

Enhancing playful customer experience with personalization

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Abstract: Retailers develop personalized websites with the aim of improving customer experience. However, we still have limited knowledge about the effect of personalization on customer experience and the underlying processes. With a lab experiment, this research specifically examines the effect of actual personalization and perceived personalization on playful customer experience using both subjective and objective measures, with the support of eye-tracking techniques. We show that personalization, regardless of whether it is perceived or not, enhance the playful customer experience of a retailing website. In addition, we highlight the presence of two concomitant processes. Content needs to be perceived as personalized to influence the subjective playful customer experience, but actual personalization does influence objective playful customer experience. Although customers spend the same time on the website, they focus more of their attention on their favorite products when content is personalized. Such focused attention leads them to select their favorite products for purchase.

Keywords: Actual personalization; Perceived personalization; Personalization; Playful customer experience; Playfulness

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1. Introduction

Retailers increasingly integrate digital technologies, such as personalization, into the customer experience (Jain et al., 2021; Tyrväinen et al., 2020). The implementation of a personalization technologies enables them to collect and analyze customer data at a low cost and deliver tailored content to each customer (Kalaighnam, 2018; Oberoi et al., 2017). For example, online retailers such as Amazon and eBay personalize the content suggested on their website homepage based on customers' past searches. Retailers expect that the personalization process will enhance customer experience (Baier & Stüber, 2010; Hänninen et al., 2019; Jain et al., 2021; Kalaighnam et al., 2018) and sales (Behera et al., 2020). According to a BCG survey (2019), retailers plan to invest 30% more in personalization over the next three years. Furthermore, 41% of marketing leaders consider personalization an immediate priority to deliver a superior customer experience (Forbes Insight, 2019).

Despite retailers' increased investment in personalization, we still have a lack of empirical research on the impact of personalization on customer experience (Salonen & Karjaluoto, 2016; Tyrväinen et al., 2020), and especially on the underlying psychological mechanism of personalization (Li, 2016; Maslowska et al., 2016; Setyani et al., 2019). Understanding this process is important to help retailers better identify how their personalized content triggers customers' responses and strengthen their value to customers (Setyani et al., 2019). Although some prior research have shown that personalization may be effective, there is a lack of a common view of how exactly personalization triggers its effects (Maslowska et al., 2016) and of the role of actual and perceived personalization in this process. Whereas some prior research (Ho & Bodoff, 2014; Tam & Ho, 2006) have shown the effectiveness of actual

personalization – the personalization initiated by the retailer – , other research (Li, 2016; Maslowska et al., 2016) have found that it is more perceived personalization - the extent to which customers perceive content as personalized – instead of actual personalization, that influences customers' responses, suggesting that personalization needs to be noticed to be effective. However, these last studies assessed the effectiveness of personalization on customer responses with subjective (perceptual) measures. Even though these subjective measures have long been used in marketing research, they only capture what is conscious for customers (Derbaix & Poncin, 2005). Customers' actual responses to personalized retail websites can be different from what they assume (Dekeyser et al., 2020; Lee & Park, 2009). Therefore, prior research (Lee & Park, 2009) state that future online retailing studies should combine both subjective and objective measures to gain further understanding of personalized customer experience.

Not only is there a notable lack of consensus among findings of the prior studies focused on understanding the impact of personalization on customers' responses and disentangling the underlying psychological processes, but there is also a lack of prior studies combining both subjective and objective measures to capture customer experience on personalized retail websites. To address these gaps, this research intends to investigate the effect of personalization on customer experience and better appraise the underlying psychological mechanisms by combining both subjective and objective measures. With a lab experiment, this research specifically intends to examine the effect of actual personalization and perceived personalization on playful customer experience, with the support of eye-tracking techniques, to capture both conscious and unconscious responses to personalization.

The contributions to the customer experience and retailing literature streams are theoretical, methodological, and managerial. From a theoretical point of view, this research provides a better understanding of processes underlying the effect of personalization on

customer experience (Salonen & Karjaluoto, 2016; Tyrväinen et al., 2020) by specifically examining the process underlying (Li, 2016; Maslowska et al., 2016) the effect of actual and perceived personalization on the playful customer experience of a retailing website. This research highlights the presence of two concomitant processes. While perceived personalization influences subjective playfulness, actual personalization influences objective playfulness, even if customers are not conscious of it. This research shows that personalization, regardless of whether it is perceived or not, influences customer experience. The combined use of subjective (perceptual) and objective measures (Lee & Park, 2009) enables to gain a more comprehensive view of the processes underlying playful customer experience on personalized websites by capturing both conscious and unconscious responses.

From a methodological perspective, the contributions are threefold. First, the use of eye-tracking technology enables us to better understand how contextual elements are experienced by customers in an objective manner (Verhulst et al., 2019; De Keyser et al., 2020). Combining objective and subjective measures of playful customer experience enables us to have a more comprehensive view of the processes underlying the effect of the personalization process on playful customer experience. Second, prior research has acknowledged the dynamic nature of customer experience (Klaus & Kuppelwieser, 2021). In this study, the adaptation of repertory grid techniques to analyze eye-tracking data enables us to capture the dynamic aspect of customer experience through the browsing behavior. Third, the use of a repertory grid enables us to focus our analysis on the focused attention on participants' favorite products and not on all fixations made on the website, which represents a more efficient time spent on the website.

From a managerial perspective, this research shows retailers that actual personalization processes are still worthwhile for retailers as actual personalization influences customer responses. Personalization, regardless of whether it is perceived or not, enhance the playful customer experience on retailing websites and subsequent behaviors (product selection).

In the next section, we begin by presenting the literature on playful customer experience and personalization. Then, we outline our research method and detail the findings. Finally, we discuss the implications and avenues for future research.

2. Theoretical background

2.1. Playful customer experience

Emerging from research on play, playfulness has been identified as a key construct for studying online experience in retail sector (Ahn et al., 2007; Alatalo et al., 2018; Ben Mimoun & Poncin, 2015; Oh et al., 2009). Characterizing playfulness is difficult because researchers define ‘play’ in several ways (Day, 1981; Hwang & Choi, 2020). Playfulness is either considered a trait or a state (Ahn et al., 2007). The trait of playfulness represents a predisposition to be playful and interact spontaneously and imaginatively with computers (Webster & Martocchio, 1992). A trait tends to be stable over time and across situations (Woszczynski et al., 2002). Customers who rank high in playfulness demonstrate a positive attitude toward retailing websites (Ahn et al., 2007; Webster & Martocchio, 1992). The state of playfulness rather represents a short-lived experience felt by customers (Ben Mimoun et al., 2017). Customer experience refers to internal responses that customers have to any interaction with a retailer throughout the customer journey (Gao et al., 2021; Holmlund et al., 2020; Lemon & Verhoef, 2016; McLean et al., 2018). When experiencing the state of playfulness, customers focus their attention on the interaction and are absorbed in the activity, which gives them enjoyment (Ahn et al., 2007; Han et al., 2020; Kuts, 2009).

Most research on playfulness as a state is based on flow theory (Csikszentmihalyi, 1975, 1990) that highlights the interaction environment's role in explaining individual motivated behaviors (Moon & Kim, 2001). When interacting with retailing website, customers can

become so absorbed in a situation-specific activity that they lose track of time, as if time had stood still (Mathwick et al., 2001). In this research, we consider playfulness to be a situational state, as customers might have a more or less playful experience during the interaction with the retailing website (Ben Mimoun et al., 2017). In human-computer interaction and specifically in website experience, playfulness is viewed as elements of the website that “engage people’s attention or involve them into activity for play, amusement, or creative enjoyment” (Kuts, 2009, p.7).

By offering a playful customer experience or playfulness¹, retailers can foster positive behavioral intentions in using their website (Ahn et al., 2007; Moon & Kim, 2001; Oh et al., 2009; Sledgianowski & Kulviwat, 2009) and a positive attitude toward their website (Ahn et al., 2007). They can also enhance perceived ease-of-use (Moon & Kim, 2001), pleasure, and satisfaction (Zolkepli & Kamarulzaman, 2015).

Providing optimal customer experience has become a key challenge for retailers (Ho & Bodoff, 2014; Lemon & Verhoef, 2016). For instance, customers can decide to leave a retailing website without purchasing anything if their experience is not satisfying (Srinivasan et al., 2002). To address this challenge, retailers increasingly personalize their website content with the aim of improving customer experience (Hänninen et al., 2019; Jain et al., 2021; Kalaighnam et al., 2018).

2.2. Personalization

Personalization is considered an important customer-oriented process in online retailing (Ampadu et al., 2022; Baier & Stüber, 2010; Song et al., 2021; Tyrväinen et al., 2020) and involves providing adapted content based on customer data (Pappas et al., 2016). Personalization is not a new process. For instance, service representatives have always adapted

¹ The terms playful customer experience and playfulness are used interchangeably in this article.

their communication and behavior to each customer in face-to-face interactions based on their knowledge of the customer (Shen & Ball, 2009). Retailers can use personalization with or without the mediation of technologies (Shen & Ball, 2009). However, technological advances have expanded the use of personalization processes on online retailing websites (Aguirre et al., 2015). With personalization technologies, retailers can now track customer online behavior and adapt the content they display on their websites (Zhang et al., 2011). For instance, online retailers such as Barnes & Noble provide personalized suggested content on their website based on customers' previous searches (Aguirre et al., 2015).

Automation is a central aspect of personalization (Ku et al., 2016). Unlike customization, which enables customers to tailor content themselves according to their needs, personalization is initiated by the system, which automatically adapts website content to every customer based on their data (Arora et al., 2008; Cavdar Aksoy et al., 2021).

2.2.1. Actual personalization vs. perceived personalization

The personalization process encompasses two distinct constructs: actual personalization and perceived personalization (Komiak & Benbasat, 2006; Maslowska et al., 2016). Whereas retailers are in control of actual personalization, customers are in control of perceived personalization (Li, 2016).

Actual personalization occurs when retailers intentionally adapt content based on customer data (Li, 2016), and involves three stages: learning, matching and evaluation (Murthi & Sarkar, 2003). In the learning stage, retailers collect data to learn more about their customers and infer their preferences. In the matching stage, retailers adapt their content based on inferred customer preferences. In the evaluation stage, they assess the impact of personalization (Aguirre et al., 2015, Murthi & Sarkar, 2003).

Perceived personalization represents the extent to which customers perceive content as personalized (Smink et al., 2021). Despite retailers' effort to personalize content, these two constructs do not automatically match such that perceived personalization will not always reflect actual personalization: non-personalized content might be misinterpreted as personalized and personalized content might accidentally not be perceived as personalized (Komiak & Benbasat, 2006). The decision-making literature (Bettman et al., 1998; Simonson, 2005) can explain how actual and perceived personalization can induce biased perceptions (Li, 2016).

The first stage in the actual personalization process consists of inferring customer preferences based on the data collected (Kramer et al., 2007; Murthi & Sarkar, 2003). Nevertheless, customers do not automatically recognize that personalized content match their preferences (Kramer, 2007). According to the decision-making literature (Bettman et al., 1998; Simonson, 2005), customers do not always have well-defined preferences and often construct their preferences when they need to make decisions. Therefore, inferred preferences may differ from customers' actual preferences, which brings an error in the preference measurement. Although the actual personalization process may have created a match between the suggested content and a customer's inferred preferences, it may have not created a match between the suggested content and the actual preferences (Li, 2016). In addition, the same content can be framed or communicated differently and displayed at different times. These different factors can influence customers' perceptions of whether content is personalized (Maslowska et al., 2016; Rimer & Kreuter, 2006). Even if customer preferences are correctly assumed by retailers, customers might therefore not perceive that content is personalized depending on the way it is framed (Li, 2016).

2.2.2. The effects of personalization

By personalizing their website content, retailers expect to enhance customer experience (Jain et al., 2021; Kalaignanam et al., 2018). Prior research has shown that personalized content is expected to be more memorable and persuasive than generic, non-personalized content (Noar et al., 2009) and that customers are expected to pay closer attention to personalized content and to use it for decision making (Rimer & Kreuter, 2006; Song et al., 2021; Tam & Ho, 2006). Personalization can generate a more positive evaluation because the content is perceived to be more relevant (Tam & Ho, 2006). It can also foster satisfaction (Rust & Chung, 2006), improve attitude toward websites (Ho & Bodoff, 2014; Kalyanaraman & Sundar, 2006), increase intentions to purchase (Lee & Park, 2009; Pappas et al., 2016) and influence e-impulse buying (Ampadu et al., 2022). Prior research has also shown that personalization is positively correlated to customer experience (McLean et al., 2018; Pappas et al., 2017; Rose et al., 2012; Tyrväinen et al., 2020).

Nevertheless, the underlying psychological mechanism of personalization effects has recently been called into question. In his study conducted in an advertising context, Li (2016) shows that perceived personalization, instead of actual personalization of the ad content, generates a better attitude toward the ad content and higher behavioral intentions. In their study, Maslowska et al. (2016) also show that perceived personalization triggers more attention towards personalized advertising. These results suggest it is perceptions more than reality that shape customer responses.

However, prior research has shown that customer perceptions do not always reflect objective experience per se (Ben Mimoun et al., 2017; Mitra & Golder, 2006). In their studies, Li (2016) and Maslowska et al. (2016) assessed the effectiveness of personalization on customer responses with subjective measures (perceptual measures) while other studies have

avored objective measures (e.g., Ansari & Mela, 2003; Tam & Ho, 2005) or a combination of subjective and objective measures (e.g.: Ho & Bodoff, 2014; Tam & Ho, 2006).

2.2.3. Measures to assess the effects of personalization of playful customer experience

Subjective measures capture customers' perceptions, what is conscious for customers. Although they have long been used in marketing, they do not capture the underlying unconscious mechanisms (Derbaix & Poncin, 2005). Customer experience exists at conscious and unconscious levels (Joy & Sherry, 2003; Lemke et al., 2011), and the processing of content is mostly unconscious and implicit (Hazlett & Hazlett, 1999). Such unconscious and uncontrolled processing can only be assessed with objective measures (Derbaix & Poncin, 2005). Therefore, the use of subjective measures alone may not capture the whole reality of customer experience. In addition, only using subjective measures can neglect the effects of actual personalization on customer experience because of shared method variance (Derbaix, 1995) between perceived personalization and customer perceived experience.

Therefore, this research intends to investigate the effect of actual personalization and perceived personalization on playful customer experience, with objective and subjective measures to capture the responses customers have during an interaction with a personalized retailing website. Subjective playfulness will capture the extent to which customers perceive that their attention is focused and that they feel absorbed in an activity for play, amusement, or enjoyment (Han et al., 2020; Kuts, 2009) and therefore capture the extent to which they perceive their experience as playful (Ahn et al., 2007; Oh et al., 2009)). It represents a short-lived cognitive and affective experience felt by customers (Ben Mimoun et al., 2017) that will be measured using a perceptual measure. The unit of analysis will, therefore, be the participant.

Objective measures will capture the extent to which customers actually focus their attention during navigation and are absorbed into the activity. These behavioral measures will

be captured using eye-tracking techniques. The use of eye-tracking techniques will capture customers' focused attention (Jacob & Karn, 2003) on favorite products. Unlike the subjective measure that reflects customers' perceptions and will be analyzed at the participant level, the objective measures capture focused attention on products and will be analyzed at the product level. Table 1 presents an overview of the objective and subjective measures used to assess playful customer experience and the analysis unit. The use of both measures to assess the playful customer experience will enable to capture both the unconscious and conscious underlying mechanisms.

<INSERT TABLE 1 HERE>

2.2.4. The impact of perceived personalization on playful customer experience

Perceived personalization has been found to influence attitude toward personalized advertising (Li, 2016; Maslowska et al., 2016) and the retailing website (Lee & Park, 2009), behavioral intentions (Ampadu et al., 2022; Lee & Park, 2009; Li, 2016), cognitive trust (beliefs) (Komiak & Benbasat, 2006) and brand responses (Smink et al., 2021), which are subjective measures. Based on prior research we therefore assume that perceived personalization will influence subjective playfulness.

The process underlying the effect of perceived personalization on subjective customer responses, can be further analyzed through the theory of salience (Fiske & Taylor, 1991; Heckler & Childers, 1992). The concept of salience has been employed in the literature on customer perception (Fiske & Taylor, 1991; Heckler & Childers, 1992; Taylor & Fiske, 1975, 1978) to describe the property of particular stimuli that stand out in the environment and are perceived by customers (Fiske & Taylor, 1991; Guido, 1998).

Based on the theory of salience, a stimulus that is perceived and attracts attention generates more favorable responses from customers (Guido, 1998; Pryor & Kriss, 1977). This

can be explained by the fact that a salient stimulus can be perceived as more congruent to customers in a certain context (Guido, 1998). Congruence refers to a match between two entities and includes two dimensions: relevancy and expectancy (Fleck & Maille, 2010; Mandler, 1982). Relevancy of the association represents the extent to which the content helps identify the message, whereas expectancy reflects the extent to which the information fits into a pre-established structure (Fleck & Quester, 2007; Heckler & Childers, 1992). In the context of personalization, relevancy would refer to the extent to which there is a match between customer preferences and the content displayed on the website (Tam & Ho, 2006). Expectancy could refer to the extent to which customers expected the displayed content based on their preferences. Noar et al. (2009) and Rimer and Kreuter (2006) suggested that perceived content relevancy, which is one of the dimensions of congruence, is the primary mediator that explains the effect of personalization on the processing of content, as well as behavioral intentions and attitude towards this content. In their research, Tam and Ho (2006) show that perceived content relevancy mediates the effect of personalization on customers' evaluation of website content.

Building on prior research (Li, 2016; Maslowska et al., 2016; Smink et al., 2021) and the theory of salience (Guido, 1998; Pryor & Kriss, 1977), we assume that perceived personalization influences perceived content congruence and subjective playfulness. We posit that when customers perceive content as personalized (no matter from what process it is produced) they will perceive it as more congruent. Thus, we hypothesize that:

H1: Perceived content congruence is higher when content is perceived as personalized than when content is not perceived as personalized

In addition, as salient stimuli generate more positive responses from customers (Guido, 1998; Pryor & Kriss, 1977), we posit that when customers perceive content as personalized, they will perceive their experience as more playful. Therefore, we hypothesize that:

H2: Subjective playfulness is higher when content is perceived as personalized than when content is not perceived as personalized

Finally, as congruence has been identified as an antecedent of customer responses (Guido, 1998; Tam & Ho, 2006) and identified as a mediator that explains the effect of personalization on the processing of content (Kalyanaraman & Sundar, 2006; Tam & Ho, 2006), we believe that perceived personalization influences subjective playfulness because the content is perceived as more congruent. Thus, we hypothesize that:

H3: Perceived content congruence mediates the relationship between perceived personalization and subjective playfulness

2.2.5. The impact of actual personalization on playful customer experience

Actual personalization has been shown to influence the customer decision-making process (Ho & Bodoff, 2014; Ho & Tam, 2005; Song et al., 2021; Tam & Ho, 2005). A website is a decision-making environment and personalized content can be considered as a persuasive message (Tam & Ho, 2005). Actual personalization displays a set of suggested products based on inferred customer preferences with the goal of influencing their decisions (Song et al., 2021; Zanker et al., 2010). A personalized content is therefore supposed to be more persuasive than a generic content (Noar et al., 2009). According to the elaboration likelihood model of persuasion (Petty & Cacioppo, 1986), persuasive messages influence customers that interact with the website, by diverting attention, responses, and subsequent behaviors (Tam & Ho, 2005) such as item selection (Ho & Bodoff, 2014). When exposed to personalized content, customers are expected to pay closer attention to it and to use it for making decisions (Bang & Wojdyski, 2016; Rimer & Kreuter, 2006; Tam & Ho, 2006). In their study, Bang and Wojdyski (2016) observed that customers paid relatively longer and more attention to the personalized advertised content compared to non-personalized content. Tam and Ho (2006) also found that customers

click more on personalized offers than on non-personalized offers and tend to select recommended offers more in shopping carts.

Based on prior research (Bang & Wojdyski, 2016; Ho & Bodoff, 2014; Ho & Tam, 2005; Tam & Ho, 2005; Tam & Ho, 2006) and the elaboration likelihood model of persuasion (ELM) (Petty & Cacioppo, 1986), we therefore assume that actual personalization will influence objective playfulness, which represents the extent to which customers actually focus their attention on their favorite products during navigation, even if customers are not conscious of it. Thus, we hypothesize that:

H4: Objective playfulness is higher when content is personalized than when content is not personalized

In addition, we assume that customers are more likely to select their favorite products for purchase when they focus their attention on their favorite products (Bang & Wojdyski, 2016; Rimer & Kreuter, 2006; Tam & Ho, 2006), which is measured by objective playfulness. Therefore, we hypothesize that:

H5: Objective playfulness predicts the likelihood that customers select their favorite products for purchase

We present the conceptual models encompassing all our hypotheses in Figure 1.

<INSERT FIGURE 1 HERE>

3. Method

3.1. Design and sample

We developed a personalized retailing website to conduct a between-subject laboratory experiment. Furniture was chosen for the product category as it can be of interest to women and men and presents a medium level of involvement. The website presented living room furniture with four categories of products (sofas, coffee tables, lamps, and carpets). It included a homepage, three pages per category (18 products per category), a wish list page, and a basket page. Figure 2 presents different pages of the website.

<INSERT FIGURE 2 HERE>

This study was conducted in Europe. Study collaborators recruited participants through Facebook. They were requested to recruit customers that were different in terms of age and gender and to avoid family members, friends, and students (Derbaix, 1995). They gave them a brief overview of the study. 60 participants took part to the study. We excluded the answers from one participant due to a technical problem during data recording. The final sample was therefore composed of 59 participants. Table 2 presents the composition of the sample and the groups. Groups were equivalent in terms of age, gender, digital skills, and online shopping involvement. However, the mean of the involvement in the product category was significantly higher in the actual personalization condition ($M_{ipc}=5.29$) than in the no actual personalization condition ($M_{ipc}=4.50$; $t=-2.012$; $p=0.05$). Therefore, we added this variable as a covariate in the tests to control its potential impact on the results.

<INSERT TABLE 2 HERE>

Table 3 presents a matrix crossing the groups based on actual personalization condition (vertically) and the groups based on perceived personalization (horizontally). For the perceived

personalization variable, we created a dummy-coded variable with 1 being perceived as personalized ($M_{pp} > 4$) and 0 being perceived as not personalized ($M_{npp} \leq 4$). In the no actual personalization group, 48% of participants did not perceive that the content was personalized, while 52% perceived that it was personalized. In the actual personalization group, 37% did not perceive that the content was personalized, whereas 63% perceived that it was personalized.

<INSERT TABLE 3 HERE>

To confirm that actual personalization and perceived personalization are two distinct constructs (Li, 2016), we used a chi-2 test. Results show no relationship between these two variables (Pearson chi-square=0.814, df=1; $p=0.377$).

3.2.Procedure

The study was carried out in two steps. The first step was addressed online and aimed to collect participants' data. Participants received a link to the website and were invited to browse all the products displayed on the website and select their four favorite products by category in order to have similar exposure to the products. In order to increase the ecological validity of our study and the interest of respondents in the exercise, we informed them that five of them would win one of their favorite products.

Five days later, participants were invited to our research laboratory to participate in the second step of the study. They were randomly assigned to one of two conditions: actual personalization and non-personalization. In the personalized condition, the website was automatically adapted and presented the four favorite products selected by participants in Step 1 on the first pages of each category. We did not signal personalization with a message. Figure 3 shows an example of the presentation of personalized content on the coffee table category pages. The participant had selected the Wilde, Tolkien, Shakespeare and Byron tables as

favorite products in the first step. These 4 products were then put first in the second step. In the non-personalized condition, the website remained unchanged between the two steps².

<INSERT FIGURE 3 HERE>

The experiment took place in a test room with a desk, a chair, and a computer that reproduced the natural settings at home or work as closely as possible. This room was equipped with audio and video recording material that enabled researchers to observe participants from a control room. Such a room arrangement helps avoid potential biases related to the presence of researchers (Ben Mimoun et al., 2017). Figure 4 presents the test rooms' arrangement.

<INSERT FIGURE 4 HERE>

Participants sat at computers equipped with eye-tracking software (Tobii Pro X3 120) and were asked to shop for one product per category. Using such technology enables analysis of customer experience during participants' navigation session without being intrusive (Ben Mimoun et al., 2017). After a calibration phase, we informed the participants that five of them would win one of their favorite products. After treatment, participants were invited to complete a questionnaire. Finally, the participants were invited to the debriefing room to explain the experiment in which they had just participated. Five of the participants won one their favorite products.

3.3. Subjective measures

We operationalized the key constructs: perceived personalization, perceived content congruence, and subjective playfulness, using established multi-item scales. Appendix A reports the measures of the constructs and statistics. Perceived personalization was measured

² Except for participants who had selected their favorite products from the first four products in each category. For those participants, we moved the favorite product(s) so that they were no longer among the first four products presented.

with an adaptation of the 4-item scale developed by Maslowska et al. (2016) ($\alpha=0.85$). Perceived content congruence was assessed with an adaptation of the 6-item scale developed by Fleck and Quester (2007) ($\alpha=0.86$) and subjective playfulness with the 9-item scale developed by Ahn et al. (2007) ($\alpha=0.89$). Our manipulation was checked with the item “display of the products was based on the wish list I made during my first visit on the website.” All variables were measured on 7-point Likert scales. We also controlled for some individual characteristics: digital skills, online shopping involvement, and product category involvement. Digital skills were measured with an adaptation of the 4-item scale developed by Rose et al. (2012) ($\alpha=0.95$). Online shopping involvement was assessed with an adaptation of the 6-item scale developed by Strazzieri (1994) ($\alpha=0.96$) and product category involvement was measured with an adaptation of the same scale ($\alpha=0.96$). All scales were considered to be unidimensional. They achieved a Cronbach's alpha value greater than .8 and therefore presented a very good level of internal consistency. Finally, we tested for discriminant validity to assess construct validity of the variables (see Appendix A).

3.4.Objective measures

An objective measure of playfulness captures the extent to which customers focus their attention and are absorbed in the activity. To capture objective playfulness, we used eye-tracking technology to capture customer responses based on behavioral manifestations (Léger et al., 2014; Menon et al., 2016). Eye-tracking techniques enable participants' eye movement to be tracked and particularly aim to analyze how customers focus their attention on defined stimuli during navigation (Jacob & Karn, 2003; Verhulst et al., 2019) in settings that approximate a natural use environment (Ben Mimoun et al., 2017).

To analyze how customers focused their attention during navigation, we adapted repertory grid techniques (Tan & Hunter, 2002). Using such a technique is important, given the

sensory dimension of customer experience (Hair et al., 2009). Adapting repertory grid techniques to analyze eye-tracking data enables the dynamic aspect of customer experience through the browsing behavior to be captured, which traditional analysis of eye-tracking data does not enable for dynamic websites. In addition, although eye-tracking techniques enable the recording of all the eye movements made on the website (Jacob & Karn, 2003), the use of repertory grid techniques also enables the focused attention made on defined products to be captured. This latter measure enables more efficient use of time to be captured (Koiso-Kanttila, 2005; Shapiro et al., 1999).

Repertory grid techniques are mapping techniques that aim to describe customer responses to phenomena (Hair et al., 2009; Tan & Hunter, 2002). These techniques include three central components: elements, constructs and grid (Hair et al., 2009). Elements are eliciting elements from which comparisons are drawn (Hair et al., 2009; Tan & Hunter, 2002). In this study, the eliciting element is the website that participants are asked to browse to purchase products. Constructs represent participants' responses and interpretations of the elements. These responses are generally gathered through interviews or questionnaires and are subjective (Tan & Hunter, 2002). In this study, participants' responses correspond to actual behavioral manifestations using eye-tracking data, which enables us to reach a more objective coding. We analyzed the videos of the eye movements of the 59 participants millisecond by millisecond (Fig. 5).

<INSERT FIGURE 5 HERE>

In the coding phase, we manually coded fixations and interactions on products to operationalize playfulness objectively. Fixations reflect a period where the eyes focus their attention toward a stimulus (Jacob & Karn, 2003). Interactions represent the total number of

interactions with a product. For example, a participant may have made two fixations in one interaction or two interactions with the product.

In the coding of the fixations, we made a distinction between different types of fixations (Table 4). First, we distinguished simple and long fixations to capture the amount of time for which participants focus their attention and are therefore absorbed. The longer the fixation is, the longer the participant is absorbed into the activity. We also distinguished fixations made on the image and the text of a product. Finally, to capture all the time spent by participants focusing their attention on a product, we aggregated the number of simple and long fixations on the products. The latter measure enables all the fixations to be considered while taking the weighting into account. This measure summarizes the experience in terms of focused attention.

<INSERT TABLE 4 HERE>

Finally, the grid is used to present links between elements and constructs (Tan & Hunter, 2002). We developed a repertory grid to perform a systematic analysis of behavioral manifestations of experience. In the development of the grid, we took a nomothetic approach, meaning that we established a common set of elements to compare groups (Tan & Hunter, 2002). Appendix B presents an example of a completed grid. It represents 4,248 lines of coded data. In addition to the metrics explained above regarding fixations and interactions, we indicated for each product (72 products) if it was one of the participant's favorite products in Step 1 and if it had been selected for purchase by the participant in Step 2. In addition, as the Tobii eye tracker records all the fixations made on the website by default (Jacob & Karn, 2003), we also controlled this measure in parallel with the coding.

4. Results

4.1. Subjective measures

To check the manipulation of personalization, we performed an independent sample t-test. Results show that the manipulation of personalization was as expected ($M_{np}=4.24$; $M_p=5.17$; $t=-2.127$; $p=.019$; one-tailed). In all tests, we controlled for the effect of the involvement in the product category³ using a general linear model with actual personalization as a factor and the involvement in the product category as a covariate, and it did not change the significance of the results.⁴

To test the effect of perceived personalization on perceived content congruence and subjective playfulness, we created a dummy-coded variable with 1 being perceived as personalized ($M_{pp}>4.00$) and 0 being perceived as not personalized ($M_{npp}\leq 4.00$). To test that perceived content congruence is higher when content is perceived as personalized than when content is not perceived as personalized (H1), we performed an independent sample t-test. As expected, content that was perceived as personalized was perceived as more congruent ($M_{pp}=5.48$) than content that was not perceived as personalized ($M_{npp}=4.80$; $t=-2.8$; $p=.004$; one-tailed), which confirms our hypothesis.

To test the effect of perceived personalization on subjective playfulness and the mediating role of perceived content congruence (H2 and H3), we used Preacher and Hayes's (2008)'s mediation model. Results show that perceived personalization had an indirect effect

³ Involvement in the product category was added as covariate in the tests comparing actual personalization and no actual personalization groups as the mean was significantly higher in the actual personalization condition compared to the no actual personalization condition. We also controlled the effect of this variable in the tests comparing perceived personalization and no perceived personalization. In all cases, it didn't change the significance.

⁴ We controlled the effect of customers' other individual characteristics, namely gender, digital skills, and involvement in online shopping in all tests and it didn't change the significance of the results.

on subjective playfulness. Perceived personalization had a positive effect on perceived content congruence ($\beta=.68$; $t=2.80$; $p=0.007$) and perceived content congruence had a positive effect on subjective playfulness ($\beta=.39$; $t=2.83$; $p=0.007$), leading to an overall positive, indirect only, effect of perceived personalization on subjective playfulness ($\beta=.27$; 95%; $CI=[+.0487, +.5883]$). These results confirm our hypotheses.

Finally, we controlled the effect of actual personalization on perceived content congruence and subjective playfulness⁵. To test the effect of actual personalization on perceived content congruence, we performed an independent sample t-test. Results show that perceived content congruence was not significantly higher in the personalization condition ($M_p=5.08$) than the no personalization condition ($M_{np}=5.29$; $t=0.853$; $p=.397$; two-tailed). To test the effect of actual personalization on subjective playfulness, we performed the same test. Results show that subjective playfulness was not significantly higher in the actual personalization condition ($M_p=5.42$) than the no actual personalization condition ($M_{np}=5.18$; $t=-0.877$; $p=.384$; two-tailed)⁶.

In the next section, we investigate the effect of personalization on objective playful customer experience.

4.2.Objective measures

To test whether objective playfulness is higher when content is personalized than when content is not personalized (H4), we performed independent sample t-tests. Results support this hypothesis, as the number of fixations on favorite products (whatever the type of fixations) and

⁵ When we tested our hypotheses, it was unfortunately not possible to include both objective and subjective measures in the same analysis because the unit of analysis differs (the participant vs. the product).

⁶ Two-tailed tests were used in making these contrasts, because no effects were predicted from actual personalization based on Li (2016)'s work.

the number of interactions was significantly higher in the actual personalization condition compared to the no personalization condition (see Table 5).

We controlled the number of fixations made on the whole website with an independent sample t-test, and results show that the number of fixations on the whole website was not significantly higher in the actual personalization condition ($M_p=598.30$), compared to the no personalization condition ($M_p=541.66$; $t=-.807$; $p=.212$; one-tailed). These results show that there was no difference in the browsing experience between conditions if we consider the time spent on the whole website. Nevertheless, we can see that the navigation time was not used in the same way between personalized and non-personalized conditions. In the personalized condition, the attention time was used more efficiently as customers focused their attention more on their favorite products.

We also controlled the effect of perceived personalization on objective measures with the same tests. Results show that the number of fixations on favorite products (whatever the type of fixations) and the number of interactions was not significantly higher in the perceived personalization condition than the no perceived personalization condition (see Table 5). Objective measures capture the customer's unconscious, spontaneous, and uncontrolled responses. Perceptions do not influence responses that are not controlled by the customer's will (Derbaix & Poncin, 2005).

<INSERT TABLE 5 HERE>

We checked that these results were not due to the simple highlighting of products on the four first positions of each category, regardless of whether they were favorite or not. To control this, we performed independent sample t-tests and compared fixations and interactions on the first four products positioned on the first page of each category. While the number of fixations and interactions on the four products positioned first was significantly higher in the actual

personalization condition than the no-personalization condition, there was no significant difference when content was perceived as personalized compared to when content was not perceived as personalized. These results show that the effect of actual personalization on objective measures is not a mere exposure effect (Zajonc, 1968). If it were the mere exposure effect, the simple highlighting of the content, whether personalized or not, would have the same effect. However, we have seen that it is the personalization of content (the highlighting of favorite products) that influences objective measures and not the simple highlighting of products. Table 6 presents these results.

<INSERT TABLE 6 HERE>

Finally, to test that objective playfulness predicts customers' likelihood of selecting their favorite products for purchase (H5), we performed a logistic regression on the 4,248 lines of coded data. Results support this hypothesis as the number of aggregate fixations on the favorite products positively influences the likelihood of customers selecting their favorite products for purchase ($\beta=.068$; Wald=114.259; $p=0.000$).

4.3.Discussion

In summary, the results of this study support our hypotheses H1-H5. The results on subjective measures confirm that content that is perceived as personalized generates a more subjective playful customer experience compared to content that is not perceived as personalized because the content is perceived as more congruent. Consistent with prior research (Li, 2016; Maslowska et al., 2016), these results show that content needs to be perceived as personalized to have an impact on customers' subjective responses.

However, unlike previous studies, we show that actual personalization does influence customers' responses. Prior research (Li, 2016) found that actual personalization wasn't effective but it only used subjective measures to capture customer responses. Customer

experience exists at conscious and unconscious levels (Joy & Sherry, 2003; Lemke et al., 2011). Although subjective measures enable to capture conscious customers' responses, customers' actual responses can be different from what they assume (Dekeyser et al., 2020; Lee & Park, 2009). Objective measures are also needed to capture the unconscious mechanisms underlying customer experience (Derbaix & Poncin, 2005). Therefore, prior research (Lee & Park, 2009) advocates that online retailing studies should combine both subjective and objective measures to gain a more comprehensive view of personalized customer experience. In this study, we used both subjective and objective measures. The results on objective measures confirm actual personalization influences objective playfulness and subsequent behaviors. Although customers tend to spend the same time on the website regardless of condition, they tend to focus their attention more on their favorite products when content is personalized, and this focused attention enables us to predict the likelihood that customers select their favorite products for purchase. In this study, the combined use of subjective and objective measures enables to gain a more comprehensive view of the effect of personalization on playful customer experience and the underlying psychological mechanisms.

5. Conclusion

5.1. Theoretical contributions

From a theoretical perspective, this research contributes to the customer experience and retailing literatures streams (Lee & Park, 2009; Tyrväinen et al., 2020) by providing a better understanding of the effect of actual personalization and perceived personalization on the playful customer experience of a retailing website using objective and subjective measures.

This research shows that personalization enhances playful customer experience; and highlights the presence of two concomitant processes. First, we show that perceived personalization – the extent to which customers perceive that content is personalized – influences subjective playfulness. This is consistent with findings from prior research showing that perceived personalization influences subjective customer responses (Li, 2016; Maslowska, 2016; Smink et al., 2021). In light of the theory of salience (Guido, 1998; Pryor & Kriss, 1977), we show that the impact of perceived personalization on subjective playfulness is mediated by perceived content congruence. Second, we show that actual personalization – the adaptation initiated by the retailer– influences objective playfulness and subsequent behavior (product selection), even if customers are not conscious of it. Customers focus their attention more and interact more with their favorite products when the website is personalized than when the website is not personalized. Such focused attention on favorite products predicts the likelihood that customers select them for purchase. This research therefore shows that personalization, regardless of whether it is perceived or not, enhance playful customer experience. With the use of multiple measures, we assessed the playful customer experience more holistically. We’ve seen that personalization improves the playful customer experience at cognitive, affective and behavioral levels.

5.2.Methodological contributions

From a methodological point of view, the contributions of this research are threefold. First, the use of the eye-tracking technology enabled us to capture playfulness objectively based on behavioral manifestations (Léger et al., 2014; McColl-Kennedy et al., 2015). Using such a method enables to better understand customer experience in an objective manner (Verhulst et al., 2019; De Keyser et al., 2020) and to capture customers’ unconscious responses to personalization. Such spontaneous and objective measures particularly aim to understand

responses that are not controlled by the customer's will (Derbaix & Poncin, 2005), which are the majority of responses customers have when processing content (Hazlett & Hazlett, 1999).

Second, researchers have recognized the dynamic nature of customer experience (Klaus & Kuppelwieser, 2021; Verhulst et al., 2020). Prior research using eye-tracking techniques to understand customer experience mainly focused on analyzing aggregated data using fixed scan paths (e.g., Kahn, 2017) and heat map analysis (e.g., Ben Mimoun et al., 2017; Wang et al., 2014). In this study, the adaptation of repertory grid techniques (Hair et al., 2009; Tan & Hunter, 2002) to analyze eye-tracking data helped to better appraise the dynamic aspect of customer experience through the browsing behavior, which traditional analysis of eye-tracking data does not enable for a dynamic website.

Third, the use of a repertory grid enabled us to focus our analysis on the focused attention on participants' favorite products and not on all fixations made on the website. Unlike web analytics used by retailers to analyze the efficiency of a website that measures the whole time customers spend on pages and websites (Bucklin & Sismeiro, 2003), the use of this technique to analyze eye-tracking data enabled us to distinguish between the whole time spent on the website and the time spent on their favorite products, which represents a more efficient time spent on the website (Koiso-Kanttila, 2005; Shapiro et al., 1999). Using a grid, we coded all the different fixations made on products and interactions. In coding the fixations, we made a distinction between different types of fixations. For instance, we distinguished simple and long fixations to capture how long the participants were absorbed in the activity. However, we also used an aggregated and weighted measure to summarize the experience in terms of focused attention. We observed that personalization influences objective playfulness, whatever the type of fixations. Therefore, although the different measures of fixations bring nuance to the observed behaviors, the aggregated and weighted measure can be used to best summarize the objective experience of customers during an interaction with a personalized website.

5.3. Managerial contributions

Customer experience is influenced by individual factors, context-related factors, and retailers' stimuli (Becker & Jaakkola, 2020; Lemon & Verhoef, 2016). For instance, customer characteristics, such as personality, values, and sociodemographic characteristics, can influence customer experience (Holbrook & Hirschman, 1982). Context-related factors also affect customer experience. Context includes situational contingencies (immediate context), such as the presence of customers in the store, but also sociocultural contingencies (the system in which customers are embedded), such as culture and societal norms and rules (Becker & Jaakkola, 2020). Retailers cannot control customer responses, but they can assess, design, manage, and optimize a range of stimuli that influence customer experience (Becker & Jaakkola, 2020).

From a managerial perspective, this research shows that actual personalization processes are still worthwhile for retailers. The use of personalization technologies enables to enhance playful customer experience on their website and subsequent behavior (product selection). However, the choice of measures to assess the impact of personalization on playful customer experience is important.

Actual personalization, which is initiated and controlled by the retailer, appears not to influence subjective and conscious measures of experience but rather influence unconscious and uncontrolled responses while browsing the website. Customers appear to focus their attention more on their favorite products when the website content is personalized and are more likely to select their favorite product for purchase when they focus their attention on it.

Such findings raise the question of whether retailers need to communicate that content is personalized. Some research shows that it is more the fact of saying that content is personalized rather than the personalization itself that influences customers' responses (Vandenbulcke, 2019). With this study, we show that both perceived and actual personalization

influence customer experience. Although the present research did not accompany personalization with a message signaling personalization and still shows that actual personalization influences customer responses, indicating that the content is personalized could foster perceived personalization and therefore influence subjective customer responses positively.

5.4. Limitations and avenues for future research

Despite our rigorous experimental approach, some limitations to our work persist, which can be considered as future research avenues.

First, this research is based on an experimental study carried out in the laboratory and mobilizes a fictive website of an unknown brand. Further research on brand websites is needed to investigate the effect of the relationship with the brand. Trust toward the brand and prior experience with the brand (Aguirre et al., 2015; Lemon & Verhoef, 2016; Rose et al., 2012) could influence the effect of actual personalization and perceived personalization on playful customer experience.

Second, the website we used to conduct the experiment presents furniture products, which can be perceived as products with both utilitarian and experiential attributes (Brakus et al., 2014). Future research should investigate the effect of actual and perceived personalization on customer responses on websites displaying other product categories.

Third, the subjective measure to assess playful customer experience was analyzed at the participant-level while the objective measures were analyzed at the product-level. Future research is needed with additional physiological measures, such as electroencephalography, to conduct additional analysis on customer attention (Gordon et al., 2018; Léger et al., 2014) at the participant level.

Fourth, in this research, we did not signal personalization with an accompanying message. Signaling personalization is a factor that could influence customer perceptions of personalization (Li, 2016). Future research should, therefore, investigate the effect of personalization of playful customer experience when it is signaled.

Fifth, we created a personalization algorithm for this study. This algorithm focuses on the personalization of content, which is one form of the personalization of website features (Murthi & Sarkar, 2003). Future research could investigate how the personalization of the design of the website (Hauser et al., 2014) or the personalization of the menu (Al-Omar & Rigas, 2009) can influence playful customer experience.

Finally, this research investigates playful customer experience on a personalized website and focuses on positive customer responses to personalization. Although personalization has been found to have positive effects, it has also been found to have downsides, such as privacy concerns (Zeng et al., 2020). Future research should investigate customer experience on personalized websites further and the downsides that such personalization may trigger for customers.

Appendices

Appendix A: Measurement scales

Construct	# items	Reference	Adapted scale	Cronbach's alpha	% variance explained
Digital skills	4	Rose et al. (2012)	• I consider myself knowledgeable about the internet and digital practices • I am extremely skilled at using the internet • I am an expert in the internet and digital technologies • I know somewhat more than my friends about the internet and digital practices	0.951	87.67%
Online shopping involvement	6	Strazzieri (1994)	• Online shopping means a lot to me • I attach particular importance to online shopping • I particularly like to talk about online shopping • I am interested in online shopping • I feel particularly drawn to online shopping • Just finding out about online shopping is a pleasure	0.963	84.50%
Perceived personalization	4	Maslowska et al. (2016)	• I have the impression that the organization of the proposed products was based on my wish list • I have the impression that the choice of products displayed took into account my wishes • The organization of the content was adapted to my preferences • The products highlighted on the first page of each category corresponded to my wish list	0.854	70.38%

Appendix A: Measurement scales (continued)

Construct	# items	Reference	Adapted scale	Cronbach's alpha	% variance explained
Perceived content congruence	6	Fleck and Quester (2007)	• I am not surprised by the content provided by the website based on my wish list • Given my preferences, I expected this website to display these products • Based on my wish list, it was foreseeable that this website would display these products • The products displayed correspond to my preferences • The displayed products are a good choice for me regarding my wish list • The content provided by the website fits well with my wish list	0.855	61.25%
Product category involvement	6	Strazzieri (1994)	• Furniture products mean a lot to me • I attach particular importance to furniture products • I particularly like to talk about furniture products • I am interested in furniture products • I feel particularly drawn to furniture products • Just finding out about furniture products is a pleasure	0.963	85.26%
Subjective playfulness	9	Ahn et al. (2007)	• When interacting with the website, I did not realize the time elapsed • When interacting with this website, I was totally absorbed in the task at hand • When interacting with this website, I forgot about everything else • Using this website gave enjoyment to me for my task • Using this website gave fun to me for my task • Using this website kept me happy for my task • Using this website stimulated my curiosity • Using this website stimulated my search for products • Using this website aroused my imagination	0.893	55.90%

Appendix A: Measurement scales (continued)

Discriminant validity of constructs

	Perceived personalization	Perceived content congruence	Subjective playfulness	Digital skills	Online shopping involvement	Product category involvement
Perceived personalization	1					
Perceived content congruence	0.483	1				
Subjective playfulness	0.125	0.339	1			
Digital skills	-0.119	0.131	0.083	1		
Online shopping involvement	0.073	0.273	0.270	0.457	1	
Product category involvement	0.241	0.198	0.310	-0.017	0.366	1

	Perceived personalization	Perceived content congruence	Subjective playfulness	Digital skills	Online shopping involvement	Product category involvement
Perceived personalization	0.638⁷					
Perceived content congruence	0.517	0.562⁷				
Subjective playfulness	0.356	0.475	0.440⁷			
Digital skills	-0.321	0.021	0.186	0.716⁷		
Online shopping involvement	0.017	0.336	0.427	0.626	0.726⁷	
Product category involvement	0.405	0.493	0.424	0.119	0.381	0.447⁷

These tables show correlations between subjective measures. The Square Root value of AVE of a particular construct is always higher than that between that construct with other constructs, which meets the Fornell-Larcker Criterion. This confirms a satisfactory discriminant validity between constructs.

⁷ AVE

Appendix B: Repertory grid

Participant ID	Product category	Product	Favorite product [0-1]	Purchased product [0-1]	Pg. #	Position on page	All simple fixations	Simple fixations image	Simple fixations text	All long fixations	Long fixations image	Long fixations text	Inter-actions	Aggregate fixations	Aggregate fixations image	Aggregate fixations text
1	Coffee tables	Christie	0	0	1	1	4	0	4	1	0	1	1	6	0	6
1	Coffee tables	Austen	0	0	1	2	12	1	11	3	1	2	3	18	3	15
1	Coffee tables	Defoe	0	0	1	3	7	2	5	1	0	1	2	9	2	7
1	Coffee tables	Conrad	0	0	1	4	4	1	3	0	0	0	1	4	1	3
1	Coffee tables	Wilde	1	1	1	5	16	1	15	9	4	5	3	34	9	25
1	Coffee tables	Tolkien	0	0	1	6	10	0	10	0	0	0	1	10	0	10
1	Coffee tables	Shakespeare	0	0	2	1	7	1	6	0	0	0	1	7	1	6
1	Coffee tables	Byron	0	0	2	2	3	0	3	0	0	0	1	3	0	3
1	Coffee tables	Shelley	0	0	2	3	2	0	2	1	0	1	1	4	0	4
1	Coffee tables	Dickens	1	0	2	4	4	0	4	1	0	1	1	6	0	6
1	Coffee tables	Rowling	0	0	2	5	13	0	13	1	0	1	1	15	0	15
1	Coffee tables	Orwell	0	0	2	6	3	0	3	0	0	0	1	3	0	3
1	Coffee tables	Eliot	1	0	3	1	8	0	8	0	0	0	1	8	0	8
1	Coffee tables	Joyce	0	0	3	2	6	2	4	0	0	0	1	6	2	4
1	Coffee tables	Spenser	0	0	3	3	5	0	5	0	0	0	1	5	0	5
1	Coffee tables	Keats	1	0	3	4	5	0	5	1	0	1	1	7	0	7
1	Coffee tables	Jonson	0	0	3	5	6	0	6	0	0	0	1	6	0	6
1	Coffee tables	Greene	0	0	3	6	4	0	4	0	0	0	1	4	0	4
1	Carpet	Atlas	1	0	1	5	6	3	3	0	0	0	1	6	3	3
1	Carpet	Helios	0	0	1	1	3	0	3	0	0	0	1	3	0	3
1	Carpet	Coeos	1	0	1	6	5	1	4	0	0	0	1	5	1	4
1	Carpet	Thethys	0	0	1	2	4	0	4	0	0	0	1	4	0	4
1	Carpet	Eos	1	0	2	1	4	1	3	0	0	0	1	4	1	3
1	Carpet	Asteria	0	0	1	3	4	0	4	0	0	0	1	4	0	4
1	Carpet	Gaia	0	0	1	4	4	0	4	2	0	2	1	8	0	8
1	Carpet	Thalassa	0	0	2	2	11	0	11	0	0	0	1	11	0	11
1	Carpet	Athena	0	0	2	3	2	0	2	0	0	0	1	2	0	2
1	Carpet	Aura	0	0	2	4	3	1	2	0	0	0	1	3	1	2
1	Carpet	Selene	0	0	2	5	2	0	2	0	0	0	1	2	0	2
1	Carpet	Demeter	0	0	2	6	4	1	3	0	0	0	2	4	1	3
1	Carpet	Ourea	0	0	3	1	7	3	4	0	0	0	1	7	3	4
1	Carpet	Damysos	0	0	3	2	4	0	4	0	0	0	1	4	0	4
1	Carpet	Palemon	0	0	3	3	3	0	3	0	0	0	1	3	0	3
1	Carpet	Bolina	0	0	3	4	1	1	0	0	0	0	1	1	1	0
1	Carpet	Minos	1	1	3	5	7	3	4	0	0	0	1	7	3	4
1	Carpet	Ino	0	0	3	6	3	0	3	0	0	0	1	3	0	3

Appendix B: Repertory grid (continued)

Participant ID	Product category	Product	Favorite product [0-1]	Purchased product [0-1]	Pg. #	Position on page	All simple fixations	Simple fixations image	Simple fixations text	All long fixations	Long fixations image	Long fixations text	Inter-actions	Aggregate fixations	Aggregate fixations image	Aggregate fixations text
1	Lamp	Vega	0	0	1	1	7	1	6	0	0	0	1	7	1	6
1	Lamp	Canopus	0	0	1	2	4	0	4	1	0	1	2	6	0	6
1	Lamp	Pollux	0	0	1	3	7	0	7	1	0	1	1	9	0	9
1	Lamp	Rigel	0	0	1	4	5	0	5	1	0	1	1	7	0	7
1	Lamp	Deneb	0	0	1	5	4	0	4	0	0	0	1	4	0	4
1	Lamp	Aldebaran	0	0	1	6	4	0	4	0	0	0	1	4	0	4
1	Lamp	Altair	0	0	2	1	4	0	4	1	0	1	1	6	0	6
1	Lamp	Sirius	1	0	2	2	8	2	6	1	0	1	5	10	2	8
1	Lamp	Achernar	1	1	2	3	27	2	25	0	0	0	4	27	2	25
1	Lamp	Antares	0	0	2	4	3	0	3	1	0	1	1	5	0	5
1	Lamp	Capella	0	0	2	5	5	1	4	1	0	1	1	7	1	6
1	Lamp	Kappa	1	0	2	6	5	0	5	1	0	1	1	7	0	7
1	Lamp	Epsilon	0	0	3	1	5	1	4	0	0	0	1	5	1	4
1	Lamp	Mizat	0	0	3	2	2	1	1	0	0	0	2	2	1	1
1	Lamp	Zeta	1	0	3	3	4	0	4	0	0	0	2	4	0	4
1	Lamp	Alfard	0	0	3	4	0	0	0	0	0	0	0	0	0	0
1	Lamp	Almak	0	0	3	5	1	0	1	0	0	0	1	1	0	1
1	Lamp	Bellatrix	0	0	3	6	0	0	0	0	0	0	0	0	0	0
1	Sofa	Balzac	0	0	1	1	21	4	17	1	0	1	3	23	4	19
1	Sofa	Camus	1	1	1	5	36	9	27	3	0	3	5	42	9	33
1	Sofa	Flaubert	0	0	1	2	11	2	9	1	0	1	3	13	2	11
1	Sofa	Moliere	0	0	1	3	4	0	4	0	0	0	1	4	0	4
1	Sofa	Maupassant	1	0	1	6	22	1	21	3	0	3	2	28	1	27
1	Sofa	Zola	0	0	1	4	9	0	9	1	0	1	2	11	0	11
1	Sofa	Corneille	0	0	2	1	3	2	1	0	0	0	1	3	2	1
1	Sofa	Sartre	0	0	2	2	5	0	5	0	0	0	1	5	0	5
1	Sofa	Hugo	0	0	2	3	8	1	7	1	0	1	1	10	1	9
1	Sofa	Baudelaire	1	0	2	4	11	0	11	1	0	1	1	13	0	13
1	Sofa	Racine	0	0	2	5	6	0	6	0	0	0	1	6	0	6
1	Sofa	Prevert	0	0	2	6	8	1	7	0	0	0	2	8	1	7
1	Sofa	Rimbaud	0	0	3	1	5	0	5	0	0	0	1	5	0	5
1	Sofa	Musset	1	0	3	2	7	0	7	1	0	1	2	9	0	9
1	Sofa	Montaigne	0	0	3	3	7	0	7	0	0	0	1	7	0	7
1	Sofa	Gide	0	0	3	4	7	0	7	1	0	1	1	9	0	9
1	Sofa	Apollinaire	0	0	3	5	7	0	7	0	0	0	2	7	0	7
1	Sofa	Voltaire	0	0	3	6	2	2	0	0	0	0	1	2	2	0

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TABLES

Table 1: Subjective and objective measures to assess playful customer experience

Playfulness	Description	Customer responses investigated	Measure	Analysis unit
Subjective playfulness	Extent to which customers perceive that their attention is focused and that they feel absorbed in the activity for play, amusement, or enjoyment	Affective and cognitive responses	Perceptual measure developed by Ahn et al. (2007)	Participants
Objective playfulness	Extent to which customers focus their attention during navigation and are absorbed in the activity	Behavioral responses	Customer actual focused attention (Jacob & Karn, 2003) on favorite products, using eye-tracking techniques	Products by participant

Table 2: Sample and groups composition

Sample				
N	59			
Age mean	35.69	(SD=13.135)		
Digital skills mean	3.80	(SD=1.617)		
Involvement in online shopping mean	4.53	(SD=1.554)		
Involvement in product category mean	4.91	(SD=1.544)		
Gender (female)	51%			
No actual personalization			Actual personalization	
N	29		N	30
Age mean	36.00	(SD=13.299)	Age mean	35.40 (SD=13.195)
Digital skills mean	4.07	(SD=1.792)	Digital skills mean	3.53 (SD=1.409)
Involvement in online shopping mean	4.39	(SD=1.562)	Involvement in online shopping mean	4.66 (SD=1.562)
Involvement in product category mean	4.51	(SD=1.404)	Involvement in product category mean	5.29 (SD=1.597)
Gender (female)	52%		Gender (female)	50%
No perceived personalization			Perceived personalization	
N	25		N	34
Age mean	37.00	(SD=14.705)	Age mean	34.74 (SD=11.988)
Digital skills mean	4.03	(SD=1.761)	Digital skills mean	3.63 (SD=1.507)
Involvement in online shopping mean	4.47	(SD=1.627)	Involvement in online shopping mean	4.57 (SD=1.522)
Involvement in product category mean	4.70	(SD=1.708)	Involvement in product category mean	5.06 (SD=1.419)
Gender (female)	44%		Gender (female)	56%

Table 3: Matrix crossing groups

	No actual personalization	Actual personalization	Total
No perceived personalization	14	11	25
Perceived personalization	15	19	34
Total	29	30	59

Table 4: Types of coded fixations

Types of fixations	Description
All simple fixations	Total number of simple fixations made on the products. This number corresponds to the sum of simple fixations made on text and images.
Simple fixations image	Total number of simple fixations made on the image area of the products.
Simple fixations text	Total number of simple fixations made on the text area of the products.
All long fixations	Total number of long fixations made on the products. This number includes the sum of the long fixations made on text and images. The size of the point of the long fixation is twice the size of a simple fixation.
Long fixations image	Total number of long fixations made on the image area of the products.
Long fixations text	Total number of long fixations made on the text area of the products.
Aggregate fixations	Total number of all fixations made on the products. This number represents the sum of all simple fixations and long fixations. Long fixations are converted to simple fixations.
Aggregate fixations image	Total number of all fixations made on the image area of the products. This number represents the sum of all simple image fixations and long image fixations. Long fixations are converted to simple fixations.
Aggregate fixations text	Total number of all fixations made on the text area of the products. This number represents the sum of all simple text fixations and long text fixations. Long fixations are converted to simple fixations.

Table 5: Results on objective measures

	Actual personalization			Perceived personalization		
	No AP Mean	AP Mean	T-test and p-value*	No PP Mean	PP Mean	T-test and p-value*
All simple fixations	82.00	133.50	$t=-2.513$; $p=.008$	116.04	102.41	$t=.620$; $p=.269$
Simple fixations (image)	46.86	73.87	$t=-3.382$; $p=.001$	61.04	60.27	$t=.087$; $p=.466$
Simple fixations (text)	35.14	59.63	$t=-1.649$; $p=.054$	55.00	42.15	$t=.832$; $p=.205$
All long fixations	32.52	58.13	$t=-2.718$; $p=.005$	44.20	46.53	$t=-.227$; $p=.411$
All long fixations (image)	25.00	41.47	$t=-2.477$; $p=.009$	30.48	35.50	$t=-.705$; $p=.242$
All long fixations (text)	7.52	16.67	$t=-1.744$; $p=.045$	13.72	11.03	$t=.488$; $p=.314$
Aggregate fixations	147.04	249.77	$t=-2.757$; $p=.005$	204.44	195.47	$t=.221$; $p=.413$
Aggregate fixations (image)	96.86	156.80	$t=-3.067$; $p=.002$	122.00	131.27	$t=-.431$; $p=.334$
Aggregate fixations (text)	50.17	92.97	$t=-1.740$; $p=.045$	82.44	64.21	$t=.709$; $p=.241$
Interactions	35.17	51.83	$t=-3.582$; $p=.001$	44.08	43.32	$t=.144$; $p=.443$

* One-tailed tests

Table 6: Results depending on the highlighting of products

	Actual personalization			Perceived personalization		
	No AP Mean	AP Mean	T-test and p-value*	No PP Mean	PP Mean	T-test and p-value*
All simple fixations	58.52	133.50	$t=-3.908$; $p=.000$	99.24	94.74	$t=.204$; $p=.420$
Simple fixations (image)	38.72	73.87	$t=-4.654$; $p=.000$	54.56	58.09	$t=-.390$; $p=.349$
Simple fixations (text)	19.79	59.63	$t=-2.864$; $p=.004$	44.68	36.65	$t=.528$; $p=.300$
All long fixations	21.59	58.13	$t=-3.948$; $p=.000$	37.56	42.09	$t=-.425$; $p=.337$
All long fixations (image)	15.83	41.47	$t=-4.014$; $p=.000$	25.20	31.56	$t=-.865$; $p=.196$
All long fixations (text)	5.76	16.67	$t=-2.113$; $p=.021$	12.36	10.53	$t=.333$; $p=.370$
Aggregate fixations	101.69	249.77	$t=-4.126$; $p=.000$	174.36	178.91	$t=-.109$; $p=.457$
Aggregate fixations (image)	70.38	156.80	$t=-4.655$; $p=.000$	104.96	121.21	$t=-.733$; $p=.234$
Aggregate fixations (text)	31.31	92.97	$t=-2.608$; $p=.007$	69.40	57.71	$t=.457$; $p=.325$
Interactions	33.10	51.83	$t=-4.100$; $p=.000$	42.56	42.68	$t=-.022$; $p=.492$

* One-tailed tests

FIGURES

Figure 1: Conceptual model

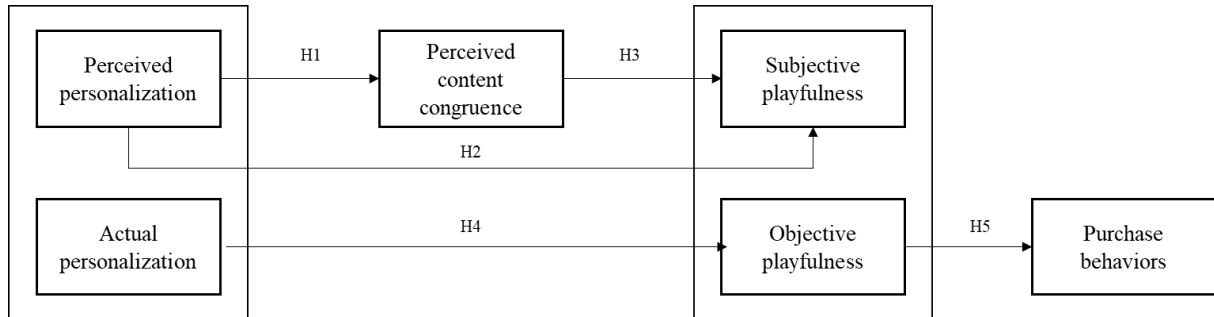


Figure 2: Website pages

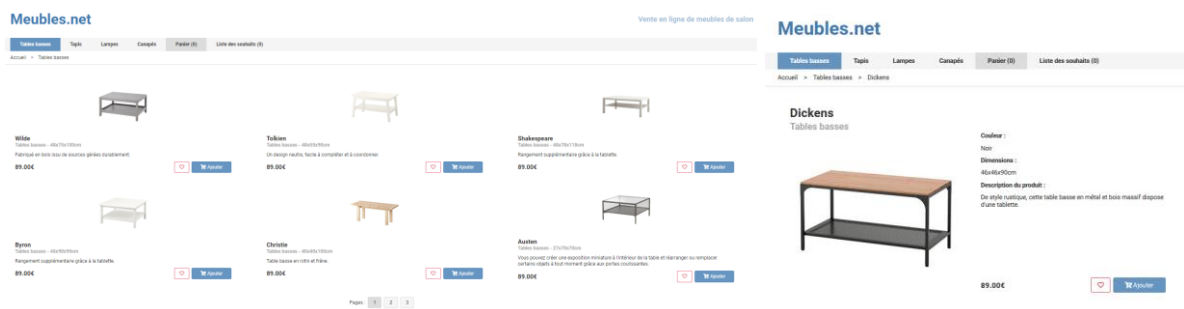


Figure 3: Presentation of personalized content

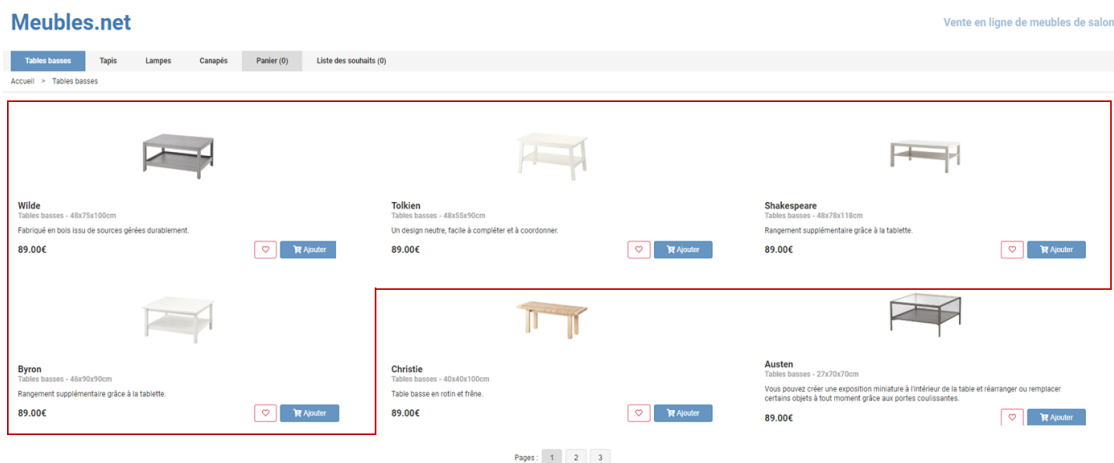


Figure 4: Test rooms' arrangement

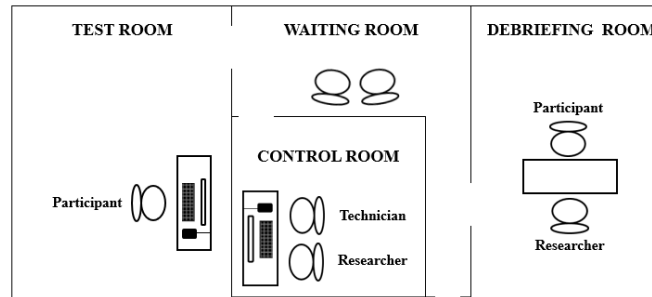


Figure 5: Tracking eye movements

