

Repositório ISCTE-IUL

Deposited in *Repositório ISCTE-IUL*:

2023-04-03

Deposited version:

Accepted Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Loureiro, S. M. C., Correia, C. & Guerreiro, J. (2023). Mental imagery, product involvement and presence at virtual reality supermarket. *Journal of Creative Communications*. 18 (1), 79-92

Further information on publisher's website:

10.1177/09732586221086655

Publisher's copyright statement:

This is the peer reviewed version of the following article: Loureiro, S. M. C., Correia, C. & Guerreiro, J. (2023). Mental imagery, product involvement and presence at virtual reality supermarket. *Journal of Creative Communications*. 18 (1), 79-92, which has been published in final form at <https://dx.doi.org/10.1177/09732586221086655>. This article may be used for non-commercial purposes in accordance with the Publisher's Terms and Conditions for self-archiving.

Use policy

Creative Commons CC BY 4.0

The full-text may be used and/or reproduced, and given to third parties in any format or medium, without prior permission or charge, for personal research or study, educational, or not-for-profit purposes provided that:

- a full bibliographic reference is made to the original source
- a link is made to the metadata record in the Repository
- the full-text is not changed in any way

The full-text must not be sold in any format or medium without the formal permission of the copyright holders.

Published in Journal of Creative Communications

<https://journals.sagepub.com/doi/abs/10.1177/09732586221086655?journalCode=crc>

Loureiro, S. M. C., Correia, C., & Guerreiro, J. (2022). Mental Imagery, Product Involvement and Presence at Virtual Reality Supermarket. *Journal of Creative Communications*, 09732586221086655.

Mental imagery, product involvement and presence at virtual reality supermarket

Abstract

Virtual Reality (VR) is a technology that creates fully-immersive and virtual experiences and have been used to create virtual supermarkets and explore consumer behaviour on such alternate reality. The current study uses a virtual reality scenario to analyse the effects of mental imagery, product involvement and presence on customer's emotions and on the customers purchase intention, during a virtual shopping experience. The proposed model was tested with 108 participants in the laundry detergent category on a VR scenario. Findings reveal that on a virtual setting, mental imagery has the most significant impact on emotions whereas presence has a strong influence on the purchase decision. Yet, product involvement has any effect only on emotions. Moreover, the obsession for laundry products highly decreased the effect of product involvement on purchase intention.

Keywords: mental imagery, product involvement, presence, emotions, purchase intentions

Introduction

For retailers, the new digital age has become a great challenge (Grewal, Nordfält, & Roggeveena, 2017). In such a dynamic setting, consumers have become more complex and more demanding. Thus, retailing has shifted from a more offline and single-channel based communication to modern in-store practices where an omnichannel approach is the key (Souidena & Ladharia, 2018). The omnichannel model involves the use of many diverse channels and, additionally, the increase of shopper touchpoints (Shankar *et al.*,

2011). Such multichannel environment is enhanced by some new technology developments such as advanced mobile devices and interfaces (Shankar *et al.*, 2011) and virtual and augmented reality tools (Grewal *et al.*, 2017). Slowly, retailers are trying to establish a multichannel relationship with their customers by converging offline and online channels using these new devices, particularly because digital channels have been found to affect consumer behaviour (Sama, 2019; Amegbe, Owino, & Kerubo, 2017).

However, although marketing experts see the evolution of VR with high hopes for companies, there are still no clear guidelines on how VR should be integrated on the companies' strategies (Boyd & Koles, 2018). In VR, the consumers are exposed to a computer-generated environment that fully immerses them on a virtual experience (Loureiro *et al.*, 2019; Loureiro *et al.*, 2020). When exposed to a virtual environment, the consumer experiences a sense of immersion or presence within that environment, thus being isolated from the real world. Besides immersion, VR also provides a very dynamic environment (Boyd & Koles, 2018), which is important to create consumer involvement with the brands.

The use of these technological innovations allows customers to feel less time pressure while increasing consumer satisfaction and pleasure during the experience and engagement with the companies (Grewal *et al.*, 2017). Although this new experience approach brings a big opportunity for brands, research on the use of VR has been scarce in the last 20 years (Loureiro *et al.*, 2019). Particularly absent from research is the role of mental imagery (the perceptual image stored in long-term memory) and its effects on involvement, tele-presence perception, purchase intentions and emotions at a virtual supermarket setting.

Virtual Reality in Retail

In 1995, Milgram, Takemura, Utsumi, & Kishino suggested a model known as the reality-virtuality continuum (RVC) that was later used to explain the different degrees of exposure that users/consumers may have with their surrounding environment. The physical world is at one spectrum of the RVC while Virtual Reality is on the opposite end of such continuum. VR in the RVC is a fully synthetic universe that may or may not resemble the natural world and in which the person is completely immersed (Milgram, Takemura, Utsumi, & Kishino, 1994) while in other less immersive degrees of virtual environments such as augmented reality, the viewer sees the real world with overlaid objects, by wearing translucent smart glasses or a smartphone (Bimber & Raskar, 2000). VR implies the creation of a simulated reality where users are absorbed in the interactive reality as though they were part of it. There are different VR interfaces, ranging from movable gadgets such as VR headsets to non-movable ones such as specifically built rooms with several wide displays. Over the years, many styles of head mounted displays (HMD) have been produced and today, most of them acknowledge the location of the consumer by providing gyroscopes and accelerometers that track the user location in the scene. In VR environments, participants have a fully-immersive experience with a binaural dynamic sound that allows them to interact with 3D objects using their body movement, just as they would in a regular shopping environment. Although VR is still focused on controlling two senses (visual and auditory), interactive VR often allows the users to have unique physical or quasi-physical interplay with the objects by using haptic systems such as monitoring sensor data gloves (Mizell et al. 2002).

In retailing in particular, VR is a promising alternative to e-commerce (Evans & Wurster 1999; Krasonikolakis et al., 2014; Krasonikolakis et al., 2018). Usually, e-commerce limitations are linked to the lack of feeling of the real environment and not being able to touch the products. Although VR is not yet able to imitate sensations such

as touch, it immerses the consumers in the shopping environment. Indeed, recent studies explored the influence of such immersion on adoption (Peukert et al., 2019) and the differences between consumer perceptions of physical stores versus virtual reality stores (Pizzi et al., 2019). The authors have showed that consumers reported higher levels of hedonism and utilitarianism and that satisfaction with the store is less influenced by utilitarianism when consumers perceived the store to have a large assortment size. Other studies have also explored the role of crowding on a virtual reality shopping experience (Van Kerrebroeck et al., 2017). Results have showed that attitudes, satisfaction and loyalty increase in crowded virtual spaces (Loureiro & Ribeiro, 2014). However, despite the extant literature on virtual reality in retail, studies are still scarce and particularly absent on the role that memory plays on retail outcomes.

Hypotheses Development

According to Miller, Hadjimarcou and Miciak (2000), mental imagery is an activation of the perceptual knowledge stored in the long-term memory and related to personal experiences. Therefore, mental imagery can act as a stimulus for consumers depending on their previous knowledge. Indeed, in an imagined situation, mental imagery can evoke consumer organism responses such as attention, positive feelings or behavioural responses (i.e. purchase intention) (Ha, Huang, & Park, 2019; Xu, Chen & Jiang, 2020; Lv, Li & Xia, 2020). Mental Imagery can be evoked in different ways. First through a mental elaboration (Bogicevic *et al.*, 2019) that relates the number of images formed on someone's mind and the memory activation when exposed to such image (Yoo & Kim, 2014). Such memory activation is known to be dependent on vividness: the intensity of the stimulus (Miller, Hadjimarcou, & Miciak, 2000), which relates to the clarity, vibrance and distinctiveness of the stored images. Effective tone – which

reflects the emotional meaning of the recall memory and provokes the individual's emotional reaction is also known to evoke mental imagery (Yoo & Kim, 2014). (Yoo & Kim, 2014; Loureiro, Bilro, & Japutra, 2020). Finally, imagery can be evoked by different types of sensory stimulus: tactile, visual, auditory, olfactory, or gustatory – the modality dimension of mental imagery (Miller, Hadjimarcou, & Miciak, 2000; Bilro, Loureiro, & Guerreiro, 2019). Given the role of mental imagery as a stimulus that may lead to consumer behavioural intentions (Yoo & Kim, 2014), we suggest that:

H1: Mental imagery is positively related to purchase intention

H2: Mental imagery is positively related to emotions

Product involvement has been studied "the perceived significance of the object by an individual based on intrinsic desires, beliefs, and interests." Zaichkowsky (1984:342). Therefore, each customer has a different involvement with the different products and brands. (Porrall, Vega, & Mangin, 2018). Indeed, product involvement reflects the amount of interest, attention, excitement and motivation of the consumer toward a product (Calvo-Porrall, Vega, & Mangin, 2018). Involvement depends on personal factors, choices, and customer perceived value (Peng *et al.*, 2019) and is one of the most important factors in consumers' behaviours. Indeed, involvement is known to influence the way customers engage with the brands (Calvo-Porrall, Vega, & Mangin, 2018). Therefore, we posit that:

H3: Product involvement is positively associated to Purchase Intention

H4: Product involvement is positively associated to Emotions

Telepresence means the illusion that you're there. This perception serves as a mediator between the stimulus and the positive or negative appraisal of the virtual environment (Loureiro et al., 2019; Hyun, & O'Keefe, 2012; Marsh (2003); Shi *et al.*, 2016). The feeling of telepresence in the virtual reality environment creates a highly immersive store atmosphere (Boyd & Koles, 2018). In VR, consumers experience the feeling of escaping and telepresence (Van Kerrebroeck, Brengman, & Willems, 2017) and such telepresence perception is known to influence their behaviour. Hence:

H5: Presence is positively associated to Purchase intention

H6: Presence is positively associated to Emotions

Insert Figure 1 about here

Methodology

A quasi-experimental study using a between-subjects design was implemented to test the proposed model. The quasi-experimental manipulation was done using a virtual grocery store, using VR. A quantitative approach was followed using a questionnaire to get data to test the model. The virtual scenario displayed the product assortment, prices, and promotions to a group of regular shoppers that agreed to participate in the study. Participants were requested to wear an Oculus Rift headset, which includes an appropriate oculus to emerge in a virtual world and two motion sensors that detect the person movement in the virtual environment. The VR environment was developed using Unity software and was based on an existing shelf layout and real brands in order to resemble the physical experience (see figure 2). The virtual model was created using Unity software (version 2017.2.0f3). The virtual environment (VE) simulated a store with which participants could interact. Wall textures were done using simulated shelves and printed ads of the brand. Additionally, several 3D shelves were also used so that participants could

explore the elements while inside the store. The environment was set to have good lighting conditions.

INSERT FIGURE 2 ABOUT HERE

Two types of products of the laundry care category were chosen for the experiment, specifically, HDD – Hard Duty Detergent – and FFI – Fabric Finishers. In order to ensure maximum accuracy, the virtual environment was based on an existing shelf layout and used real brands (Pizzi *et al*, 2019).

First, participants were asked if they had ever been to a supermarket. If the answer was affirmative, they were informed about the apparatus of the VR equipment and that they could move around the scenario of the virtual supermarket until they decided which products they would buy, without any pre-determined time limit. In the end, participants were asked to fill in the final questionnaire. The first two questions of the survey were related to the individual's experience in a physical store (Pizzi *et al.*, 2019). The remaining questions measured involvement, using a 7-point Likert scale (adapted from Deng, Unnava, & Lee, 2019), the emotions felt during the experience - measured using a 7-point Likert scale (adapted from Deng, Unnava, & Lee, 2019), and the level of 'presence' in the virtual world - adapted from Van Kerrebroeck, Brengman, & Willems (2017). Mental imagery's dimensions - quantity, vividness, valence and modality – were measured using Miller, Hadjimarcou, and Miciak (2000) scale. Finally, purchase intention was measured using a scale adapted from Spears and Singh, (2014).

Participants were also asked about their gender, age and education, in order to describe the sample profile.

A total of 108 subjects participated in the experiment, of which 73 are female (67.6%, mean age=31.96) and 35 are male (32.4%, mean age=31.83). The average age of

the total respondents is 31.92 (range: 18-69 years old). In terms of education level, 35.2% of the participants have Bachelor-Degree and 34.3% have Master Degree/Doctored/PhD, while 21.3% have Elementary/Secondary Education and only 9.3% have vocational training.

Another relevant item for this study regards to the frequency that the customer goes to the supermarket to buy these types of products. In the table 1, it is possible analyse the respondents' behaviour. In fact, 55.6% of the participants buy laundry products monthly, whereas 26.9% goes biweekly.

Insert table 1 about here

Results

Descriptive statistics

The first variable to be studied is the product involvement. The question is composed by 4 items presented in the table 2. The item with a highest average value is PI1 (mean= 5.39). On contrary, item PI3 has the lowest average with a value of 3.69. Regarding to standard deviation, the values are very similar for all items, excluding PI1 with the lowest value of 1.65. The new construct PI presents an average value of 4.54 and a standard deviation of 1.49 (see table 2).

Insert table 2 about here

The variable presence has 6 items presented in the table 2. The item with a highest average value is PRE1 (mean=5.59). On contrary, item PRE2 has the lowest average with a value of 4.23. Regarding to standard deviation, PRE1 shows the lowest value of 1.50. The new construct PRE presents an average value of 5.04 and a standard deviation of 1.17.

Mental imagery is composed by quantity, modality, vividness and valence. The variable quantity is composed by 3 items. The item with a highest average value is MiQt2 (mean=4.19), very similar to MiQt (mean=4.18). On contrary, item MiQt2 has the lowest average with a value of 4.19. Regarding to standard deviation, MiQt1 shows the lowest value of 1.84. The new construct MiQt presents an average value of 3.95 and a standard deviation of 1.08. The variable modality is composed by 4 items. The item with a highest average value is MiMo1 (mean=5.03). On contrary, item MiMo2 has the lowest average with a value of 3.96. Regarding to standard deviation, both MiMo1 shows the lowest value of 1.77. The new construct MiMo presents an average value of 4.56 and a standard deviation of 1.36. Vividness aggregates 7 items presented in the table 6. The item with a highest average value is MiVi6 (mean=5.64). On contrary, item MiVi7 has the lowest average with a value of 2.92. Regarding to standard deviation, MiVi6 shows the lowest value of 1.35. The new construct MiVi presents an average value of 4.76 and a standard deviation of 1.09. Finally, valence contains 4 items. The item with a highest average value is MiVa3 (mean=5.54). On contrary, item MiVa4 has the lowest average with a value of 4.99. Regarding to standard deviation, MiVa1 shows the lowest value of 1.39. The new construct MiVa presents an average value of 5.34 and a standard deviation of 1.35.

The variable purchase intention is composed by 4 items (see table 2). The item with a highest average value is Pin3 (mean=5.00). On contrary, item Pin4 has the lowest average with a value of 4,44. Regarding to standard deviation, PIn1 shows the lowest value of 1.55. The new construct PIn presents an average value of 4.71 and a standard deviation of 1.46.

The variable emotion is composed by 4 items. The item with a highest average value is EM2 (mean=5.71). On contrary, item EM3 has the lowest average with a value

of 5.38. Regarding to standard deviation, EM1 shows the lowest value of 1,44. Both EM3 and EM4 present the same standard deviation value ($\alpha=1.64$). The new construct EM presents an average value of 5.57 and a standard deviation of 1.38.

Structural results

A PLS-SEM (partial least squares-structural equation model) approach using SmartPLS 3.0 was used to test the model. PLS-SEM was considered suitable for analysing the current data due to its fit under small-medium sample sizes that are common in laboratory experiments. Using the guideline proposed by Hair et al. (2010), the analysis was conducted on two levels: a first-order constructs level and a second-order construct level to analyse the four dimensions of mental imagery: vividness, quantity, valence, and modality.

At the first-order construct level, item reliability was analysed. Reliability measures the internal consistency between all the items which belong to a construct (Götz et al., 2010). Cronbach's alpha and composite reliability should be above 0.7 (Hair *et al.*, 2010) to be accepted. All composite reliability values are above 0.8. Regarding Cronbach's alpha values, all variables exceeds 0.7, except for Presence which has a Cronbachs' alpha = 0.675, very close to the acceptable limit. Convergent validity was measured using Average Variance Extracted (AVE) and the minimum value of 0.5 was met for all the constructs (see table 3).

Insert table 3 about here

Discriminant Validity was also according to the levels required by the Fornell-Larcker criteria. Here, the square root of AVE of all constructs needs to be greater than its highest correlation with any other construct (Henseler, et al., 2016) .Table 4 shows the results.

Insert table 4 about here

Regarding the second-order construct, we have the parameter estimates of the indicator weights, significance of the weight (t-student) and multicollinearity for mental imagery's dimensions. First, weight indicator measures the contribution of each item to the variance of the latent variable. According Chin, Marcolin and Newsted (2003) the recommended indicator weight should be above 0.2. All the items have values equal or above 0.2, except for the quantity sub-dimension of mental imagery. Table 5 shows that the items show positive beta weight, therefore they contribute significantly for the latent variable. Even though, quantity sub-dimension weight is equal to 0.07, the item shows a positive significance for the construct, so the construct was accepted. A high multicollinearity among dimensions would produce unstable estimates and would make it difficult to separate the effect of the individual dimensions on the construct (Petter, Straub, & Rai, 2007). The degree of multicollinearity among the formative indicators should be assessed by variance inflation factor (VIF) (Fornell & Bookstein, 1982). The VIF indicates how much an indicator's variance is explained by the other indicators of the same construct and should be below 3.33. All the constructs meet that threshold, except for vividness, which is very close to the acceptable value and below the less conservative threshold of 5.

Insert table 5 about here

A bootstrapping method (using 500 samples) was applied to estimate the statistical significance of the effects between each construct. This non-parametric method is used to obtain the standard errors of the estimates (Chin, Marcolin, & Newsted, 2003; Hair *et al.*, 2010). Regarding the established hypotheses, not all paths coefficients were found

significant. Table 6 shows the results for each hypothesis. Hypothesis H1, H2, H3, H5 and H6 are fully supported, while H4 is not supported.

Insert table 6 about here

The model explained 61.5% of the total variance of Purchase Intention and 55.7% of Emotions construct, while Q^2 - the level of predictive power – is positive in both cases, which shows that the model is able to predict new data (see table 7).

Insert table 7 about here

Table 8 shows the hypothesis that were supported.

Insert table 8 about here

Discussion and Conclusions

Bogicevic *et al.* (2019) suggest that in the new technologic world, Virtual Reality can be a significant stimulus to increase Marketing outcomes. While being exposed to strong stimuli, consumers long-term memory has an influence on consumer behavioural responses (Yoo & Kim, 2014), namely on purchase intentions and positive emotions (Bilro, Loureiro, & Guerreiro, 2019).

The current results show that mental imagery leads to a purchase intention in a virtual setting ($\beta = 0.307$), which means that, when in the VR shopping experience, mental imagery explains the purchase intention variable, therefore, H1 is supported. The effects of mental imagery on purchase intention that were found in the current study bring implications for both academics and managers. The study shows that memory cues are important drivers of purchase in VR, which confirm that brand cues may be important not only in the physical environment and e-commerce (Kulshreshtha, Tripathi & Bajpai, 2017) but also on virtual environments. Therefore, the findings suggest that brands should highlight both intrinsic and extrinsic cues in the virtual

setting. Regarding emotions, results show that there is a relationship between mental imagery and emotions ($\beta = 0.611$), thus supporting H2. It is crucial to highlight that the positive effect of mental imagery in emotion was the strongest direct effect of whole model, pointing out the crucial role that mental imagery may play in the generated emotions. Indeed, emotional responses occur when our cognitive senses are stimulated (Miller, Hadjimarcou, & Miciak, 2000) and according to mental imagery definition, this is exactly what happens when mental images take a lead role in the brain.

Product involvement is the way customers perceive the relevance of a product, brand or category (Calvo-Porrá, Vega, & Mangin, 2018). The product involvement is not the same for all consumers. The level of involvement will determine the consumers' attitude towards the product; therefore, brands should approach the audience taking their involvement level into account. Here, VR has an important role. According Cowan and Ketron (2019) the use of VR, as marketing tool, has a different impact depending on the degrees of involvement. In fact, VR enhances engagement and communication with customers who are highly involved leading to a product purchase. The current study confirms the results obtained by Cowan and Ketron (2019). Results show that product involvement leads to a purchase decision in a VR setting ($\beta = 0.203$). Therefore, when in the virtual shopping experiences, consumer who is highly involved with the product/brand, tend to be more prone to buy the product. Thus, product involvement explains purchase intention in a virtual setting (H3 is supported).

Calvo-Porrá, Vega and Mangin (2018) highlighted the importance of product involvement on emotions. According to the authors, the positive or negative emotions are related to product involvement. High involvement is linked to positive and pleasurable emotions, while low involvement leads to negative emotions. In Calvo-Porrá, Vega and Mangin (2018) case the products involved were wine (high

involvement) and coffee (low involvement). However, our results show that product involvement does not affect emotions on a VR setting and H4 is not supported.

One of the most important characteristics of virtual reality is the feeling of physical presence in a virtual world. Some authors suggest that this characteristic is very important to engage customers and consequently leads to positive emotions and also purchase behaviours (Sands, Oppewala, & Beverlan, 2015). Marketers found that virtual reality and this feeling of presence can be a tool to enhance sensory perceptions. Therefore, when atmosphere conditions stimulate our senses, there is an emotional response. The current results show that presence leads to a purchase decision ($\beta = 0.491$). Therefore, when the consumers feel a sense of physical present in a virtual world they show a higher intention to buy the product, thus supporting H5. Presence was also found to positively affect emotions ($\beta = 0.191$). This means that interactivity and immersion experienced on virtual supermarket enhances emotions, thus supporting H6. However, the positive relationship between presence and emotion was the weakness direct effect of model.

The current study contributes to the literature by showing that a shopping virtual environment influences the consumers purchase intentions and emotions. Findings show that mental imagery, product involvement and presence have positive direct effect on purchase intention and emotions.

The findings suggest that, in order to develop a better experience within a virtual store, managers should create an atmosphere focused on strong mental imagery cues, which will lead to positive emotions and influence the consumers purchase decision. Results also showed that when consumers are totally immersed in the virtual shopping environment (a high presence perception), both emotions and purchase intention increases. Therefore, managers should develop virtual

environments that promote such escapism effect. In conclusion, the current study emphasizes the importance of creating the right atmosphere for a better shopping experience. Marketers must provide a personalized shopping experience given the different variables that influence the shopper's behaviour.

Despite the contributions of the study, there are some limitations that should be acknowledged. First, the main limitation relies on the sample size of only 108 participants. However, given the laboratory condition of the study, the current experiment presents a high internal validity at the expense of external validity. The sample was also composed mainly of women. Such sample bias may be explained by the fact that women are still the most active buyers of laundry products. A more extensive and diversified sample could strengthen the results found in our study. It would also be interesting to sample participants in a real shop environment and compare the differences between a real and virtual setting.

For future research, we believe that other constructs could also present interesting results in the virtual setting, namely to explore the level of consumer satisfaction with the virtual shopping environment, and how such satisfaction would lead to recommending the experience to others through word-of-mouth (Sharma & Srivastava, 2017).

References

- Amegbe, H., Owino, J. O., & Kerubo, O. L. (2017). Behavioural responses to corporate image building through social media advertising: A study among Nairobi students. *Journal of Creative Communications*, 12(3), 223-238.
- Bilro, R.G., Loureiro, S.M.C., & Guerreiro, J. (2019). Exploring online customer engagement with hospitality products and its relationship with involvement, emotional states, experience and brand advocacy. *Journal of Hospitality Marketing & Management*, 28(2), 147-171.
- Bogicevic, V., Seo, S., Kandampully, J. A., Liu, S. Q., & Rudd, N. A. (2019). Virtual reality presence as a preamble of tourism experience: The role of mental imagery. *Tourism Management*, 74, 55-64.

- Boyd, D. E., & Koles, B. (2019). Virtual reality and its impact on B2B marketing: A value-in-use perspective. *Journal of Business Research*, 100, 590-598.
- Calvo-Porrá, C., Ruiz-Vega, A., & Lévy-Mangin, J. P. (2018). Does product involvement influence how emotions drive satisfaction?: An approach through the Theory of Hedonic Asymmetry. *European Research on Management and Business Economics*, 24(3), 130-136.
- Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Information systems research*, 14(2), 189-217.
- Cowan, K., & Ketron, S. (2019). A dual model of product involvement for effective virtual reality: The roles of imagination, co-creation, telepresence, and interactivity. *Journal of Business Research*, 100, 483-492.
- Deng, X., Unnava, H. R., & Lee, H. (2019). "Too true to be good?" when virtual reality decreases interest in actual reality. *Journal of Business Research*, 100, 561-570.
- Evans, P., & Wurster, T. S. (1999). Getting real about virtual commerce. *Harvard Business Review*, 77(6), 83-94, doi:10.1111/j.1460-2466.2010.01532.x.
- Fornell, C., & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research*, 19(4), 440-452.
- Götz, O., Liehr-Gobbers, K., & Krafft, M. (2010). Evaluation of structural equation models using the partial least squares (PLS) approach. In *Handbook of partial least squares* (pp. 691-711). Springer, Berlin, Heidelberg.
- Grewal, D., Roggeveen, A. L., & Nordfält, J. (2017). The Future of Retailing. *Journal of Retailing*, 93(1), 1-6.
- Ha, S., Huang, R., & Park, J. S. (2019). Persuasive brand messages in social media: A mental imagery processing perspective. *Journal of Retailing and Consumer Services*, 48, 41-49.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis*. Harlow: Pearson.
- Henseler, J., M Ringle, C., & Sarstedt, M. (2016). Testing measurement invariance of composites using partial least squares. *International Marketing Review*, 33(3), 405-431.
- Hyun, M. Y., & O'Keefe, R. M. (2012). Virtual destination image: Testing a telepresence model. *Journal of Business Research*, 65(1), 29-35.
- Krasonikolakis, I., Vrechopoulos, A., & Pouloudi, A. (2014). Store selection criteria and sales prediction in virtual worlds. *Information & Management*, 51(6), 641-652. doi:10.1016/j.im.2014.05.017
- Krasonikolakis, I., Vrechopoulos, A., Pouloudi, A., Dimitriadis, S. (2018). Store layout effects on consumer behavior in 3D online stores. *European Journal of Marketing*, 52(5/6), 1223-1256. doi:10.1108/EJM-03-2015-0183
- Kulshreshtha, K., Tripathi, V., & Bajpai, N. (2017). Impact of brand cues on young consumers' preference for mobile phones: A conjoint analysis and simulation modelling. *Journal of Creative Communications*, 12(3), 205-222.
- Ly, X., Li, H., & Xia, L. (2020). Effects of haptic cues on consumers' online hotel booking decisions: The mediating role of mental imagery. *Tourism Management*, 77, 104025.
- Loureiro, S., Bilro, R., & Japutra, A. (2020). The effect of consumer-generated media stimuli on emotions and consumer brand engagement. *Journal of Product & Brand Management*, 29(3), 387-408. <https://doi.org/10.1108/JPBM-11-2018-2120>

- Loureiro, S. M. C., Guerreiro, J., Eloy, S., Langaro, D., & Panchapakesan, P. (2019). Understanding the use of Virtual Reality in Marketing: A text mining-based review. *Journal of Business Research*, 100, 514-530.
- Loureiro, S. M. C., Guerreiro, J., & Ali, F. (2020). 20 years of research on virtual reality and augmented reality in tourism context: A text-mining approach. *Tourism Management*, 77, 104028.
- Loureiro, S.M.C., & Ribeiro, L. (2014). Virtual Atmosphere: The effect of Pleasure, Arousal and Delight on Word-of-mouth of Male and Female. *Journal of Promotion Management*, 20(4), 452-469. doi: 10.1080/10496491.2014.930283
- Marsh, T. (2003). Presence as experience: Film informing ways of staying there. *Presence: Teleoperators & Virtual Environments*, 12(5), 538-549.
- Mizell, D., Jones, S. P., Slater, M., & Spanlang, B. (2002). *Comparing immersive virtual reality with other display modes for visualizing complex 3D geometry*. London: University College London, Department of Computer Science.
- Miller, D. W., Hadjimarcou, J., & Miciak, A. (2000). A scale for measuring advertisement-evoked mental imagery. *Journal of Marketing Communications*, 6(1), 1-20.
- Pizzi, G., Scarpi, D., Pichierri, M., & Vannucci, V. (2019). Virtual reality, real reactions?: Comparing consumers' perceptions and shopping orientation across physical and virtual-reality retail stores. *Computers in Human Behavior*, 96, 1-12.
- Peukert, C., Pfeiffer, J., Meißner, M., Pfeiffer, T., & Weinhardt, C. (2019). Shopping in virtual reality stores: The influence of immersion on system adoption. *Journal of Management Information Systems*, 36(3), 755-788.
- Peng, L., Zhang, W., Wang, X., & Liang, S. (2019). Moderating effects of time pressure on the relationship between perceived value and purchase intention in social E-commerce sales promotion: Considering the impact of product involvement. *Information & Management*, 56(2), 317-328.
- Petter, S., Straub, D., & Rai, A. (2007). Specifying formative constructs in information systems research. *MIS quarterly*, 623-656.
- Pizzi, G., Scarpi, D., Pichierri, M., & Vannucci, V. (2019). Virtual reality, real reactions?: Comparing consumers' perceptions and shopping orientation across physical and virtual-reality retail stores. *Computers in Human Behavior*, 96, 1-12.
- Sama, R. (2019). Impact of Media Advertisements on Consumer Behaviour. *Journal of Creative Communications*, 14(1), 54-68.
- Sands, S., Oppewal, H., & Beverland, M. (2015). How in-store educational and entertaining events influence shopper satisfaction. *Journal of Retailing and Consumer Services*, 23, 9-20.
- Shankar, V., Inman, J. J., Mantrala, M., Kelley, E., & Rizley, R. (2011). Innovations in shopper marketing: current insights and future research issues. *Journal of Retailing*, 87, S29-S42.
- Sharma, R. W., & Srivastava, D. (2017). Measuring customer response to word-of-mouth messages on social media: Development of a multi-item scale. *Journal of Creative Communications*, 12(3), 185-204.
- Shi, Z., Wang, H., Wei, W., Zheng, X., Zhao, M., Zhao, J., & Wang, Y. (2016). Novel individual location recommendation with mobile based on augmented reality. *International Journal of Distributed Sensor Networks*, 12(7), 1550147716657266.
- Souidena, N., & Ladharia, R. (2018). New trends in retailing and services. *Journal of Retailing and Consumer Services*, 50, 1-3.

Spears, N., & Singh, S. N. (2004). Measuring attitude toward the brand and purchase intentions. *Journal of current issues & research in advertising*, 26(2), 53-66.

Van Kerrebroeck, H., Brengman, M., & Willems, K. (2017). Escaping the crowd: An experimental study on the impact of a Virtual Reality experience in a shopping mall. *Computers in Human Behavior*, 77, 437-450.

Xu, X., Chen, R., & Jiang, L. (2020). The Influence of Payment Mechanisms on Pricing: When Mental Imagery Stimulates Desire for Money. *Journal of Retailing*, 96(2), 178-188.

Yoo, J., & Kim, M. (2014). The effects of online product presentation on consumer responses: A mental imagery perspective. *Journal of Business Research*, 67(11), 2464-2472.

Figure 1. Proposed model

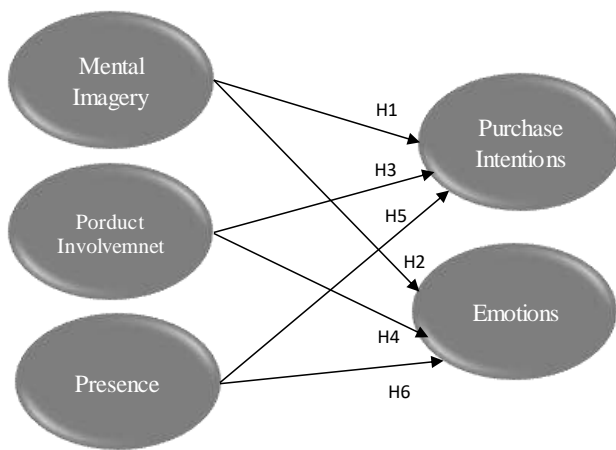


Figure 2. Scenario of the virtual supermarket



Table 1. Sociodemographic Data – Frequency of going to the supermarket

		Frequency	Percentage (%)
How many times go to the supermarket	Every two months	2	1.9
	Monthly	60	55.6
	Biweekly	29	26.9
	Rarely	4	3.7
	Weekly	9	8.3
	Semianually	3	2.8
	Quarterly	1	0.9
	Total	108	100

Table 2. Descriptive statistics

Items	Mean	Std Deviation
Product Involvement		
PI1: For me, going to the supermarket is important	5.39	1.65
PI2: For me, going to the supermarket is a concern	4.66	1.87
PI3: For me, going to the supermarket means a lot to me	3.69	1.89
PI4: For me, going to the supermarket matters to me	4.41	1.94
CONSTRUCT PI	4.54	1.49
Presence		
PRE1: I felt I was in the virtual supermarket	5.59	1.50
PRE2: I forgot I was in the middle of an experience	4.23	1.87
PRE3: My body was in the room, but my mind was inside the virtual supermarket	5.34	1.53
PRE4: The supermarket seemed to me "somewhere I visited" rather than "something I saw"	5.03	1.70
PRE5: I forgot about my immediate surroundings when I was navigating through the supermarket	4.84	1.79
PRE6: When the experience ended, I felt like I came back to the 'real world'	5.21	1.78
CONSTRUCT PRE	5.04	1.17
Mental Imagery – Quantity		
MiQt1: While I watched the assortment, many images came to my mind	4.18	1.84
MiQt2: While I watched the assortment, a lot of images came to my mind	4.19	1.59
MiQt3: While I watched the assortment, few images came to my mind	3.49	1.85
CONSTRUCT MiQt	3.95	1.08
Mental Imagery – Modality		
MiMo1: While I watched the assortment, I imagined sounds	5.03	1.77
MiMo 2: While I watched the assortment, I imagined scents	3.96	2.01
MiMo3: While I watched the assortment, I imagined sensations	4.78	1.80
MiMo4: While I watched the assortment, I imagined visual scenes	4.45	1.80
CONSTRUCT MiMo	4.56	1.36
Mental Imagery-Vividness		

MiVi1: The images that come to my mind while I watched were clear	5.14	1.59
MiVi2: The images that come to my mind while I watched were vivid	4.88	1.62
MiVi3: The images that come to my mind while I watched were distinct	5.05	1.61
MiVi4: The images that come to my mind while I watched were shiny	4.96	1.50
MiVi5: The images that come to my mind while I watched were intense	4.73	1.61
MiVi6: The images that come to my mind while I watched were realistic	5.64	1.35
MiVi7: The images that come to my mind while I watched were weak	2.92	1.73
CONSTRUCT MiVi	4.76	1.09
<i>Mental Imagery- Valence</i>		
MiVa1: The images that come to my mind while I watched the assortment were pleasant	5.42	1.39
MiVa2: The images that come to my mind while I watched the assortment were good	5.42	1.41
MiVa3: The images that come to my mind while I watched the assortment were positive	5.54	1.41
MiVa4: The images that come to my mind while I watched the assortment were fun	4.99	1.61
CONSTRUCT MiVa	5.34	1.35
<i>Purchase Intention</i>		
Pin1: High purchase interest	4.71	1.67
Pin2: I was intended to buy	4.69	1.80
Pin3: Probably bought it	5.00	1.55
Pin4: Definitely bought it	4.44	1.89
CONSTRUCT Pin	4.71	1.46
<i>Emotions</i>		
EM1: The virtual supermarket is fun	5.65	1.36
EM2: The virtual supermarket is interesting	5.71	1.44
EM3: The virtual supermarket is exciting	5.38	1.64
EM4: The virtual supermarket is appealing	5.54	1.64
CONSTRUCT EM	5.57	1.38

Table 3. Measurement results-first order construct level

	Cronbach's Alpha	Composite Reliability	AVE
Modality	0.800	0.881	0.714
Presence	0.675	0.820	0.608
Product involvement	0.834	0.899	0.748
Purchase intention	0.841	0.893	0.677
Quantity	0.701	0.789	0.514
Valence	0.962	0.972	0.898
Vividness	0.938	0.953	0.802
Emotions	0.926	0.948	0.820

Table 4. Discriminant Validity- Fornell-Larcker Criterion

	Modality	Presence	Product involvement	Purchase intention	Quantity	Valence	Vividness	Emotions
Modality	0.845							
Presence	0.399	0.780						
Product involvement	0.156	0.185	0.865					
Purchase intention	0.526	0.711	0.349	0.823				
Quantity	0.289	0.727	0.021	0.635	0.717			
Valence	0.712	0.480	0.208	0.579	0.391	0.948		
Vividness	0.613	0.604	0.142	0.560	0.452	0.843	0.895	
Emotions	0.591	0.560	0.175	0.573	0.303	0.689	0.693	0.905

Table 5. Measurement Results – Second order construct level

	Weight	t-value	VIF
Modality	0.20	10.77	2.03
Quantity	0.07	5.78	1.26
Valence	0.41	15.14	3.29
Vividness	0.45	19.24	3.61

Table 6. Structural Results

Path	Coefficient Beta	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values
Mental imagery -> P.Intention	0.307	0.096	3.203	0.001
Mental imagery -> Emotions	0.611	0.083	7.349	0.000
P.Involvement -> P.Intention	0.203	0.070	2.918	0.004
P.Involvement -> Emotions	0.029	0.060	0.492	0.623
Presence -> P.Intention	0.491	0.069	7.149	0.000
Presence -> Emotions	0.191	0.058	3.271	0.001

Table 7 Predictive relevance and validity

Construct	Q ²	R ²
Purchase intention	0.344	0.615
Emotions	0.373	0.557

Table 8. Hypothesis of the study

Hypothesis	Description	Result
H1	Mental imagery is positively associated to Purchase intention	Supported
H2	Mental imagery is positively associated to Emotions	Supported
H3	Product involvement is positively associated to Purchase Intention	Supported
H4	Product involvement is positively associated to Emotions	Not Supported
H5	Presence is positively associated to Purchase intention	Supported
H6	Presence is positively associated to Emotions	Supported