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USES AND GRATIFICATIONS THEORY IN E-COMMERCE: HABIT AND SOCIAL PRESENCE

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Abstract

Digital media have transformed the customer buying journey and recent studies show that different media (devices) are used for different steps of the decision-making process. In this study, we apply the Uses and Gratifications (U&G) theory in the marketing context in order to investigate consumers' choice to use desktop or mobile devices for conducting purchases. Habit and social presence are tested as moderators of the relationship between intention to buy and purchase via the two media. We report results from two laboratory experiments involving an actual purchase in various product categories. Findings indicate that consumers use desktop to make significantly more purchases than via mobile phone. Further, the positive relationship between the intention to buy and product purchase is moderated by the habitual use of the medium. Purchase intention x habitual use of the medium interactions are related to purchase behavior when habit is strong. Similarly, the presence of other people while the purchase is being made via desktop and mobile devices increases the likelihood of product purchase. Several implications for further academic research and managers are discussed.

Keywords: Uses and Gratifications Theory, E-Commerce, Digital Media, Habit, Social Presence

1. Introduction

As e-commerce sales grow constantly all around the world (Europe: €534 billion for 2017; US: $512 billion in 2018; Eurocommerce, 2018; U.S. Census Bureau, 2019), there is a rising academic and managerial interest in the effects of new, technology-based channels on consumer attitudes and behavior (Lowe *et al*. 2015). One area of focus has been comparative consumer behavior in offline environments (i.e., brick-and-mortar retail stores) and online environments, and the impact of one commerce channel upon the other. The main research questions pertain to whether consumers spend more time searching for products offline than online, conduct more purchases offline or online, and how experience of one medium (e.g., a desktop device or a mobile phone) influences their behavior when interacting with the other (Brosnan *et al.* 2017; Huang *et al.* 2017).

A parallel research stream examines the use of different media, or devices (such as desktops, tablets and smartphones) for e-commerce. Indeed, the extensive use of mobile phones, tablets and other mobile devices has led to the establishment of channels such as mobile commerce (Wang *et al.* 2015). In 2016, almost 30% of online sales in USA were conducted

through mobile devices (Heinze *et al*. 2017) and this figure has risen to 40% in 2018 (Statista, 2019). Acknowledging the opportunities of these trends, researchers have pointed to the need for understanding the reasons governing the use of these media in the various stages of the shopping process (Okazaki and Mendez, 2013). However, there has been limited work that compares the use of different media for on-line purchases and, what is more, there is a lack of conceptual background for understanding such behavior.

This article aims to contribute to this field by following a user (consumer)-centric approach as a theoretical vehicle to investigate consumers' choice to turn to their desktop (internet-connected computers) and/or mobile devices to make purchases. We ground our investigation in the uses and gratifications (U&G) theory. This theory is built on the psychological communication background and states that individuals use the media for different purposes (Severin and Tankard, 1997). The main inference of the theory is that users/consumers are goal-oriented and they gratify their psychological needs through the use of specific media (Lin, 1999). Studies in Information Systems have examined the motives for and outcomes of the use of Information Technology (Turel *et al.* 2011) and the U&G theory has been established as an appropriate theoretical framework to explore the link between the use of a medium and the psychological desires gratified by that use (e.g., Stafford *et al*. 2004; Grellhesl and Punyanunt-Carter, 2012). Yet, to the best of our knowledge, this framework has not been applied in a marketing context, and specifically an e-purchase context.

As a part of the body of research into mass communication (Li *et al.* 2016), the U&G theory focuses on the taxonomies of the use of a specific technology and the gratifications that result from doing so. In this article, we focus on two media, desktop and mobile to conduct purchases, and the three key gratification dimensions, namely the content gratification (i.e., information search via desktop and mobile commerce media), process gratification (i.e., habitual use of the medium), and social gratification (i.e., social presence at the time of medium use) during a shopping journey that involves an actual purchase.

We highlight the difference between web commerce and mobile commerce (wireless internet access) with two purchase scenarios (Zhang *et al.* 2012). In this regard, consider an individual sitting in front of a desktop in their room searching for products using the web commerce channel. Alternatively, consider the same individual holding a mobile phone inside or outside their house searching for products using the mobile commerce channel.

Using an experimental approach with two purchase scenarios in two consequent studies, the paper objective is to assess (1) the influence of the use of web and mobile commerce media on product buying intention and actual purchase, (2) the role of habit, and (3) the role of presence of others (co-presence) in the shopping decision. Thus, we intend to contribute to existing literature by analyzing e-commerce behavior through the lens of U&G theory and, specifically, the role of different media, of habit with the medium and of social presence in purchase decisions.

In the following sections, we present the theoretical foundations of the U&G paradigm, which was adopted to ground our investigation on the gratifications resulting from the use of online media. Then, we review the characteristics of the two media (i.e., desktops vs. mobile phones) and elaborate on the role of habit and its importance in the relationship between the intention to buy a product and actual purchase; lastly, we investigate the role of the presence of other people as drivers for product purchase. The following section presents the methodology of two laboratory experiments and their results. We conclude with a discussion of the theoretical and managerial implications, the limitations of this research and further research directions.

2. Conceptual background

The U&G paradigm is considered 'one of the most influential theories in the field of communications research' (Lin, 1996, p. 574). It is rooted in the assertion that individuals select which media to use by seeking goal-oriented gratification to satisfy their psychological needs (Guo *et al*. 2008). In this way, different media compete to satisfy the individuals and influence their subsequent behavior and the differences in the behavior of individuals are attributed to the use of a certain medium (Wu *et al.* 2010; Juntongjin, 2021). The interactive nature of the new, digital media and the goal-driven use of these media by individuals, offers the appropriate material for

the examination of the U&G paradigm (Ruggiero, 2000). As such, scholars have called for further research in the area by investigating the needs that urge individuals to use a medium and the behaviors that stem from using the chosen medium by gratifying those intrinsic needs (e.g., Stafford *et al.* 2004; Sutanto *et al.* 2013).

According to the U&G paradigm, there are psychological needs that urge individuals to use a particular medium, and the subsequent behaviors that stem from using the chosen medium gratify those intrinsic needs (Rubin, 1994). Current research relating to the U&G theory focuses on three distinct gratifications: content gratification through the use of the media (e.g., information search); process gratification (e.g., entertainment, habit); and social gratification (e.g., social presence, interaction) (e.g., Sutanto *et al.* 2013).

In the context of e-commerce, the psychological needs of consumers shape their expectations in terms of media usage and the interaction and involvement with the medium result in certain patterns of behavior (Cowles *et al.* 2002). For example, consumers may choose to use a certain medium because of the plethora of information available about products (content gratification), the enjoyment they perceive from interacting with the medium (process gratification), and the interaction with other people facilitated by the medium (social gratification).

Our study builds on these three gratification dimensions of the U&G theory. We argue that the use of a medium (i.e., desktop vs. mobile phone) through its distinctive characteristics (first dimension) offers specific value to consumers that facilitates outcomes related to consumer decision-making and ultimately their purchase behavior. As long as consumers are satisfied with the media usage, their media consumption becomes habitual (process gratification—the second dimension of the U&G theory). In terms of the third dimension, consumers may gain social gratification when they use different media due to the presence of others. The social environment supported by the different media shapes the different gratifications and behaviors. Below we develop each of these three dimensions by reviewing previous studies related to the U&G theory.

2.1. Medium: desktops vs. mobile phones

This categorization is critical for appreciating differences in consumer behavior that are driven by the adoption and use of web commerce versus mobile commerce media. Evidence suggests that consumer behavior is influenced by distinctive media characteristics (Stafford *et al.* 2004; Sohn, 2017). Constructional features of the devices such as the screen size are a case in point. Although the screen size of mobile devices is limited compared to desktops and might cause difficulties in product evaluation, their spatial and chronological elasticity (Kleijnen *et al*. 2007) is likely to help the consumer to accomplish specific goals and to access specific and 'specialty' information (Crowell, 2006), which compensate for the initial loss. Screen size and device mobility hold considerable promise in explaining and predicting customer experience at various stages of the shopping process (e.g., product search, evaluation of alternatives, intention to buy and actual purchase). A small screen size supports mobility (Kim *et al.* 2011) and facilitates timely searches for product information (Ghose *et al.* 2013), but consumers seem reluctant to buy niche products using devices with small screen (Wood and Neal, 2009). Instead, they usually buy products that they have purchased in the past, products whose characteristics are already familiar to them, or products that do not require much effort to buy (Wang *et al.* 2015).

Despite their limited functionalities due to the screen size (Okazaki and Mendez, 2013), mobile phones provide convenient access to consumers in online marketplaces (Wang *et al.* 2015). The portability of mobile devices compared with desktops offers timely access to information (Ghose *et al*. 2013) and increases consumers' interest in searching for products. Indeed, the convenience afforded by mobile devices increases purchase intentions (Yang, 2010) since consumers can search for products at any time and in any place using their mobile devices. Convenience and portability augment consumers' interests and choices (Pantano and Priporas, 2016), as they can look and evaluate alternative products and make their decision.

Desktop technologies seem to be preferred to mobile devices for complex and decisive purchasing tasks (Wang and Reani, 2017). The steps involved between the product search, evaluation, and ultimately making the purchase require the assessment of a plethora of information that is more easily understood on desktop devices than on mobile devices.

Consumers have to verify that they have chosen the appropriate product in terms of its characteristics (e.g., color, size, dimensions, specifications, etc.), choose a shipping option and arrange payment. This process requires numerous scrolling actions that cannot be performed concurrently (e.g., Pantano and Priporas, 2016); hence, previous studies suggest that desktop technologies are / will be preferred for such activities. Thus, we hypothesize:

H_1: The use of desktop leads more often to purchase than the use of mobile.

2.2. The role of habit in product purchase

Marketing research has widely assumed that actual purchase is mainly determined by the intention to buy (e.g., Chandon *et al.* 2005), a proposition that is difficult to verify empirically. One of the obstacles in investigating such relations lays in the difficulty of conducting a field or a laboratory experiment where one can measure or observe the purchase intention and associate this intention with the actual behavior. In contrast, Thorngate (1976) was among the first researchers that argued that behavior is not influenced by intention, but rather by habit. The role of habit has been neglected in marketing literature, as it is regarded as an obvious reason for making a purchase (Wood, 2002). However, the role of habit in making purchases online using either a desktop or mobile device has still to be studied empirically.

Research from U&G theory has focused on the role of habit as a component of process gratification (Dixon, 1997). Scholars have questioned and explored issues related to the habitual use of media for different purposes and the gratifications that users receive as a result (Ruggiero, 2000). Building on habit as a component of process gratification set out by the U&G paradigm, we address the question of its influence in online buying decisions using different media; in our case, we focus on desktop devices, compared to mobile phones.

The dimensions of habit development are repetition, stable context, satisfaction and comprehensiveness of usage (Limayem *et al.* 2007). With frequent use of online commerce media for purchases, the individual accumulates experience and automatizes their behavior. For example, a person who has repeatedly and successfully bought products using a desktop device will be able to accomplish the same task in the future without considerable effort (Ronis *et al.* 1989). The consumer becomes acquainted with the processes involved in pursuing their goal, which in turn increases their familiarity with the medium. An increase in the frequency of use and familiarity is likely to increase the probability that the behavior will become habitual (Kervenoael *et al.* 2014).

Another dimension in the development of a habit is the context in which the action takes place (Wood *et al.* 2002; Neal *et al.* 2012). An unchanging environment enables an action to be repeated without significant cognitive effort. In this research, an “unchanging environment” for a consumer is a home environment where the desktop device is located and used for gathering and evaluating product information or for conducting purchases. In such an environment, the cognitive effort required to perform a purchase decreases as the number of times that process has been performed increases. Once a habit has been formed, there will need to be a considerable change in context to probe the change in that habit. Introducing a new medium for the relevant behavior would qualify as such a change.

Finally, satisfactory experiences are critical for the development of habit (Aarts *et al.* 1997). Web and mobile media may illustrate effectively the link between satisfaction and habit: if a consumer uses either a desktop or mobile device to search for information regarding a set of headphones, evaluates the alternatives, decides which set to buy and ultimately proceeds with the purchase, that person has had a satisfactory experience of that medium and is likely to repeat it in the future.

In this study, the conceptualization of habit follows the U&G paradigm and is in line with Limayem *et al.* (2007). The predictive power of purchasing decisions is strengthened when the consumer performs a habitual behavior (e.g., buying products using a web/mobile commerce channel). An individual who has decided to buy a product is more likely to do so if they already have a habit of making purchases via the relevant medium. Consider the following scenario. Consumer X has made the decision to buy a product that they have evaluated using the desktop

(rather than the mobile) medium, but has not yet developed a habit of buying products using that medium. Consumer Y, by contrast, has made the decision to buy a product that they have evaluated using the desktop (rather than the mobile) medium, but has already developed a habit of buying products using that medium. What is the key element leading to product purchase? There is an association between the decision to buy the product and the actual purchase, but its strength may increase or decrease based on the consumer's habits when using this medium.

In line with above, we propose the habitual purchase hypothesis, advocating that consumers tend to buy those products upon which they have already decided by choosing to make the purchase using the medium that they are habitually used for conducting purchases. Thus, habit moderates the influence of the intention to buy on actual purchase behavior (for a similar conceptualization of habit as a moderator in other research areas, see Verplanken *et al.* 1998; Wood *et al.* 2005).

H_2: Consumers who are habitually used to conducting purchases using mobile phones (desktop devices) are more likely to make a purchase using mobile phones (desktop devices) rather than using desktop devices (mobile phones).

2.3. Social presence

Another difference between desktop and mobile media pertains to the social aspect. The size of mobile phones makes them easy to carry. Portability, along with the capability to connect online almost everywhere, brings the users of those devices closer to the rest of the world. Consumers can use their mobile phones in a café to search for products, call their friends, visit online forums and chatrooms, or use apps to interact with their social environment. The media richness that these devices offer is related to social presence, and shopping as a process involves a high level of social presence (Shen *et al*. 2002; Weisberg *et al.* 2011). One of the main motives for shopping is to interact with others who share similar interests (Tauber, 1972), ask their opinion and exchange ideas in order to make a purchase decision (Huang *et al.* 2017). Similarly, the presence of others has a normative influence on purchase behavior (Luo, 2005).

Social presence and affiliation are perceived as a goal dimension (social gratification) within the U&G paradigm (Lariviere *et al.* 2013). Through the use of media, individuals seek to gratify their social needs and gain diverse gratifications by using different technologies (Li *et al.* 2016). In the context of e-commerce, the social needs of the consumers provoke specific expectations in terms of the medium they will use, which in turn influences their involvement with and experience of the chosen medium, and finally their corresponding behavior (Cowles *et al.* 2002). Consumers receive social gratification by interacting with others when they use the medium, an outcome that has been examined by previous studies of social presence (e.g., Song and Hollenbeck, 2015).

In the offline environment, when an individual is accompanied by a friend, levels of perceived risk and uncertainty in making a purchasing decision decrease, and confidence about the purchase increases (Kiecker and Hartman, 1994). The advice of a trustworthy friend is considered reliable and can justify buying a product (Luo, 2005). However, in online shopping, the evidence for the influence of peers and friends in purchase behavior is weak and contradictory. In a longitudinal study, Limayem *et al.* (2000) showed that a friend's advice had no influence on the intention to buy; similarly, Hassanein and Head (2006) did not find a positive influence associated with social presence on purchase behavior when it comes to electronics such as headphones. On the contrary, Foucault and Scheufele (2002) reported that, when an individual purchased books online, their friends' advice was influential. Further, Garbarino and Strahilevitz (2004) demonstrated that individuals were more willing to buy from a website when it was suggested by a friend rather than by a stranger, and Shen (2012) found that social presence affects consumers' perceived ease of use and usefulness.

Given these conflicting findings, we follow an exploratory approach on this issue. We focus on the role of co-presence, defined as the level of perception of others' presence (Biocca *et al.* 2001), as it has been applied in previous studies. Co-presence has proved to be the fundamental factor for the establishment of social presence (Biocca *et al.* 2001), and is essential

for both the offline and online environments (Kim *et al.* 2013). Thus, we examine whether the presence (versus the absence) of a friend can influence purchasing decisions by those using the two-e-commerce media.

H_3: The presence (absence) of others will influence more (less) positively the actual purchases both for those using desktop media and for those using mobile media.

We designed two experiments to examine (1) the role of desktop devices versus mobile phones in product purchases, (2) the moderating influence of habit on the relationship between the purchase intention and the actual purchase, and (3) the role of co-presence (social presence – presence vs. absence of a friend) on product purchases. We use a laboratory experimental design in order to measure and control the variables under study, and observe the actual product purchase.

3. Experiment 1

3.1. Method

A hundred and fifteen undergraduate students at a European university took part in Experiment 1 in return for extra course credit. The student sample is a suitable surrogate for online consumers, as students are the population group with the highest rate of digital media use (Pew Research Center, 2017). We confirmed participants' purchasing familiarity with web and mobile commerce using a questionnaire in the first part of the experiment. Specifically, 94.5% of participants had purchased products online in the previous month, and they were similarly experienced in buying products using desktop devices and mobile phones (M = 6.1 for desktop and M = 5.9 for mobile phones on a 7-point scale). We excluded on an *a priori* basis: (1) one participant who provided incomplete or irrelevant responses; (2) two participants who chose to purchase products outside the price range (> €50), given that the decision-making process differs for high-priced versus low-priced/medium-priced products (Greenleaf *et al.* 2015); and (3) two participants who purchased clothing, given that clothing requires substantially more feel and touch than other categories such as electronics (Spence and Gallace, 2011). We tested participants individually and in private rooms.

Two weeks before the experiment's starting date, participants received an e-mail with information about the experiment. The e-mail stated that the experiment involved the possibility of an actual purchase of a product (preferably electronics) using a digital medium. In order to control for the familiarity and the level of involvement with the product to be purchased, we specified that the product should not be an often purchased one (participants should not have bought that product in the previous three months) and its price range would be between 20 and 50 euros (not particularly expensive).

A day before the onset of the experiment, we asked half of the participants at random to report to the laboratory with a friend. This group of participants was asked to take part along with one of their friends, under the pretext that social shopping with friends is an essential part of everyday shopping (Tauber, 1972). The term 'friendship' was emphasized in order to exclude other groups such as parents, relatives, and personal relations, given that such groups may influence shopping behavior in a different way than friends (Mangleburg *et al.* 2004).

The experiment's design consisted of two between-subjects factors, namely the medium and the presence vs. the absence of a friend. The medium had two levels: desktop device (N = 55) and mobile phone (N = 55). Participants accessed the desktop medium via a desktop device located in a laboratory room. The desktop device ran the Windows 10 operating system, had a 15.6-inch screen and a mouse. The rest of the participants, by contrast, accessed the mobile medium via an iPhone mobile phone with a 4.7-inch touchscreen. The second factor (presence) had two levels: friend present (N = 55) and friend absent (N = 55). Thus, approximately half of the participants who were allocated to the desktop device group were accompanied by a friend (N = 28), while the other half were alone (N = 27). Similarly, for those allocated to the mobile phone group, approximately half were accompanied by a friend (N = 28) and the other half not (N = 27). Participants were randomly allocated to one of the four groups that are summarized in Table 1.

Table 1. Experiment 1: groups and participants

Group	Treatment	Participants	Age	Gender
1	Desktop device + friend presence	28	18: 17.9% 19: 78.6% 20: 3.5%	Male: 42.9% Female: 57.1%
2	Mobile phone + friend presence	27	18: 0% 19: 88.9% 20: 11.1%	Male: 51.9% Female: 48.1%
3	Desktop device + friend absence	28	18: 28.6% 19: 64.3% 20: 7.1%	Male: 46.4% Female: 53.6%
4	Mobile phone + friend absence	27	18: 14.8% 19: 74.1% 20: 11.1%	Male: 51.9% Female: 48.1%

When the experiment commenced, we asked participants to answer mixed questions about the frequency of their internet usage, their expertise in using the internet, the purpose of their internet usage, their shopping behavior when using online platforms (e.g., product price range, product frequency) and demographics. We also measured (1) habit relating to making online purchases using a desktop device for those individuals allocated to the desktop group (*alpha* = 0.90, *M*=6.09, *SD*=1.20), and (2) habit relating to making online purchases using mobile devices for those allocated to the mobile phone group (*alpha* = 0.89, *M*=5.89, *SD*=1.08), using the scale established by Limayem *et al.* (2007) (items are presented in the Appendix). Then, participants listed the category (e.g., home accessories, car accessories) of the product they were interested in purchasing.

Each participant was then provided with a task description. We asked them to search online for the product that they were interested in buying, having written down the product category on the questionnaire sheet. To control factors related to the website design of the retailer, we asked all participants to visit the Amazon online store. We kept track of the time participants spent searching. In the four cases in which participants exceeded 20 minutes, we asked them to consider making a decision within the next 5 minutes. Once the participants had completed their product evaluation, we asked them questions regarding their purchase intentions (adapted from Dodds *et al.* 1991). They responded to four questions regarding their purchase intentions using a scale of 1 to 7 (1 = strongly disagree, 7 = strongly agree): “The probability that I would consider buying the product I am interested is high”; “The likelihood of my purchasing the product I am interested in is high”; “My willingness to buy the product I am interested is high”; “If I were to buy the product I am interested in, I would consider buying it” (*Cronbach alpha* = 0.94, *M*=5.48, *SD*=1.70). Finally, participants indicated their actual purchase decision (0 = no purchase, 1 = purchase) and proceeded with the purchase. A researcher confirmed coherence between indication and action. We completed all experimental sessions in two weeks.

3.2. Results

Table 2 shows the breakdown of the product purchases in the experiment. The most popular categories for the participants were phones accessories, computer accessories, and audio and hi-fi accessories, whereas the least popular were books and CDs.

Table 2. Breakdown of product purchases in experiment 1

Product category	Total transactions (N = 110)
Books	3
CDs	4
Toys/technology (e.g., drones)	6
Cameras accessories	5
Audio & hi-fi accessories	16
Car accessories	14
Phones accessories	28
Computer accessories	24
Home accessories	10

Hypothesis 1 examines the difference between the binomial proportions of the two independent groups, namely the use of desktops compared with mobile phones, on purchases, which is the dichotomous dependent variable. Utilizing a chi-square test, we compared the occurrence of an actual purchase by those who used the desktops with those who used the mobile phones. There was a significant difference in the proportion of participants who conducted a purchase depending on whether they had used a desktop or mobile phone (purchases using desktops: 42/55; purchases using mobile phones: 30/55; ($x2$ (1) = 5.79, $p = 0.016$). Thus, Hypothesis 1 is supported.

We then conducted a logistic regression to assess the effects of intention to buy, habit and the interaction between the two on actual purchase (i.e., likelihood that participants actually bought the product). Taking into account the experimental setting and the quantitative measurement of both factors, logistic regression is the appropriate test to examine the main and interaction effects (Kutner *et al.* 2004). The mean-centered scores of the variables intention to buy, habit and the interaction between the two were entered in the regression. The Hosmer-Lemeshow test was non-significant ($p = 0.52$), indicating the model's appropriate fit for the data. The logistic regression model was statistically significant, $\chi2$ (3) = 107.882, $p < 0.001$. The model explained 86.3% (Nagelkerke R^2) of the variance in actual purchases. Of the predictors, purchase intention ($B = 4.27$, Wald = 11.34, $p = 0.001$) was significant and habit ($B = -0.96$, Wald = 2.44, $p = 0.118$) was not, but a stronger habit was associated with increased purchase (interaction term: $B = 1.43$, Wald = 5.68, $p = 0.017$). The final model correctly predicted group membership for approximately 96% of the cases (89.5% did not make the purchase and 98.6% did make the purchase). In line with previous research, the intention to buy was positively associated with the actual product purchases. The interaction term between intention to buy and habit was significant, indicating that habit moderates the effect of purchase intentions on actual purchases, thus Hypothesis 2 was supported. When consumers have made their decision and are habitually used to buying using a specific platform, they tend more to proceed with the purchase, whereas they do not behave similarly when they have made their decision but the use of the medium for conducting purchases is less of a habit.

Finally, we utilized two chi-square tests to compare the occurrence of a purchase using different media (e.g., desktop vs. mobile phone) taking into account the presence or absence of a friend. As the assumption of an expected value of five or higher for each cell was not met in the data, we used Fisher's exact test. Of the participants allocated to the desktop group, those who were accompanied by a friend (51%) indicated a significantly higher rate of actually making the purchase than those who were unaccompanied (Fisher's exact test, $p < 0.001$). Also, of the participants allocated to the mobile phone group, those who were accompanied by a friend (51%) indicated a significantly higher rate of actually making the purchase than those who were unaccompanied (Fisher's exact test, $p < 0.001$). Thus, Hypothesis 3 is supported for both media. The presence of a friend increases the likelihood of product purchase.

4. Experiment 2

The aim of the second experiment was twofold: (1) to replicate experiment 1 at a different time and with different subjects; and (2) to further explore the moderating role of habit based on the results of the first experiment by measuring the level of habit with both media for all participants. The specific question we sought to investigate was: is there a relationship between the habit of purchasing using one medium compared to using another medium? This topic has not been addressed in the first experiment.

Thus, the difference between the designs of Experiments 1 and 2 is associated with the measurement of habit. In Experiment 1, we measured (1) habit relating to making online purchases using a desktop device for those individuals allocated to the desktop group, and (2) habit relating to making online purchases using mobile devices for those allocated to the mobile phone group, using Limayem *et al.* (2007) scale. In Experiment 2, by contrast, we measured habit relating to making online purchases using desktop devices (*M*=4.13, *SD*=2.34) *and* habit relating to making purchases using mobile devices (*M*=4.05, *SD*=1.80) for all participants, regardless of which group they were allocated for the purpose of the experiment. We captured the purchase behavior of the individuals taking into consideration both the habitual use of the medium in which they were experimentally tested and the habitual use of the medium in which they were not tested as part of the experiment. The rest of the procedure was identical to that of Experiment 1 for direct comparison reasons.

4.1. Method

One hundred and two undergraduates at a Southern European university participated in Experiment 2 in return for extra course credit, four months after Experiment 1 was conducted. All participants had purchased products using a desktop or a mobile medium in the previous three months. We excluded one participant for providing incomplete responses to the questionnaire at the start of the experiment, and one participant who purchased a product outside the price range (> €50).

We followed exactly the same procedure as in Experiment 1 in terms of the design and execution. The design consisted of two between-subjects factors: the medium and the presence vs. absence of a friend. The medium had two levels: desktop device (N = 50) and mobile phone (N = 50). The presence factor also had two levels: friend present (N = 50) and friend absent (N = 50). Thus, half of the participants allocated to the desktop device group were accompanied by a friend (N = 25) and the other half were alone (N = 25). Similarly, for those allocated to the mobile phone group, half of them were accompanied by a friend (N = 25) and the other half were not (N = 25). We randomly allocated participants to one of the four groups that are summarized in Table 3.

Table 3. Experiment 2 groups and participants

Group	Treatment	Participants	Age	Gender
1	Desktop device + friend presence	25	19: 4.0% 20: 80.0% 21: 16.0%	Male:48.0% (12) Female:52.0%(13)
2	Mobile phone + friend presence	25	19: 28.0% 20: 72.0%	Male: 52.0% Female: 48.0%
3	Desktop device + friend absence	25	18: 12.0% 19: 68.0% 20: 20.0%	Male: 40.0% Female: 60%
4	Mobile phone + friend absence	25	18: 4.0% 19: 8.0% 20: 64.0% 21: 24.0%	Male: 68.0% Female: 32.0%

We completed all experimental sessions in three weeks. The descriptives and reliability analysis of habitual use of the medium for conducting purchases both for those allocated to desktop and mobile devices are presented in Table 4. Finally, participants indicated their purchase intentions by answering to the same questions as in the previous experiment (purchase intention: Cronbach *alpha* = 0.93, *M*=5.51, *SD*=1.67).

Table 4. Descriptive and reliability of habitual use of the medium for conducting purchases

Treatment	Participants	Habit for Desktop device	Habit for mobile device
Desktop device	50	*Cronbach a*=0.92 *M*=6.10 *SD*=1.25	*Cronbach a*=0.91 *M*=6.50 *SD*=1.37
Mobile phone	50	*Cronbach a*=0.89 *M*=2.72 *SD*=1.29	*Cronbach a=0.90* *M=5.38* *SD=1.11*

Note: Cronbach a: Cronbach alpha, M: Mean, SD: Standard Deviation

4.2. Results

Table 5 shows the breakdown of the product purchases in the second experiment. We used a chi-square test to compare the occurrence of an actual purchase using the two media. We found a significant difference in the proportion of participants who actually made a purchase depending on whether they used a desktop device or mobile phone (purchases through desktops: 38/50; purchases through mobile phones: 28/50; (x2 (1) = 4.46, p = 0.035). In line with Experiment 1, Hypothesis 1 is supported.

Table 5. Actual product purchases in experiment 2

Product category	Total transactions (N = 100)
CDs	1
Toys/technology (e.g., drones)	4
Camera accessories	10
Audio & hi-fi accessories	17
Car accessories	8
Phone accessories	29
Computer accessories	24
Home accessories	7

To test Hypothesis 2, we conducted a logistic regression to assess the effects of intention to buy, habit with the medium, and their interaction on actual purchase. The mean-centered scores of the variables intention to buy, habit, and their interaction were entered in the regression. The Hosmer-Lemeshow test was non-significant (p = 0.84), indicating the model's appropriateness for the data. The model was statistically significant, χ^2 (3) = 96.893, p < 0.001, and explained 85.9% (Nagelkerke R^2) of the variance in actual purchases. Of the predictors, purchase intention (B = 4.27, Wald = 8.73, p = 0.003) was significant and habit (B = -0.72, Wald = 1.55, p = 0.213) was not significant, but a stronger habit was significantly associated with increased purchase (interaction term: B = 1.35, Wald = 4.59, p = 0.032). The final model correctly predicted group membership for 95% of the cases. In line with Experiment 1, the interaction term between intention to buy and habit was significant, indicating that habit moderates the effect of purchase intentions on actual purchases. Thus, Hypothesis 2 is supported in Experiment 2.

As noted in Section 4.1 above, during Experiment 2 we measured habitual usage of both media (desktop and mobile devices) for making purchases online, regardless of which group the participants were allocated to as part of the experiment. However, in order to test Hypothesis 2,

we entered in the regression the 'desktop' habit for those allocated in a desktop device, and 'mobile' habit for those allocated in the mobile device. Following that, and in order to further test whether there are any differences between the habit of using different media for the same individual, we conducted a second logistic regression to assess the effects of intention to buy, the habit with the medium that was not used in the experimental design, and their interaction on actual purchase. Thus, we entered in the equation the habitual use of conducting purchase through mobile devices for those allocated in a desktop device and the habitual use for conducting purchases through a desktop device for those allocated in the mobile device group.

The mean-centered scores of the variables intention to buy, habit, and their interaction were entered in the regression. The Hosmer-Lemeshow test was non-significant ($p = 0.83$), indicating the model's appropriateness for the data. The model was statistically significant, χ^2 (3) = 94.843, $p < 0.001$, and explained 84.8% (Nagelkerke R^2) of the variance in actual purchases. Of the predictors, purchase intention (B = 3.86, Wald = 8.57, $p = 0.003$) was significant and habit (B = 0.15, Wald = 0.31, $p = 0.576$) was not significant, but the interaction intention_to_buy x habit was significantly and negatively associated with purchase (interaction term: B = -0.73, Wald = 4.62, $p = 0.032$). The final model correctly predicted group membership for 96% of the cases. Taking into account the previous regression results, we have found that respondents with a stronger habit with the medium (e.g., desktop) will decrease the actual purchase behavior with another medium (e.g., mobile, and vice versa).

Considering the co-presence in the shopping process, we utilized two chi-square tests to compare the occurrence of a purchase using desktop devices and mobile phones. We used Fisher's exact test, as the assumption of an expected value of at least of five for each cell was not met in the data for both desktop and mobile phone groups. Of the participants in the desktop group, those who were accompanied by a friend (50%) indicated a significantly higher rate of actually making the purchase than those who were unaccompanied (Fisher's exact test, $p = 0.018$). Of the participants in the mobile phones group, those who were accompanied by a friend (50%) indicated a significantly higher rate of actually making the purchase than those who were unaccompanied (Fisher's exact test, $p < 0.001$). Thus, Hypothesis 3 is supported in Experiment 2.

5. Discussion and theoretical contributions

Based on the U&G theory, the objective of this study was three-fold: (1) assess the influence of web and mobile commerce media use on product buying intention and actual purchase, (2) investigate the moderating role of habit, and (3) test the role of the presence of others (co-presence) in the online shopping decision. The results demonstrate that although purchase intentions influence positively the ultimate enactment of that behavior, the (digital) medium used, habit and co-presence set the boundary conditions for the applicability of this relationship.

In contrast to the body of literature that studies purchase intentions and its antecedents (e.g., Okazaki, 2008), we adopted the U&G theory in a shopping scenario, using two large scale laboratory experiments, to trace the process from purchase intention to actual product purchase. To the best of our knowledge, this is the first cross-disciplinary experimental application of the three dimensions of the U&G theory- an established conceptual framework in the communication and human-computer interaction- on the online decision-making process, particularly the use of alternative media for conducting online purchases.

Our study complements previous findings but also adds to our understanding of e-commerce behavior. The results of both experiments are consistent with previous findings regarding the influential role of commerce channel on the intention to buy a product (Huang *et al.* 2016). We demonstrated that the nature of the medium has an effect on actual purchase behavior. In particular, the use of the desktop medium led to more purchases than the use of mobile, a phenomenon that may be explained by the characteristics of the devices. Previous research has found that consumers prefer desktop devices (with larger screens) in comparison with the mobile phones (Wood and Neal, 2009). Devices with large screens facilitate product display and decrease perceived risk in the steps involved in the payment process, helping consumers to arrive at a decision and feel confident about the process.

Building on the U&G theory of habit as a component of process gratification, we found that the habitual use of the medium habit moderates the established relationship between intention and behavior that the marketing theory suggests (e.g., Chandon *et al.* 2005). Reinforcing and extending the findings of experiment 1, experiment 2 confirms the moderating role of habit: when consumers intend to buy on-line, the probability of that intention turning to an actual purchase increases with the medium that has habitually been used for purchases. Therefore, when consumers have a buying habit with desktop (vs. mobile), their intention to buy via mobile (vs. desktop) decreases the possibility of actual purchase. Thus, the purchase intention–behavior relationship is accentuated when the person has a strong habit of using the medium. Consumers seem to feel comfortable in conducting purchases using media with which they had formed a habitual behavior over time, indicating that minor cognitive effort is required (Limayem *et al.* 2007).

The presence of others and specifically of friends in influencing buying behavior has been studied in the past, with contradictory findings (e.g., Garbarino and Strahilevitz, 2004; Hassanein and Head, 2006). Our research adds to current understanding of purchasing decisions using the web and mobile commerce media when friends are part of an individual's shopping experience. We provide evidence to showcase consumers' willingness to proceed with a purchase more often when they are accompanied by friends.

Methodologically, the design of our experiments ensured that participants had adequate experience with using both web and mobile platforms. In contrast to most 'paper-and-pencil' online commerce studies conducted in the past (e.g., Okazaki, 2008), our research relied on actual use of the platforms and actual shopping behavior. Thus, we were able to observe behaviors and not just measure intentions, further strengthening the power of our conclusions.

6. Conclusion

At a managerial level, the results of our experiments utilizing U&G theory informs retailers in better understanding the customers' motives when using different mediums (e.g., product information search or purchase) and consequently may guide them in their omni-channel management, a very topical issue in the last years (e.g., Piotrowicz and Cuthbertson, 2014). In our study, smartphones proved to be less used for online purchases than desktops. However, retailers should continue their efforts in increasing the use of mobile medium for conducting purchases, since mobile devices have the advantage of being carried by customers everywhere, and at all times. The moderating role of habit in the 'intention to buy – actual purchase' relationship provides retailers with an important leverage; helping customers become more familiar with (getting the habit of) buying via their smartphone may increase sales opportunities. Developing user friendly e-commerce apps, promoting the convenience of mobile phone and providing incentives to use them may help in this direction. As these apps become smarter thanks to artificial intelligence and offer simpler and secure payment solutions (e-wallets, banks' e-payment apps), mobile purchases will become more convenient, thus minimizing the impact of small screen size or other mobile phone limitations. The Amazon go stores, the voice-enabled shopping experiments of Walmart are disruptive initiatives that position mobile phones as the central device for shopping.

Further, retailers — rather than considering each available digital medium as just another source of additional sales opportunities — should focus on cross-channel synergies in order to enhance their customers' experience. Experimental design methodologies, as the one implemented in this study, may capture the utility of different media across the buying journey (Pleyers and Vermeulen, 2019). Consequently, this may help companies better combine desktop and mobile media with info-kiosks and other in-store media (screens and other digital signage options). Thus, mobile commerce, when synergized with web and physical commerce, can offer new opportunities of providing a holistic customer experience.

In regard to co-presence, finding that consumers proceed with an online purchase more often when they are accompanied by friends points to the value of social context. The importance of physical co-presence may apply to the virtual via social networks (often referred as social commerce). Social commerce involves the use of Web 2.0 social media technologies and infrastructures to support online interactions and user contributions in the process of buying products or services (e.g., Liang and Turban, 2011). Practitioners may focus on providing online

applications and services that facilitate synchronous communication and interaction over mobile platforms. By providing instant communication, consumers can interact with their friends in real time, and this interaction can increase confidence in the purchasing decision and diminish any perception of risks.

7. Limitations and future research directions

The experimental design of our studies has several limitations that are inherent to this method. First, both experiments involved products that primarily fall under the electronics/accessories product categories. Our findings may not apply directly to other product categories where consumers may respond differently (e.g., groceries, food, clothing, durables, travel services, etc). Future research should address how product characteristics or types (durable products or services) influence consumer-buying behavior for different media. Both academic research (Lian and Lin, 2008) and recent surveys (PwC, 2017) suggest different on-line shopping behaviors for different product types. In a similar vein, both experiments in the study involved the purchase of non-often bought products. It is likely that consumers may behave differently when it comes to the purchase of habitual – routine-based products.

Our online media involved the use of desktops (15.6”) and mobile devices (4.7”). Interaction with other devices of different sizes may affect consumer behavior differently, as screen size has been found to explain lower rates of e-shopping via mobile. The web store interface appears differently in alternative screen sizes and, along with different levels of product presentation, it is likely that such characteristics may influence differently the consumer’s purchasing decision (Patel *et al.* 2020).

Concerning social presence, a promising research direction would be to examine how other groups (e.g., family) or how group characteristics (e.g., cohesiveness, susceptibility) influence consumer behavior. In the early years of online commerce, there were few technologies and applications that could support instant communication between a consumer and their social environment. Today, social networks allow consumers to experience enhanced synchronous communication with their social environment during the online shopping process, and researchers should examine how the characteristics of social groups affect consumers in the various phases of the shopping process (Grange *et al.* 2019).

Finally, this paper reported comparative results of the most used devices for online shopping today, desktop and mobile phones. As technology evolves very fast and offers constantly new devices (digital assistants, Internet of Things) and interfaces (voice commands, augmented reality), customers will be able to choose from a large pool of media, channels and touch-points. Future research should explore the specific characteristics of different devices and consumers’ motives that form individuals’ preferences of medium use for conducting purchases.

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Appendix. Constructs and measures

Construct	Measures	Adapted from
Purchase intention	If I were to buy the product I am interested in, I would consider buying it. The likelihood of my purchasing the product I am interested in is high. The probability that I would consider buying the product I am interested is high My willingness to buy the product I am interested is high.	Dodds *et al.* (1991)
Habit for Web Commerce	The use of a desktop for commerce has become a habit for me. I am addicted to using a desktop for commerce. I must use a desktop for commerce. Using a desktop for commerce has become natural to me.	Limayem *et al.* (2007)
Habit for Mobile Commerce	The use of a mobile phone for commerce has become a habit for me. I am addicted to using a mobile phone for commerce. I must use a mobile phone for commerce. Using a mobile phone for commerce has become natural to me.	Limayem *et al.* (2007)