online Shopping	.277	.108	.158*
Scarcity x Device	-.266	.383	-.067
Scarcity x Scepticism	.246	.162	.396

Note. $N = 236$.
* $p < .05$ ** $p < .01$

Appendix D: Study Two Questionnaire

VICTORIA UNIVERSITY OF WELLINGTON
Te Whare Wānanga o te Ūpoko o te Ika a Māui

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Senior Lecturer
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Wellington 6140
+64 4 463 6933
micael-lee.johnstone@vuw.ac.nz

Dr Aaron Gazley
Senior Lecturer
School of Marketing & International Business
PO Box 600
Wellington 6140
+64 4 463 5725
aaron.gazley@vuw.ac.nz

Human Ethics Committee Convener:
Associate Professor Susan Corbett
+64 4 463 5480
susan.corbett@vuw.ac.nz

Have you purchased a product or service online in the last 12 months?

- ○ Yes
- ○ No

How often do you make purchases online?

- ○ Daily
- ○ 2-3 times a week
- ○ Once a week
- ○ 2-3 times a month
- ○ Once a month
- ○ 4-6 times a year
- ○ 1-3 times a year

Please indicate which devices you own (tick all that apply)

- ☐ Tablet/iPad
- ☐ Laptop
- ☐ Desktop Computer
- ☐ None

Of these options what is your preferred device for shopping online?

- ○ Tablet/iPad
- ○ Laptop
- ○ Desktop computer

Do you own a smartphone?

- ○ Yes
- ○ No

Please indicate your agreement with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I do not like to shop online	○	○	○	○	○	○	○
Online shopping makes me feel happy	○	○	○	○	○	○	○
I feel excited when I shop online	○	○	○	○	○	○	○
Online shopping is a wise way to shop	○	○	○	○	○	○	○
Online shopping is useful to people	○	○	○	○	○	○	○
Online shopping is an effective way to shop	○	○	○	○	○	○	○

Please indicate your agreement with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
There is a good chance I will make a mistake if I purchase products online	○	○	○	○	○	○	○
Purchasing products online is a big risk	○	○	○	○	○	○	○
Purchasing products online creates a high potential for loss	○	○	○	○	○	○	○
Purchasing products online could be a very negative situation	○	○	○	○	○	○	○

Have you purchased products on your smartphone in the last 12 months?

- ○ Yes
- ○ No

How often do you purchase online using your smartphone?

- ○ Daily
- ○ 2-3 times a week
- ○ Once a week
- ○ 2-3 times a month
- ○ Once a month
- ○ 4-6 times a year
- ○ 1-3 times a year

Please indicate your agreement with the following statements.

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
There is a good chance I will make a mistake if I purchase products on my smartphone	○	○	○	○	○	○	○
Purchasing products on my smartphone is a big risk	○	○	○	○	○	○	○
Purchasing products on my smartphone creates a high potential for loss	○	○	○	○	○	○	○
Purchasing products on my smartphone could be a very negative situation	○	○	○	○	○	○	○

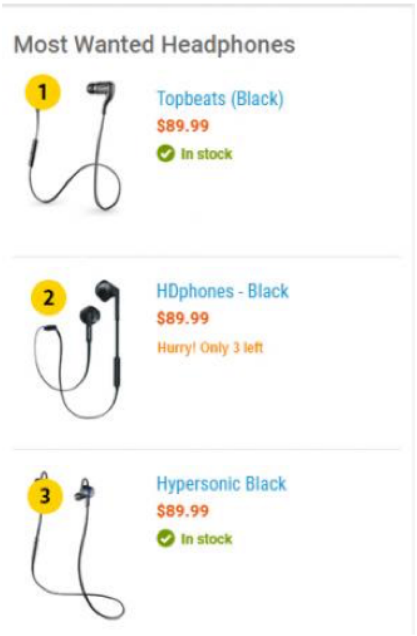
Please indicate your agreement with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I am particularly interested in wireless headphones	○	○	○	○	○	○	○
Given my personal interests, wireless headphones are not very relevant to me	○	○	○	○	○	○	○
Overall, I am quite invested when I am purchasing wireless headphones for personal use	○	○	○	○	○	○	○

Please carefully read the following scenario. **Imagine** you need to buy new wireless headphones and have decided on a budget of $100.

> You are on your smartphone and decide to look up wireless headphones on the website of a well-known and reputable electronics retailer. They have a range of brands and styles available.

On the next page you will see a section of the online store. When you look at the online store remember that you need to buy new wireless headphones and have a budget of $100.



Please indicate your attitude toward the **first pair** of headphones (Topbeats) shown above.

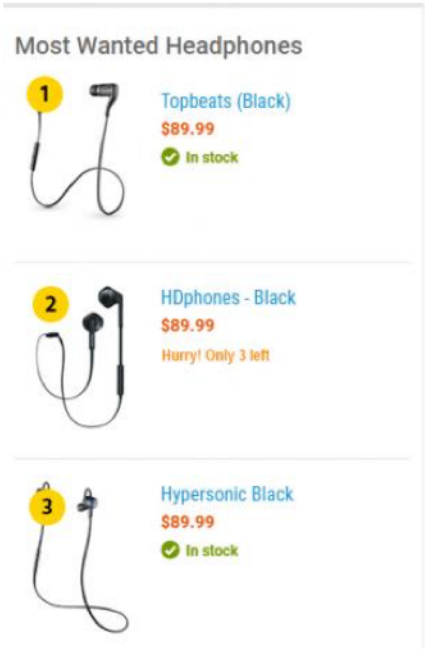
Dislike	○ ○ ○ ○ ○ ○ ○	Like
Unfavourable	○ ○ ○ ○ ○ ○ ○	Favourable
Low quality	○ ○ ○ ○ ○ ○ ○	High quality
Not valuable	○ ○ ○ ○ ○ ○ ○	Valuable
Undesirable	○ ○ ○ ○ ○ ○ ○	Desirable

Considering the **first pair** of headphones (Topbeats) shown above, please indicate your agreement with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I am likely to buy the headphones on offer on my smartphone	○	○	○	○	○	○	○
It is probable that I will purchase the headphones on my smartphone	○	○	○	○	○	○	○
It is certain that I will purchase the headphones on my smartphone	○	○	○	○	○	○	○
There is a good chance that I will buy the headphones on my smartphone	○	○	○	○	○	○	○

How available do you think the **first pair** of headphones (Topbeats) is?

Very limited	○ ○ ○ ○ ○ ○ ○	Not very limited



Please indicate your attitude toward the **second pair** of headphones (HDphones) shown above.

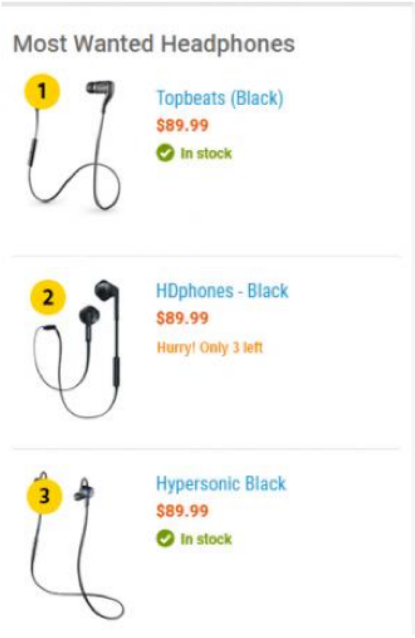
Dislike	○ ○ ○ ○ ○ ○ ○	Like
Unfavourable	○ ○ ○ ○ ○ ○ ○	Favourable
Low quality	○ ○ ○ ○ ○ ○ ○	High quality
Not valuable	○ ○ ○ ○ ○ ○ ○	Valuable
Undesirable	○ ○ ○ ○ ○ ○ ○	Desirable

Considering the **second pair** of headphones (HDphones) shown above, please indicate your agreement with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I am likely to buy the headphones on offer on my smartphone	○	○	○	○	○	○	○
It is probable that I will purchase the headphones on my smartphone	○	○	○	○	○	○	○
It is certain that I will purchase the headphones on my smartphone	○	○	○	○	○	○	○
There is a good chance that I will buy the headphones on my smartphone	○	○	○	○	○	○	○

How available do you think the **second pair** of headphones (HDphones) is?

Very limited	○ ○ ○ ○ ○ ○ ○	Not very limited



Please indicate your attitude toward the **third pair** of headphones (Hypersonic) shown above.

Dislike	○ ○ ○ ○ ○ ○ ○	Like
Unfavourable	○ ○ ○ ○ ○ ○ ○	Favourable
Low quality	○ ○ ○ ○ ○ ○ ○	High quality
Not valuable	○ ○ ○ ○ ○ ○ ○	Valuable
Undesirable	○ ○ ○ ○ ○ ○ ○	Desirable

Considering the **third pair** of headphones (Hypersonic) shown above, please indicate your agreement with the following statements

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
I am likely to buy the headphones on offer on my smartphone	○	○	○	○	○	○	○
It is probable that I will purchase the headphones on my smartphone	○	○	○	○	○	○	○
It is certain that I will purchase the headphones on my smartphone	○	○	○	○	○	○	○
There is a good chance that I will buy the headphones on my smartphone	○	○	○	○	○	○	○

How available do you think the **third pair** of headphones (Hypersonic) is?

Very limited	○ ○ ○ ○ ○ ○ ○	Not very limited

Please indicate your attitude toward the website content you viewed.

Unbelievable	○ ○ ○ ○ ○ ○ ○	Believable
Not credible	○ ○ ○ ○ ○ ○ ○	Credible
Unreliable	○ ○ ○ ○ ○ ○ ○	Reliable
Not trustworthy	○ ○ ○ ○ ○ ○ ○	Trustworthy

What is the screen size of your smartphone?

- ○ 3.5 - 3.9 inches (e.g. iPhone 3G/3GS/4/4S)
- ○ 4 - 4.4 inches (e.g. iPhone 5/5C/5S/SE, Galaxy S I/II)
- ○ 4.5 - 4.9 inches (e.g. iPhone 6/6S/7, Galaxy S III, Sony Xperia X Compact)
- ○ 5 - 5.4 inches (e.g. Galaxy S4/S5/S6/S6 Edge/S7/J3/J5, Huawei P9, Sony Xperia X)
- ○ 5.5+ (e.g. iPhone 6 Plus/6S Plus/7 Plus, Galaxy S6 Edge+/S7 Edge, Huawei P9 Plus)
- ○ Other (please specify)

How old are you?

- ○ Under 18
- ○ 18 - 24
- ○ 25 - 34
- ○ 35 - 44
- ○ 45 - 54
- ○ 55 - 64
- ○ 65 - 74
- ○ 75 - 84
- ○ 85 or older

What is your gender?

- ○ Male
- ○ Female
- ○ Gender diverse
- ○ Prefer not to say

What country do you currently live in?

What is your highest qualification?

- ○ No qualification
- ○ Some high school
- ○ High school graduate
- ○ Diploma or Certificate
- ○ Bachelors Degree
- ○ Post-graduate or Honours Degree
- ○ Masters Degree
- ○ Doctorate Degree

What is your employment status?

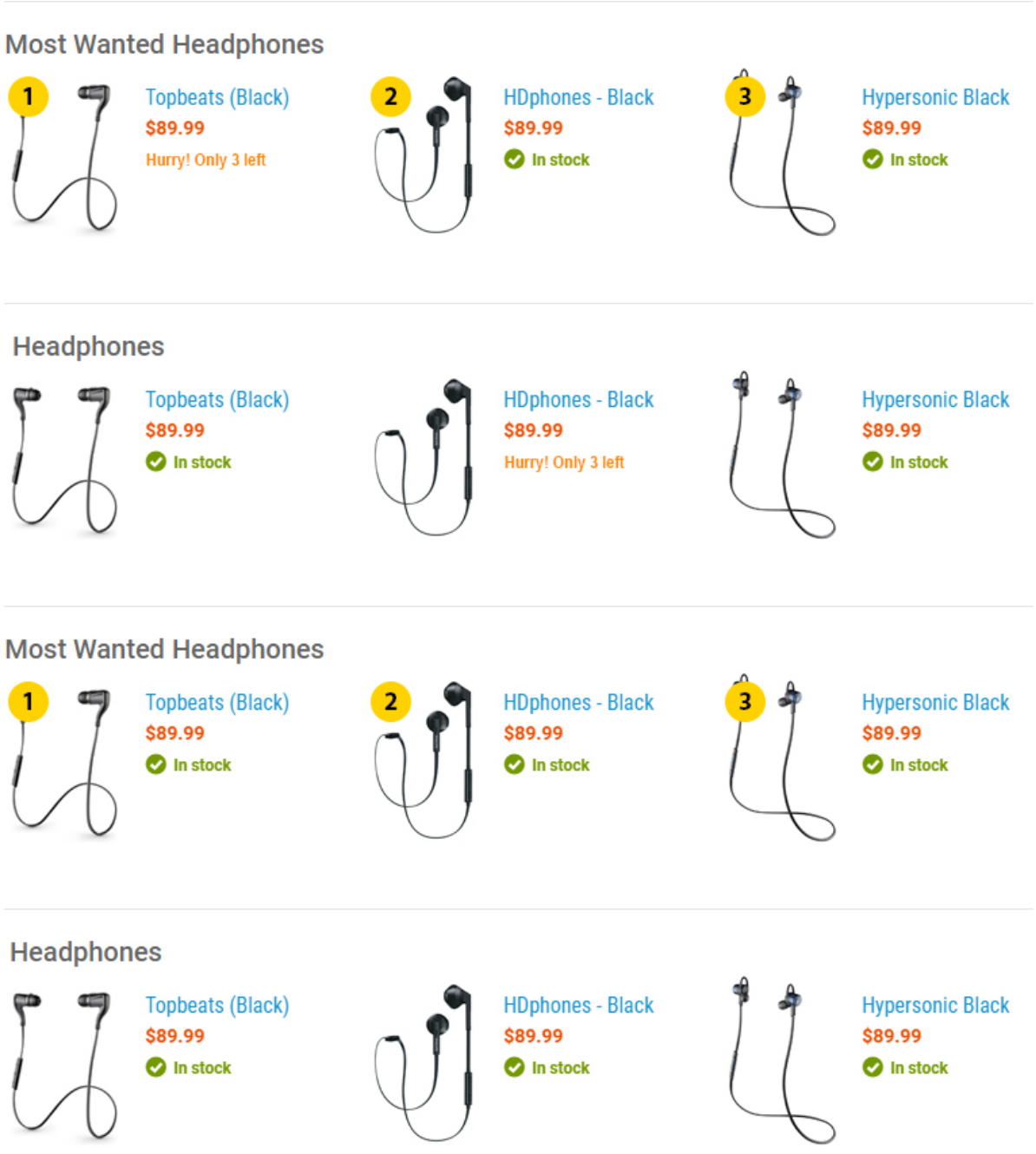
- ○ Employed full-time
- ○ Employed part-time
- ○ Unemployed (seeking work)
- ○ Unemployed (not seeking work)
- ○ Retired

What is your yearly income?

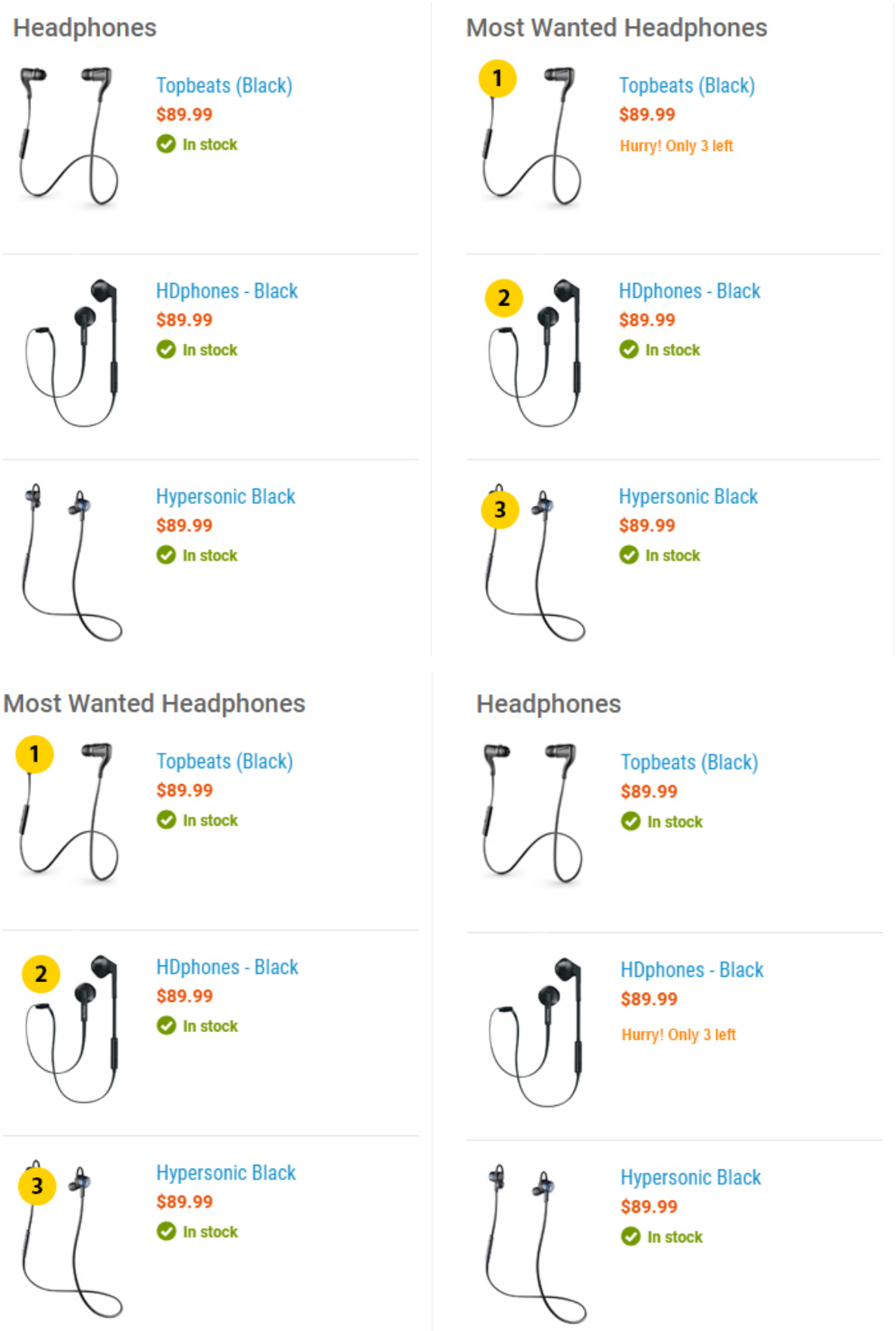
- ○ Zero income
- ○ $1–$5,000
- ○ $5,001–$10,000
- ○ $10,001–$15,000
- ○ $15,001–$20,000
- ○ $20,001–$25,000
- ○ $25,001–$30,000
- ○ $30,001–$35,000
- ○ $35,001–$40,000
- ○ $40,001–$50,000
- ○ $50,001–$60,000
- ○ $60,001–$70,000
- ○ $70,001–$100,000
- ○ $100,001–$150,000
- ○ $150,001 or More
- ○ Prefer not to say

Appendix E: Study Two Scenario Image Examples

Fixed Device Images

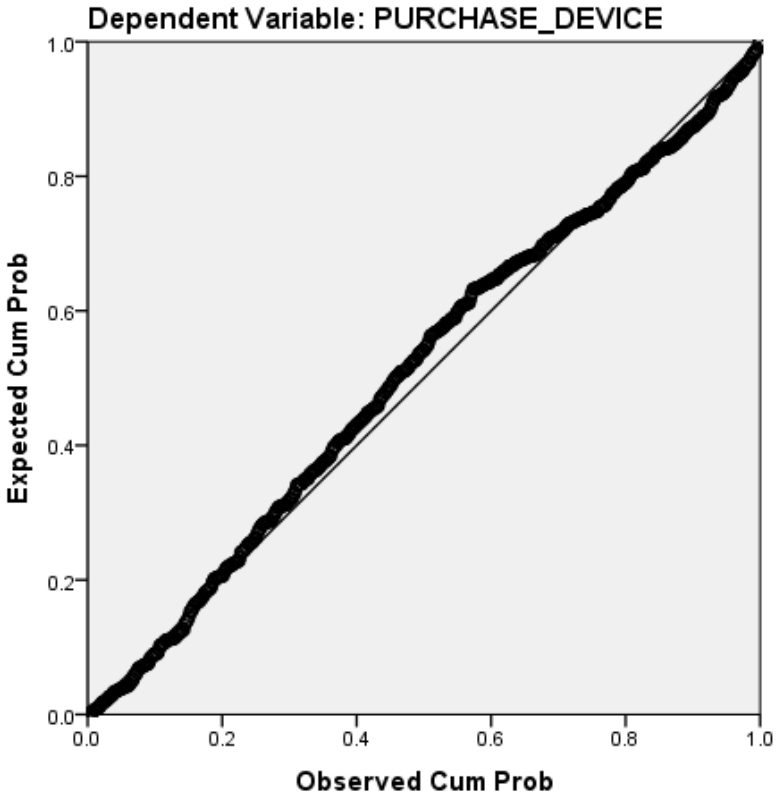


Mobile Device Images

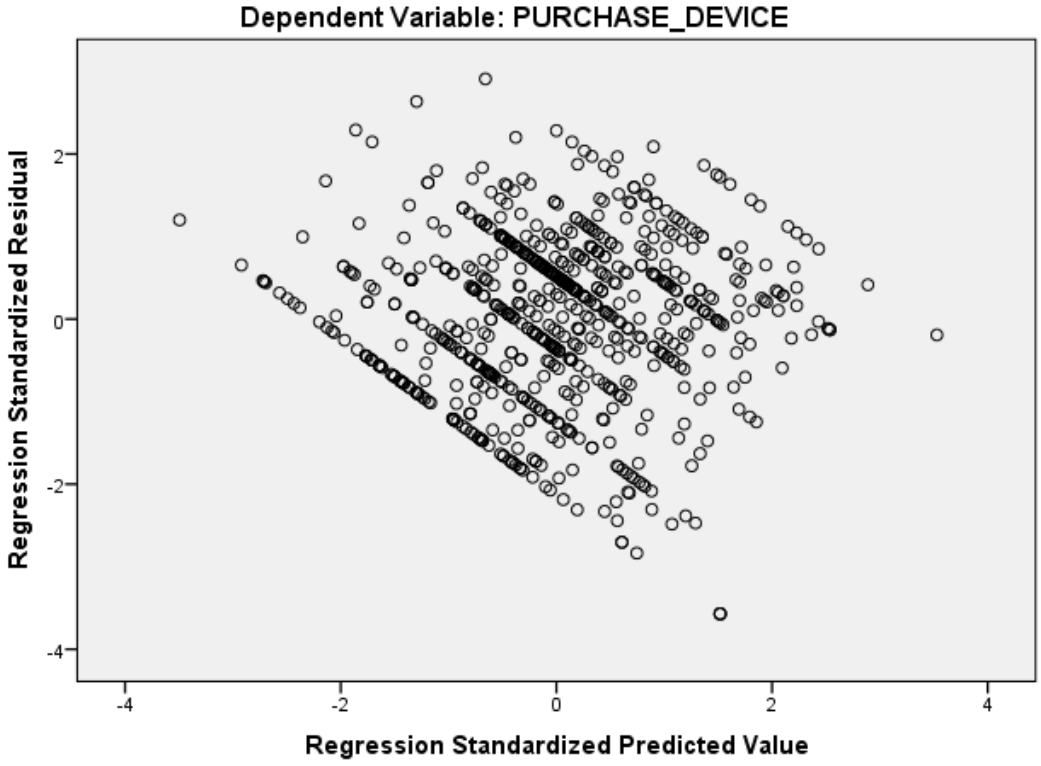


Appendix F: Study Two Regression Outputs

Normal P-P Plot of Regression Standardised Residual



Scatterplot



Appendix G: Study Two Additional Testing

To further investigate the effect of perceived risk of online shopping on device, the multiple regression analysis was conducted without the moderating variable.

In combination, the predictor variables accounted for a significant 47.6% of the variability in purchase intention on device $R^2 = .476$, adjusted $R^2 = .467$, F (12, 719) = 54.469, $p < .000$. Unstandardised (B) and standardised (β) regression coefficients, and the standard error for each predictor in the regression model are reported in Table 6.7.

Multiple Regression Results

Variable	*B*	Std. Error	β
Scarcity	.185	.646	.044
Popularity Ranking	2.223	.489	.715**
Device	-.401	.085	-.129**
Attitude to Online Shopping	.130	.043	.084**
Attitude to Product	.621	.034	.525**
Product Involvement	.501	.070	.286**
Credibility	.235	.048	.187**
Scarcity x Popularity Ranking	-.261	.228	-.046
Device x Popularity Ranking	.021	.173	.006
Device x Scarcity	.139	.227	.025
Scarcity x Credibility	-.156	.094	-.167
Popularity Ranking x Credibility	-.063	.071	-.095
Scarcity x Product Involvement	.149	.125	.155
Popularity Ranking x Product Involvement	-.381	.096	-.516**

Note. $N = 244$.
* $p < .05$ ** $p < .01$