

**The power of Virtual Fitting Rooms on specific curiosity, online patronage intention and online purchase intention.**

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## **The power of Virtual Fitting Rooms on specific curiosity, online patronage intention and online purchase intention.**

**Abstract :** This research studies the effects of using an environmental New Sales Aid like a Virtual Fitting Room on online consumer's exploratory behavior. Hypotheses focuses on efficacy and mechanism engaged in presence of such a tool. First, results improve the significant positive impact of the presence of a VFR on specific curiosity about the product, willingness to patronize a website and online purchase intention. Then, linear regressions and mediation tests highlight the process engaged when a VFR is available on a website. The more specific curiosity increases, the more willingness to patronize the website increases and the more online purchase intention increases.

**Key-words :** virtual fitting rooms, new sales aids (NSA), curiosity, patronage intention.

## 1. Introduction and objectives

A major disadvantage of online purchasing is that consumers cannot experience and test products (Chiang et Dholakia, 2003). This is particularly significant for clothes' purchases. That is why engineers developed Interactive Consumer Decision Aids (ICDA) or New Sales Aids (NSA) such as Virtual Agents or Virtual Fitting Rooms based on comparison matrix or augmented/virtual reality. As new tools in websites, managers and researchers are interested in knowing more about their effects on consumer behavior. Despite the significant amount of research on these tools, very little part is focused on the behavior of the consumer before the purchase. Hence, in accordance with this gap we propose to explore effects of NSA on exploratory behavior before purchase and to highlight the mechanism engaged in the presence of a NSA. The specific curiosity is chosen to explain exploratory behavior.

This research aims to find answers to the following questions: how the presence of a NSA influence consumers' specific curiosity about the product, online patronage intention and purchase intent? What are the links between these variables? Why is it important to distinguish specific curiosity about the product and specific curiosity about the tool?

The first part develops the literature review on NSA and on curiosity, which is a relevant variable to explain the exploratory behavior. The second part presents the research question, hypotheses and model. Then the method is presented, followed by the findings of this research. At the end of this article we present the contributions for researchers and managers, the limitations and we proposed ideas for further research.

## 2. Literature review

### 2.1. Literature review on NSA

NSA could be defined as *"tools for sale or purchase, sometimes dematerialized available to the vendor or customer that enrich the experience by giving him access to a maximum of information, features and facts about the product or service"* (Beck et Crié, 2013). The many tools that fit this definition can be divided into two groups: the social NSA (i.e. Virtual Agents) and the environmental NSA (i.e. Virtual Fitting Room) (Beck et Crié, 2013).

The research on social factors showed their positive impacts on per-purchase and post-purchase variables like in trust (Lemoine and Notebaert, 2011), immersion (Wang et al., 2007), positive emotions (Murray and Häubl, 2008), purchase intention (Senecal and Nantel, 2004), and satisfaction to the website (Viot and Bressolles, 2012). Just a little part of research indicated the power of retention of the website (Diesbach, Chandon and Galan, 2007) and the consumers' exploratory behavior (Swaminathan, 2003). Otherwise, the research on environmental factors is less developed. Marketing researchers showed the effect of such a tool on purchase intention (Li, Daugherty and Biocca, 2002), satisfaction (Murray and Häubl, 2008) and quality of decision making (Lurie and Mason, 2007). Despite its relevance, no research indicates effects of environmental NSA on the exploratory behavior before purchase.

This lack of research has seriously inhibited the potential for establishing complete model of NSA impact before purchase. However, the exploratory behavior is a key to understand the purchase intention. This research want to explore this underutilized way. Among the many variables explaining the exploratory behavior of consumers, curiosity seems to be the most relevant. Indeed, innovative aspect is the most important characteristics of NSA (Beck et Crié, 2012) and research on innovations showed their impacts on curiosity (Huang, 2003).

### 2.2. Curiosity

Since 1969 human curiosity has been identified as important basic research areas of the future for buyer behavior (Howard and Sheth, 1969). Although this article clearly calls for marketing

researchers to consider the concept of curiosity in their work, the major relevant research on curiosity comes from psychology and education science (i.e. Loewenstein, 1994). The concept of curiosity, initially developed by Berlyne (1954), is considered as a main characteristic to understand exploratory behavior in psychology research. We found four types of curiosity in literature: interpersonal, epistemic, sensory, and perceptual (Koo and Ju, 2010). Perceptual curiosity seems to be the most interesting type of curiosity for our research because it is defined as “*the desire that motivates individuals to having interest in and giving attention to novel perceptual stimulation* » (Collins et al. 2004, p. 1130). Here, the « novel perceptual stimulation » could be the NSA. In the rest of this article we also consider the perceptual curiosity.

Furthermore, Collins et al. (2004) demonstrated that curiosity could be directed towards either a range of diverse topics (diversive curiosity) or narrowly focused on a specific topic (specific curiosity). Diverive curiosity refers to the personal tendency to be curious about a lot of things (e.g. to like exploring new places). It implies exploration and uncertainty dimensions. However, Specific Curiosity (SC) is defined as “*an intrinsic desire or motivation for new information to stimulate interest and/or remove uncertainty*” (Berlyne, 1954). It is increased by the so-called collative variables: novelty, complexity, uncertainty and conflict with prior information (Berlyne, 1954). This research is focused on effects of a new tool on a specific situation. So, SC seems to be the most adequate type to explore.

Moreover, existing research on curiosity does not distinguish the curiosity generated by the stimulus (i.e. advertisement) for the stimulus and the curiosity generated by the stimulus for the product (i.e., Menon and Soman, 2002). However, the two qualitative studies on consumers (N=38) show the importance to distinguish these two types of specific curiosity generated by a stimulus. That is why for the rest of this research we consider the perceptual specific curiosity about the VFR and the perceptual specific curiosity about the product.

### **3. Research question, hypotheses and model**

Literature review showed that no research indicates effects of an environmental NSA on exploratory behavior. Thus a pertinent question arises: how the presence of environmental NSA on a website could affect the consumer’s exploratory behavior? To address this question, we consider the effects of a Virtual Fitting Room (VFR) on perceptual specific curiosity about the product, perceptual specific curiosity about the tool, willingness to patronize the online retailer and online purchase intention. We propose three hypotheses linked with the efficacy of the NSA and five hypotheses linked with the mechanism engaged in presence of a NSA.

#### *3.1. Hypotheses relatives to the efficacy of the NSA*

According to Berlyne (1954), specific curiosity is generated, inter alia, by the novelty and the complexity of a stimulus. In this line, Smith and Swinyard (1988) showed that the trial (versus an advertisement) increases the curiosity about the product. Most recently, Arnone et al. (2011) indicated that a new media environment could increase specific curiosity. In accordance with these findings, as a novel and complex stimulus part of a new media environment, environmental NSA could affect perceptual specific curiosity of consumer. We propose the following hypothesis:

**H1: Presence of an environmental NSA increases perceptual specific curiosity about the product.**

Previous research showed that a social NSA makes the experience more favorable and intense (Bitner et al., 2000). Furthermore, the quality of experience is thought to have a positive effect on consumers' behavioural intentions (Wakefield and Baker, 1998) like patronage intention (Hoffman and Novak, 1996). In this line, Mathwick, Malhotra, and Rigdon (2001) improved the link between online experience and patronage intentions.

Otherwise, literature on the willingness to patronize the online retailer showed that this variable may be affected by store atmosphere (Kotler, 1973) and the services provided by retailers (Baker et al., 2002). Poncin and Ben Mimoun (2014) consider the magic mirror as an "e-atmospherics tool" for physical store. As a part of atmosphere environmental NSA could have an impact on online patronage intention. So, we propose this hypothesis:

**H2: Presence of an environmental NSA increases the willingness to patronize the online retailer.**

Based on Bitner et al. (2000) and Wakefield and Baker (1998) research, the purchase intention could be affected by the presence of a NSA. Li, Daugherty and Biocca's research (2002) also indicated that the presence of an environmental NSA (i.e. 3D presentation of a product) increases the online purchase intention. Similarly, we propose that the presence of another environmental NSA (Virtual Fitting Room) could have the same effect.

**H3: Presence of an environmental NSA increases online purchase intention.**

### *3.2. Hypotheses relatives to the mechanism engaged by the presence of a NSA*

Based on our two qualitative studies we consider here two types of specific curiosity: the SC about the NSA and the SC about the product. We would like to test the effect of specific curiosity about the NSA on the specific curiosity about the product. As found in advertising research, attitude toward the ad affects attitude toward the brand (Homer, 1990) and so affects attitude toward the product. In line with these findings, we consider curiosity as a part of the attitude of consumer and NSA as a form of an advertisement. We propose that the curiosity toward the NSA affects the curiosity toward the product.

**H4: Perceptual specific curiosity about the environmental NSA has a positive effect on perceptual specific curiosity about the product.**

Curiosity, is a determinant of the exploratory behavior (Berlyne, 1950). The more consumer is curious, the more exploratory behavior is intense (Swaminathan, 2003). The willingness to patronize is a major variable to explain the exploratory behavior. That is why we expect that the specific curiosity about the product could impact positively the patronage intention.

**H5: Perceptual specific curiosity about the product has a positive effect on the willingness to patronize the website.**

According to Smith and Swinyard (1988), the specific curiosity about the product has a direct effect on the acquisition of this product. Therefore, we expect a positive effect of specific curiosity about the product on online purchase intention.

**H6: Specific curiosity about the product has a positive effect on online purchase intention.**

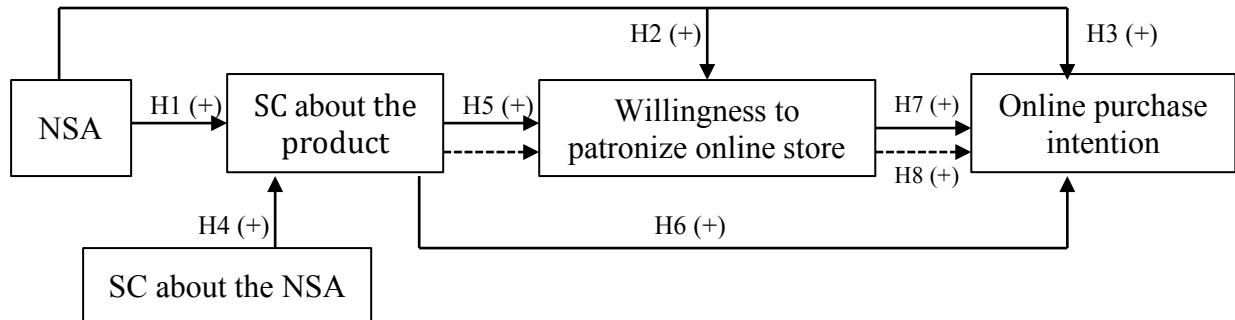
Various prior results showed the effect of patronage intention on the intention to buy (i.e. Grewal et al., 2003). We therefore hypothesize:

**H7: The willingness to patronize the online retailer has a positive effect on online purchase intention.**

Based on hypotheses H5, H6 and H7, specific curiosity about the product has an effect on patronage intention and purchase intention, and patronage intention impacts purchase intention. Also we can expect that the patronage intention mediates the effect of specific curiosity about the product on purchase intention.

**H8: the willingness to patronize the online retailer mediates the effect of specific curiosity about the product on online purchase intention.**

Fig. 1 presents the research model.



#### 4. Methodology

We propose three studies to empirically verify this research model and to investigate these hypotheses. Studies 1 and 2 consist in exploratory approaches (N=38) however, study 3 consists in a quantitative experimentation (n=114).

##### 4.1. Qualitative approach

**Study 1** consists in an exploratory approach consisted of 18 semi-structured interviews (12 female;  $M_{\text{time}}=1$  hour 02). All interviews were recorded and fully transcribed. Three types of analyses were conducted on the transcribed texts: thematic, interpretative and lexicometric.

**Study 2** includes two focus groups (N=20;  $M_{\text{time}}=2$  hours 07) entirely filmed and recorded. Participants were asked to discover stimuli and to choose pictures to explain their feelings. A thematic analysis was conducted.

##### 4.2. Quantitative approach

**Study 3** is an online quantitative study. The two following paragraph develop the procedure and measurement scales for this study.

- *Participants and procedure*

The study was conducted during one month (December 2013). Participants were randomly assigned to one of the two versions of a website. Consumers assigned to the first version were asked to explore the e-catalogue of no brand apparel. Consumers assigned to the second version were asked to try the Virtual Fitting Room with augmented reality (consisting in a “magic mirror” with augmented reality) (illustrations available in Appendix). Then all respondent were asked to complete the questionnaire.

The questionnaire was administered online through Qualtrics software in laboratory. It included three confound checks questions relatives to the diversive curiosity (Menon and Soman, 2002) ( $\alpha_{\text{exploration}} = 0.677$ ;  $\alpha_{\text{uncertainty}} = 0.643^1$ ) which can impacts specific curiosity (Beck and Crié, 2014), clothing interest (Lumpkin, 1985) ( $\alpha = 0.876$ ) and expertise (Aurier and N’Gobo, 1999) ( $\alpha = 0.820$ ). We performed t-tests to check the equality between groups. Results revealed non-

<sup>1</sup> A factor with four or more loadings greater than 0.6 “is reliable regardless of sample size.” (Field, 2009, p. 647)

significant differences between the two groups on exploration diversive curiosity ( $t=-0.564$ ;  $p=0.574$ ), uncertainty diversive curiosity ( $t= -1.480$ ;  $p=0.142$ ), clothing interest ( $t=-0.205$ ;  $p=0.839$ ), and expertise ( $t=-0.480$ ;  $p=0.632$ ). The questionnaire also included manipulation checks. All participants were unfamiliar with the brand presented and with the stimuli (*Do you know this brand? Have you ever used a Virtual Fitting Room?*).

We obtained 114 valid questionnaires. 35,1% of the respondent were male and 64,9% were female. The Table 1 gives more details about the sample.

|               | Total sample (N=114)                       | Sample Version 1 (N=52)                     | Sample Version 2 (N=62)                    |
|---------------|--|---|--|
| <b>Gender</b> | Female: 64.9% (n=74)<br>Male: 35.1% (n=40) | Female: 69.2 % (n=36)<br>Male: 30.8% (n=16) | Female: 61.3% (n=38)<br>Male: 38.7% (n=24) |
| <b>Age</b>    | Mean: 21<br>SD: 1.365                      | Mean: 21<br>SD: 1.305                       | Mean: 21<br>SD: 1.424                      |

**Table 1 : Sample description**

- *Measurement scales*

Study 3 is an online quantitative experimentation. The questionnaire was developed building on the literature review. It included 15 items: 8 items on specific curiosity about the product and about the NSA, measured on a nine-point Likert scale (1 strongly disagree; 9 strongly agree), 3 items on online patronage intention, measured on a seven-point Likert scale (1 strongly disagree; 7 strongly agree), and 4 items on online purchase intention, measured on a seven-point Likert scale (1 strongly disagree; 7 strongly agree), gender, age and novelty of the experience.

The questionnaire scales not only had demonstrated validity and reliability in previous research but also indicated good psychometric characteristics for our study. The details for each scale about the reliability measures are presented in Table 2.

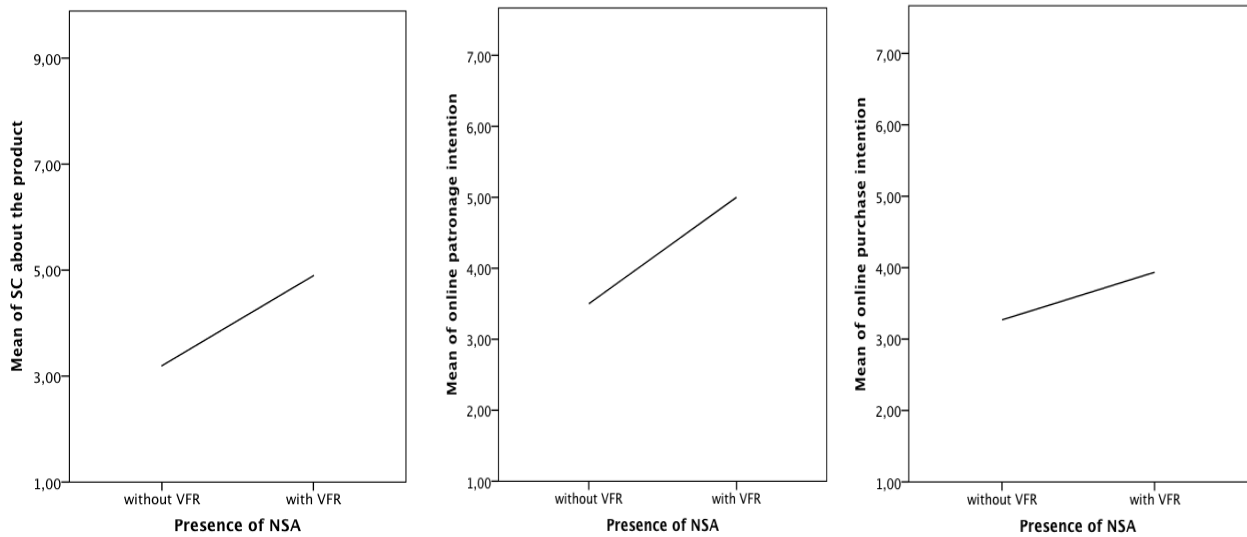
| Scales                               | Sources                                     | Explained variance and Cronbach's Alpha                         |
|--------------------------------------|---|---|
| Specific curiosity about the product | Adapted from Menon et Soman (2002)          | 4 items, 1 factor, 72,1% explained variance, $\alpha = 0,868$ . |
| Specific curiosity about the NSA     | Adapted from Menon et Soman (2002)          | 4 items, 1 factor, 68,7% explained variance, $\alpha = 0,845$ . |
| Online patronage intention           | Adapted from Baker, Levy et Grewal (1992)   | 3 items, 1 factor, 86,1% explained variance, $\alpha = 0,918$ . |
| Online purchase intention            | Adapted from Dodds, Monroe et Grewal (1991) | 4 items, 1 factor, 76,2% explained variance, $\alpha = 0,921$ . |

**Table 2: Measurement Scales**

## 5. Findings

### 5.1. Efficacy of the presence of a VFR

We used mean comparison t tests in SPSS 21 to test direct effects of the presence of NSA on specific curiosity about the product (H1), online patronage intention (H2) and online purchase intention (H3). As our data containing two modalities (no usage of the VFR and usage of the VFR), t test seems to be the most adequate data analysis method. T tests showed significant and positive effects of the presence and usage of a VFR - an environmental NSA - on a website on specific curiosity about the product ( $t=-5,795$ ;  $p<0,01$ ), online patronage intention ( $t=-7,480$ ;  $p<0,01$ ) and online purchase intention ( $t=-2,992$ ;  $p<0,01$ ) (see Fig. 3) **in accordance with hypotheses 1, 2 and 3.**



### 5.2. Mechanism engaged when a VFR is present

To highlight the mechanism engaged when there is a VFR on a website, we used linear regression and mediation test in SPSS 21.

First, we tested the predicted direct effect of SC about the VFR on the SC about the product (H4). The results indicated significant positive effect of the SC about the VFR on the SC about the product (adjusted  $R^2=0,315$ ,  $\beta=0,571$ ;  $p<0,01$ ). In **support of H4**, more the consumer is curious about the VFR, more the consumer is curious about the product. Additional regression results revealed a significant positive effect of SC about the product on the online patronage intention (adjusted  $R^2=0,037$ ,  $\beta=0,230$ ;  $p<0,10$ ), in **accordance with H5**. Moreover, results do not show a significant direct effect of specific curiosity about the product on online purchase intention ( $p=0,284$ ). **H6 is not validated**. Finally, we found a significant positive effect of willingness to patronize the website on online purchase intention (adjusted  $R^2=0,108$ ,  $\beta=0,350$ ;  $p<0,01$ ). Thus **our data supported H7**.

In addition mediating role also held interest to precise the mechanism engaged in presence of a NSA. As suggest Zhao et al. (2010), we tested the mediation effects by using the model 4 of the macro PROCESS proposed by Preacher and Hayes (2004). 5000 bootstrap resamples are used to estimate bootstrap results with a 95% level of confidence. The results from this procedure showed that total effect are significant as well as indirect effects. However, the direct effect is non significant. Therefore, the impact of SC about the product on online purchase intention is totally mediated by online patronage intention. **H8 is validated**. The result of test resulting from the procedure of Preacher and Hayes is available in Table 3.

| Normal Theory Test for Mediation                             |        |        |                   |                   |
|--|--------|--------|-------------------|-------------------|
|  | Value  | SE     | Z-value           | p-value           |
| Indirect Effect  | 0,1265 | 0,0368 | 3,4340            | 0,0006            |
| Boostrapped Sample Test for Mediation                        |        |        |                   |                   |
|  | Value  | SE     | LLCI <sup>2</sup> | ULCI <sup>1</sup> |
| Total Effect   | 0,1737 | 0,0598 | 0,0552            | 0,2922            |
| Direct Effect<br><i>c'</i> : SC Product → Purchase Intention | 0,0472 | 0,0616 | -0,0748           | 0,1692            |
| Indirect Effects   | 0,1265 | 0,0337 | 0,0704            | 0,2107            |
| <i>a</i> : SC Product → Patronage Intention                  | 0,3184 | 0,0602 | 0,1991            | 0,4376            |
| <i>b</i> : Patronage Intention → Purchase Intention          | 0,3973 | 0,0864 | 0,2260            | 0,5685            |

Table 3: Results of mediation tests

<sup>2</sup> LLCI : Lower Limit for 95% Confidence Interval ; ULCI : Upper Limit for 95% Confidence Interval



## 6. Discussion and implications

New Sales Aids has been seen like a new way for marketing researchers. However, the major part of the research tries to know effects of these tools after purchase. This research proposes to understand what is the pre-purchase process for the consumer. Perceptual specific curiosity is a relevant variable for this research way. Nevertheless, the amount of research in marketing integrated the concept of curiosity is limited (Kashdan et Silvia, 2008). Our research focuses specifically on a Virtual Fitting Room (VFR) with augmented reality technology. Our results show a positive effect of the presence of a VFR on the perceptual Specific Curiosity about the product, the online patronage intention and the online purchase intention. These results confirm that a NSA increases the specific curiosity about the product (Huang, 2003), the exploratory behavior of the consumer and the online purchase intention (Li, Daugherty and Biocca, 2002) and emphasize the importance of considering the NSA in online store to improve online purchase intention. Moreover, the data also show a direct predicted effect of SC about the NSA on SC about the product, and of SC about the product on online patronage intention. We also observe a mediating role of online patronage intention between SC about the product and online purchase intention. This result is particularly relevant to understand the cognitive process of consumer when there is an environmental NSA like a VFR on a website.

By focusing on the curiosity concept, this research offers a new way to understand why and how environmental NSA impact online consumer behavior. Thanks to our results, researchers in marketing can generate new research hypotheses based on curiosity research in psychology (e.g. Berlyne, 1954; Loewenstein, 1994). In addition, this research give a first view of the exploratory process of consumer in presence of an environmental NSA on a website and allow researchers to understand that Virtual Fitting Rooms are not just new sales aids, but also tools to attract and modify the consumer behavior before purchase. Finally, this research contributes to develop new perspectives for research on curiosity in the context of today's interactive technologies (Arnone et al., 2011).

From a managerial point of view, our results provide a better understanding of the effects of a Virtual Fitting Room in a website. This information might be used to adapt an online marketing strategy (Pantano and Servidio, 2012). Online apparel retailers may adopt environmental NSA like Virtual Fitting Room to appeal consumers on their website and to increase patronage and purchase intention.

## 7. Limitations and further research

Before closing, we add a necessary not of caution in the interpretation of our results. First, the limited size of sample ( $n=114$ ) could be a problem even if we found significantly results. Further experimental studies are called for.

Second, the results of linear regression indicate limited R-squared. So, others variables could complete our model because of their power to explain the online patronage intention like perceived risk (Forsythe and Shi, 2003) which is linked with perceptual curiosity (Koo and Ju, 2010) or affective reactions (Poncin and Ben Mimoun, 2014).

Moreover, as showed by Koo and Ju (2010), the diversive curiosity could moderate effects of the presence of a NSA on affective reactions. We recommend further research to evaluate the moderating impact of this personal trait.

Finally, as precised by Pantano (2013) and Poncin and Ben Mimoun (2014), *“the past decade has been increasing interest in the application of innovative technologies (...) to improve physical point of sale”*. Because of this major development of NSA in real environment, we highlight the need to consider online and offline channels and so to develop a similar study in a real environment.

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# Appendix

Illustration of the VFR version of website for the study 3.

