“Too true to be good?” when virtual reality decreases interest in actual reality

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\textbf{ABSTRACT}

Virtual Reality (VR) technologies enable marketers to design websites that simulate experiential consumption (e.g., museum visits, leisure travel) closely. While the motivation for employing VR-style websites is to attract people to consume the experience in real life, we proposed and found that VR-style (vs. traditional) websites may dissuade them from future consumption (Study 1). We argued that perceived similarity between virtual and real experiences mediates this negative effect. Study 2 suggested that because people's enduring involvement with a product determines their ability to discriminate well between episodes of product experience, it causes variation in both perceived similarity and consumption intention, with the former mediating the latter. Study 3 showed that this negative effect reversed in experiences in which perceived similarity was low. Study 4 demonstrated that this negative effect disappeared when perceived similarity is irrelevant to the consumption decision, for example, when the decision is whether or not to recommend the experience to a friend.

1. Introduction

Virtual Reality (VR) is a computer-generated scenario that simulates an immersive, lifelike experience grounded in reality. Through VR technology, people can experience the feeling of actually being in “another place” above and beyond the information made available by the computer (Berg & Vance, 2017). As “another place” could be a retail store, restaurant, hotel room, tourist destination, etc., VR holds great potential for marketers to promote their products and services. To the extent that visualizing, interacting with, and experiencing, a product can engage consumers and increase their likelihood to purchase and use the product (Babin & Burns, 1997; Dahl & Hoeffler, 2004; Phillips, 1996; Phillips, Olson, & Baumgartner, 1995), VR has the potential to become a highly effective marketing tool.

VR applications indeed are becoming increasingly popular in marketing, as more firms have redesigned their websites to offer customers a highly interactive and vivid VR experience. Although past work has focused on VR’s positive effects on consumer responses, in this research, we explored the possibility that such experiences may have a negative influence on consumers’ intentions to purchase a product promoted in a VR platform, and we assessed this research question in the domains of museum visits and leisure travel. Specifically, we used “Google Art Project” (hereafter, GAP) and “Google World Wonder Project” (hereafter, GWWP) in our studies as VR-style websites delivering experiences of museums and tourist destinations, respectively, that simulate reality well, and tested whether these experiences reduced participants’ interest in visiting the museum or destination physically.

In the sections that follow, we first present theoretical arguments about why a VR experience can dampen consumers’ interest in pursuing the real experience subsequently. We propose further the mediating and moderating factors of this effect, as well as a possible alternative explanation. After reporting the results of four experiments, we discuss the way in which our findings contribute to marketing theory and practice.

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2. Theoretical background

2.1. Google art project provides almost real VR Museum experiences

VR is a simulated environment wherein people feel “present” (Biocca, 1992; Kim & Biocca, 1997; Riva, 2007; Steuer, 1992). This feeling of presence, a phenomenon referred to as “teleoscope,” occurs when a virtual environment provides a high level of “interactivity” and “vividness” (Coyle & Thorson, 2001; Klein, 2002; Steuer, 1992). Interactivity allows users to manipulate an object online directly, and view the results of their manipulation in real time. Thus, the virtual environment responds to the user’s behaviors “as if” these actions were occurring in the physical world. This “as if responding” thus blurs the boundary between virtual and physical reality (Biocca, 1992). Vividness, on the other hand, provides sensory breadth (the number of different sensory channels that a medium uses) and depth (the resolution or quality of the information transmitted to the senses) to the stimuli (Steuer, 1992).

GAP (www.googleartproject.com1) is an online platform through which the public can access high-resolution images of artworks housed in 290 museums around the world (e.g., MoMA [www.google.com/culturalinstitute/beta/partner/moma-the-museum-of-modern-art], Tate Britain [www.google.com/culturalinstitute/beta/partner/tate-britain], and the Palace of Versailles [www.google.com/culturalinstitute/beta/partner/palace-of-versailles]). This online platform provides nearly real, VR-style museum experiences because the experience excels in both the dimensions of interactivity and vividness. Equipped with Google’s “Street View” technology and gigapixel (over 1 billion pixels) image-capturing capabilities, the website allows users to “walk through” the museum’s grand halls and galleries virtually (see Fig. 1A), and zoom in on a particular artwork to see detail that is difficult to catch even when one visits the museum physically (see Fig. 1B, C). While not all art pieces in the museums are available on the site, each museum curates a substantial collection of paintings, sculptures, and artifacts that a visitor to the website can view. By enabling high interactivity via Google Street View and high vividness via gigapixel image capturing, GAP creates a telepresence through which users can tour the museum “virtually.”

Before GAP (which Google launched in 2011), traditional museum websites provided previews of exhibits through blocks of text and graphics, a format with low interactivity and vividness. Such websites respond to a user’s search for information in a static (vs. interactive) way. For example, to view the collection of contemporary art, a user cannot “walk” through the gallery; instead, s/he clicks on the link and waits for the information to appear on the screen. This experience does not conform to human’s natural physical behaviors: it is 2-D (i.e., through web pages) rather than 3-D (through changes in space), and the “as if responding” is lost. Moreover, traditional websites do not support gigapixel close-up views of artworks, so the experience is less vivid.

2.2. VR decreases interest in actual reality: The role of similarity

We predicted that, relative to a traditional website with low interactivity and vividness, browsing a museum on a VR-style, highly interactive and vivid website (such as GAP) likely will decrease people’s needs for actual museum experiences. This is because, if people perceive the virtual museum experience to be nearly real, or highly similar to the actual museum experience, they will deem the latter “repetitious,” and thus not worth their time and money. While repeated consumption is common for material goods, such as consumer packaged goods, it is relatively rare for information and experiential goods (books, movies, shows, museum visits, leisure travel, etc.). First, because these products largely are consumed to satisfy the desires for emotion, fantasy, fun, novelty, etc., rather than to fulfill utilitarian functions (Holbrook & Hirschman, 1982), they will lose value if experienced repeatedly. Second, consuming these products uniquely requires “psycho-temporal” resources on the part of the consumer (Hirschman & Holbrook, 1982), which not only is time-consuming, but also engages the consumer’s cognitive activity to create excitement, evoke fantasies, and transport the consumer to a more desirable reality (Hirschman & Holbrook, 1982). Thus, if consumers have experienced such a product through VR-style websites already, they might not choose to purchase the product to consume in the future because they consider it less valuable and want to avoid future investment of psycho-temporal resources. If this is true, nearly real virtual experiences will then “cannibalize” real experiences.

The concept of satiation supports our prediction, as it states that, as people consume more units of a product, they acquire less utility per unit (Andersen, 2001). Further, habituation refers to a process in which people respond less to a stimulus as they are exposed to it repeatedly (McSweeney & Swindell, 1999). Both of these phenomena suggest that repetition causes consumers’ desire for a future consumption experience to decrease if they believe it will not differ significantly from the current experience. Consistent with this idea, Sood and Dréze (2006) showed that consumers may avoid a movie’s sequel if its title leads them to believe that it will be similar to the original movie. From the perspective of our research, we predicted that if the actual museum experience is perceived to be sufficiently similar to the virtual experience, people’s intention to visit the museum physically will decrease. Thus, Study 1 tested the main hypothesis that browsing a museum on a VR-style (vs. traditional) website leads to decreased intention to visit the museum.

The above theorizing suggests that the perception of similarity between virtual and real experiences mediates the effect discussed. Next, we discuss two moderators that are supportive of perceived similarity as the underlying mechanism: the consumer’s enduring involvement with the experience as simulated on the VR-style website and the type of experience simulated.

2.3. Enduring involvement with the experience

An individual difference variable that influences the extent to which consumers can discern differences between different episodes of product experiences is their enduring involvement (hereafter, EI) with the product. Research on product involvement has distinguished two types of involvement: situational versus enduring (Bloch & Richins, 1983; Zaichkowsky, 1985). While situational involvement with products occurs only in specific situations, such as a purchase, EI is considered a stable trait that reflects an individual’s degree of interest in, or arousal by, a product on a daily basis. In EI, as in the cases of product fanaticism exhibited by camera buffs, car enthusiasts, wine connoisseurs, etc., the emphasis is on the product itself and the intrinsic satisfaction its use provides, rather than on extrinsic goals, such as purchase optimality (Richins & Bloch, 1986).

As discussed earlier, if consumers believe their future consumption experience will be similar to the current experience delivered through VR, their desire for the future consumption experience decreases. However, we argue that EI may moderate this effect, because it affects the perceived similarity (or difference) between various consumption experiences. EI manifests in attention to product-related information and opinion leadership (Richins & Bloch, 1986). Consumers may maintain a high level of vigilance for information concerning the product (e.g., news, ads, exhibits, etc.) and engage in word-of-mouth and other product-related activities, such as product nurturance (product

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1 Named “Google Art Project” when launched in 2011, this Google initiative is now called “Google Arts and Culture.” See https://en.wikipedia.org/wiki/Google_Art_Project. A demo video is available at: https://www.youtube.com/watch?v=x4Zd5Ye1RR8& t=115.

2 On a museum’s webpage, users need to click the “explore” or street view icon ( ) to enter the VR mode.
maintenance and enhancement) and recreation (recreational use of the product, e.g., joining product-related clubs, competing in product-related contests, Bloch & Richins, 1983). It is through these extensive product exposures and experiences that individuals with high EI develop an acumen to identify and appreciate the subtle differences between many consumption episodes in their chosen domain. Thus, these individuals possess an enhanced ability to discriminate between seemingly similar experiences (e.g., a web-based experience vs. the real experience).

Based on this theorizing, we postulated that EI moderates the effect of virtual experience on the intention to engage in the actual experience. Therefore, in Study 2, we tested whether people with high (vs. low) EI with museum visits perceive virtual experiences to be less similar to actual experiences and thus demonstrate a greater interest in actual museum experiences. We also tested whether perceived similarity between virtual and actual experiences mediates consumption intention.

### 2.4. Type of experience simulated by VR

Categorization of leisure activities can be found in literature related to activity analysis, leisure, time use, and travel. Tinsley and Eldredge (1995) developed a taxonomy of 11 classes of leisure behavior based on the behavior's psychological benefits: agency (e.g., jogging, swimming); novelty (e.g., backpacking, nature walks); belongingness (e.g., team sports); service (e.g., attending church, visiting friends); sensual enjoyment (e.g., attending plays and musical performances); cognitive stimulation (e.g., art shows and galleries, reading); self-expression (e.g., ceramics, collecting stamps); creativity (e.g., painting, guitar playing); competition (e.g., cards, computer games); vicarious competition (watching basketball, football), and relaxation (e.g., listening to radio, watching television).

Previous research (e.g., Mokhtarian, Salomon, & Handy, 2006) has suggested that some activities, such as those in the “agency” and “novelty” categories, are difficult to simulate well online, even with the
most sophisticated information technologies, because these activities fulfill the need for vigorous outdoor activity or to experience things that are missing from one's daily routine. In contrast, activities in the "cognitive stimulation," "vicarious competition," or "sensual enjoyment" categories are relatively simple to simulate online, because the need is for content that generates intellectual and/or sensual stimulation.

It is worth noting that museum visits, and attending galleries and art exhibits in general, is included in the "cognitive stimulation" category, which explains why virtual and actual museum visits may be considered similar, thereby reducing the intention to visit the actual museum in future. Because the content (paintings, sculptures, artifacts, etc. and their contextual information) has been presented interactively and vividly in digital form, the need for the content can be satisfied through virtual experiences, thereby rendering a subsequent visit to the museum less desirable.

Based on this research, we identified leisure travel as one type of activity in which virtual experiences are less likely to be considered nearly real and lower the intention to consume in future. According to Tinsley and Eldredge (1995), leisure travel is a "novelty" activity, the primary psychological benefit of which is "compensation," i.e., to experience things that are missing from one's daily life. Similarly, the literature on tourist motivation suggests that the most important motive for pleasure vacation is to take a "break from routine," to seek "time out of time," and to "escape from a perceived mundane environment" (Crompton, 1979). Thus, the essence of a vacation involves changes in one's living context, and is more escape- (i.e., getting away) than approach-oriented (getting there, Iso-Ahola, 1982). Although current VR technologies can simulate physical presence in most places in the world, simulating the more important "getting away" aspects of a vacation still cannot be brought to life. In this sense, virtual experiences of leisure travel do not approximate reality well.

In Study 3, we compared museum visits and leisure travel to see whether the type of experience simulated via VR moderates the effect of virtual experiences on the interest in actual experiences. We expected that highly interactive, vivid VR experiences will reduce future intentions to visit museums, but not to engage in leisure travel. We predicted further that perceived similarity mediates this effect.

2.5. Perceived similarity versus substitutability

Before reporting our studies, we would like to distinguish our proposed mediator, perceived similarity, from a possible alternative explanation for virtual experiences' effect of decreasing interest in actual experiences, which is that consumers may consider the virtual experience a "substitute" for the actual experience. We argue that VR experiences' negative effect should be relatively "specific" ("general") if perceived similarity (substitutability) is the mechanism. Let us explain.

Perceived similarity implies that when people perceive that the virtual experience is highly similar to the actual experience, their interest in the actual experience will decrease because the virtual experience gratifies their need and leads to satiation, thus rendering the subsequent actual experience less desirable. Thus, the VR experience's negative effect on the interest in the real experience should hold only for those who have just had the VR experience. On the other hand, if the negative effect of the VR experience on the interest in a real experience is driven by the belief that VR can serve as a substitute for reality, this effect should be generally applicable. That is, if people think that whoever needs this type of experience, the VR experience can fulfill the need with similar quality, but lower cost relative to the real experience, then the real experience will lose its value and be readily replaced by the VR experience, regardless of the presence or absence of prior VR experiences.

Therefore, Study 4 was designed to tease apart these two mechanisms by asking participants to indicate their own willingness to visit the museum in the future (a decision in which their self-perceived similarity between current and future museum experiences is highly relevant) or the willingness to recommend the museum to a friend (a decision in which the participant's self-perceived similarity is irrelevant). If perceived similarity is the mechanism, then this effect (i.e., GAP reducing future museum visit intentions) should hold only in the self-consumption, but not in the recommended consumption situation, because the perception of similarity (between current and future museum experiences) and the resultant feeling of satiation should apply only to the self, but not to one's friend. However, if substitutability is the reason why GAP reduces intentions for a future museum visit, then this effect should hold in both self-consumption and recommended consumption conditions, because if people consider that GAP is a substitute for real museum experiences, they may as well recommend that to their friend, rather than the actual museum experience.

3. Summary of studies

We reported here four studies that tested the effect proposed, as well as the mediator (perceived similarity), the moderators (EI and type of experience), and a possible alternative explanation (substitutability). Study 1 demonstrated the main finding that browsing a museum on a highly interactive, vivid VR-style website, compared to a traditional one, reduced the intention to visit the museum in the future. Study 2 introduced an individual difference variable, one's EI with museum visits, which is likely to affect the degree of perceived similarity between virtual and actual experiences. The findings showed that this variable led to variation in both self-reported perceived similarity and consumption intention, and that the former mediated the latter. Study 3 manipulated the type of experience simulated online and showed that for experiences that are difficult to simulate well (e.g., leisure travel), highly interactive and vivid websites function just like static and less vivid ones, resulting in greater subsequent consumption intentions, especially for individuals with high EI. Again, perceived similarity between virtual and actual experiences meditated consumption intention. Finally, Study 4 manipulated whether participants considered visiting the museum themselves or recommending it to a friend. The findings supported the perceived similarity (vs. substitutability) mechanism—the virtual experience reduced only the self-consumption intention, but not the intention to recommend the actual experience to a friend.

4. Study 1: VR decreases interest in actual reality

4.1. Methods

Study 1 was conducted to test the main hypothesis that a highly interactive and vivid web experience, compared to a static, less vivid one, decreases the intention to engage in the experience promoted. Two hundred and seven undergraduate students participated in this computer-mediated study for course credit. At the beginning of the study, all participants were introduced briefly to the Art Institute of Chicago.23 Thereafter, they indicated how much they wanted to visit the Art Institute the next time they were in Chicago (−3 = Not at all to 3 = Very much). This measure assessed their "pre-VR" consumption

23The introduction read, “The Art Institute of Chicago is an encyclopedic art museum located in Chicago’s Grant Park, and has a permanent collection of Impressionist and Post-Impressionist art. Its holdings also include American art, Old Masters, European and American decorative arts, Asian art, and modern and contemporary art. It is located at 111 South Michigan Avenue in the Chicago Landmark Historic Michigan Boulevard District. The museum is associated with the School of the Art Institute of Chicago and is overseen by Director and President Douglas Druck. At one million square feet, it is the second largest art museum in the United States, following only the Metropolitan Museum of Art in New York City.”

4Chicago is approximately a five-hour drive from the campus on which all of the studies were conducted.
intention.

Participants were then randomly assigned to spend 10 min in a “virtual visit” to the Art Institute via either the museum’s official website (www.artic.edu, hereafter, ARTIC) or its GAP website (www.google.com/culturalinstitute/collection/the-art-institute-of-chicago?projectId=art-project). In both conditions, we provided detailed instructions on how to find different collections, as well as the artworks within each, and how to enlarge an artwork and access its contextual information. Participants were told to view as many artworks and collections as they wished within the 10 min. Immediately after this experience, their “post-VR” consumption intention was assessed using the same scale as the “pre-VR” measure.

4.2. Results and discussion

We created an index for each participant by subtracting the rating on pre-VR consumption intention from that on post-VR consumption intention to capture the change in future consumption intention as a function of the VR experience. A one-way between-subjects ANOVA (ARTIC vs. GAP) conducted on this index revealed a significant effect, such that the static, less vivid website led to a greater future intention to consume than did the interactive, vivid website: $M_{ARTIC} = 1.28$ versus $M_{GAP} = 0.85$; $F(1, 205) = 4.4$, $p = .038$.

In summary, Study 1 showed that an interactive, vivid VR experience reduced consumption intention compared to a web experience that does not approximate reality. In the next several studies, we tested whether perceived similarity between virtual and actual experiences serves as the underlying process. Specifically, Study 2 examined the mediating role of perceived similarity by introducing the individual difference variable, EI, that affects one’s ability to discern differences between product experiences. We tested whether this factor caused variation in both self-reported perceived similarity and consumption intention, and whether the former mediated the latter.

5. Study 2: Enduring involvement

5.1. Methods

Study 2 also was computer-mediated, and 80 undergraduate students participated in the study for course credit. We measured participants’ EI with attending museum exhibits using the 11-item EI scale ($\alpha = 0.96$) developed by Zaichkowsky (1985) and modified subsequently by McQuarrie and Munson (1987; see Appendix for all scale items).

The procedure was similar to the GAP condition in Study 1, except in two ways. First, we captured the difference between pre- and post-VR consumption intention directly rather than calculating it. Specifically, we asked, “On a $−50$ to $50$ scale, if your desire an hour ago to visit the museum the next time you are in Chicago was 0, what is the number that best describes your desire to visit the museum the next time you are in Chicago at this moment? If your desire increases, pick a positive number (1 to 50); if your desire decreases, pick a negative number (−1 to −50); if your desire remains unchanged, indicate 0.” Second, we measured perceived similarity by asking participants to indicate to what extent (−3 = Strongly disagree to 3 = Strongly agree) they agreed that (1) visiting the Art Institute of Chicago physically would feel the same as seeing its paintings via GAP, and (2) visiting the Art Institute of Chicago physically would have aspects that make it different from “visiting” it via GAP (reverse coded). These two items were combined to form a single index ($r = 0.73$).

Although EI can have a direct effect on consumption intention, we believe that part of its effect is indirect and mediated by the self-reported perceived similarity between virtual and actual experiences. We expected that, after an episode of virtual museum experience via GAP, as consumers’ EI (with museum visits) decreases, their perceived similarity between virtual and real museum experiences will increase, and, as a result, their intention to visit the museum in the future will decrease.

5.2. Results and discussion

5.2.1. Consumption intention

We rescaled the consumption intention scores from $−50$ to $−3$–$3$ so that the means were comparable to those in Study 1. Regressing the consumption intention scores on participants’ EI scores (Mean = 0.52, SD = 1.40) revealed a significant effect of EI ($\beta = 0.52$, $t(78) = 6.3$, $p < .0001$). The positive, linear slope of EI indicated that the higher the EI score, the greater the consumption intention.

5.2.2. Perceived similarity

Similarly, regressing the perceived similarity index on participants’ EI scores showed a significant effect of EI ($\beta = −0.24$, $t(78) = −2.3$, $p = .026$). The negative, linear slope of EI indicated that the higher the EI score, the less the perceived similarity. These results suggested that people with higher (vs. lower) EI are able to differentiate better between virtual and actual museum experiences, and we predicted that this ability should mediate their interest in visiting the museum physically.

5.2.3. Mediation analysis

We conducted an analysis through Hayes’ (2013) SAS macro with 5000 bootstrapped samples that provided support for the mediation mechanism proposed. Specifically, there was a significant indirect effect of EI on consumption intention through the hypothesized mediator, perceived similarity ($b = 0.50$, $SE = 0.03$; 95% confidence interval $[CI] = 0.01$ to 0.13).

Study 2 showed that after a virtual museum experience, people who had higher (vs. lower) EI with museum visits exhibited a greater intention to have an actual museum experience, because they reported a lower level of perceived similarity between the virtual and actual experiences. In Study 3, we examined the mediating role of perceived similarity further by manipulating the type of experience simulated and promoted online. We expected that for experiences (e.g., leisure travel) in which even a highly interactive and vivid website does not approximate reality well, such a website will function just like a traditional website and result in positive post-VR consumption intention.

6. Study 3: Type of experience

6.1. Methods

To ensure that the web experience of leisure travel was comparable to that of a museum visit, we used another Google initiative: GWWP5 (www.google.com/culturalinstitute/about/wonders/). This is an online platform that presents 3-D recreations of world heritage sites, such as the Pyramids of Giza in Egypt, archaeological sites at Pompeii in Italy, the Taj Mahal in India, etc. (www.google.com/culturalinstitute/beta/themes/2QlyV2DJ576Lg3Bl=en). Using Street View, 3D modeling, 360-degree image capturing, and other Google technologies, GWWP enables users to explore the world wonders from their armchairs as if they were there physically (see Fig. 2). The site also provides videos, photos, and factual information about each iconic site.

Study 3 also was computer-mediated. Two hundred and fifty-six undergraduate students participated in the study for course credit. The study included two factors: type of experience (visiting a museum vs. visiting a destination) which was manipulated between-subjects, and participants’ EI with the experience. The study procedure was similar to that of Study 1. First, participants were introduced briefly to either GAP

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5 Originally, this was an initiative separate from Google Art Project, but is now integrated with Google Arts & Culture.
or GWWP and given detailed instructions how to use the website. We then asked them to take a virtual trip to either the Art Institute of Chicago via GAP or the Historic Center of Florence via GWWP. We asked them to explore the museum/destination for 10 min as if they were there physically. They could “walk through” the galleries/streets, take 360-degree panoramic views, and use the “zoom in” function to get “close” to paintings/scenes of interest. After the VR experience, we measured the same variables (consumption intention, perceived similarity, and EI) as in Study 2. The EI items referred to either the museum visit or travel destination, depending on the condition.

6.2. Results and discussion

6.2.1. Consumption intention

We rescaled the consumption intention scores from −50–50 to −3–3 again so the means were comparable with previous studies. Regressing the consumption intention scores on the manipulation (type of experience), EI scores, and their interaction demonstrated significant main effects of type of experience ($F(1, 252) = 9.3, p = .003$) and EI ($F(1, 252) = 103.2, p < .0001$), and a significant interaction ($F(1, 252) = 6.0, p = .015$, see Fig. 3A). In general, the post-VR consumption intention was greater for “visiting the destination” than for “visiting the museum,” and the higher the EI, the greater the post-VR consumption intention. To decompose the significant interaction, we used regression to test the simple effect of EI for each type of experience, and floodlight analysis (Spiller, Fitzsimons, Lynch Jr, & McClelland, 2013) to test the simple effect of type of experience along the continuum of EI.

First, the regressions showed that the simple effect of EI on consumption intention was significant for both the museum ($\beta = 0.67, t(141) = 10.5, p < .0001$) and destination ($\beta = 0.41, t(111) = 5.0, p < .0001$). For both types of experiences, the slope of EI was positive and linear, indicating that the higher the EI, the greater the
A. Consumption Intention

Second, following Spiller et al.’s (2013) recommendation, we used the Johnson-Neyman technique to identify the range(s) of EI scores for which the simple effect of type of experience was significant. This analysis revealed that there was a significant effect of type of experience on consumption intention for participants whose EI scores were lower than 1.25 ($B_{23} = 0.28$, SE = 0.14, $p = .05$, see Fig. 3A). Thus, for participants who were motivated highly (those whose EI scores were > 1.25 on a scale of −3 to 3), the intention to visit the museum/destination in the future remained great regardless of type of experience. However, for those who were less motivated (EI < 1.25), the intention to visit the museum was significantly less than was the intention to visit the destination. We believe that this is because the virtual museum experience was perceived as highly similar to the actual museum experience, while the virtual travel experience was not. We tested this relation next.

6.2.2. Perceived similarity

Regressing the perceived similarity index on the manipulation (type of experience), EI scores, and their interaction revealed significant main effects of type of experience ($F(1, 252) = 4.3$, $p = .039$) and EI ($F(1, 252) = 9.1$, $p = .003$), and a significant interaction ($F(1, 252) = 4.3$, $p = .040$, see Fig. 3B). In general, perceived similarity was greater for the museum than for the destination and the greater the EI, the less the perceived similarity.

We again decomposed this significant interaction. First, regressions showed that the simple effect of EI on perceived similarity was significant for “visiting the museum” ($\beta = -0.26$, $t(141) = -4.2$, $p < .0001$) but not for “visiting the destination” ($\beta = -0.05$, $t(111) = -0.6$, $p = .53$). For the museum visit, the slope of EI was negative and linear, indicating that the higher the EI, the lower the perceived similarity between the virtual and actual experiences. For leisure travel, the null effect suggested that, for all participants, the virtual experience was not deemed similar to the actual experience.

Second, the floodlight analysis revealed that there was a significant effect of type of experience on perceived similarity for participants whose EI scores were lower than 0.27 ($B_{23} = -0.34$, SE = 0.17, $p = .05$, see Fig. 3B). Thus, participants who were less motivated (whose EI score < 0.27 on a scale of −3 to 3) reported a significantly higher rating of perceived similarity between virtual and actual experiences for the museum than for travel. This explains why their intention to visit the museum was significantly less than was their intention to visit the destination (see Fig. 3A).

B. Perceived Similarity

6.2.3. Mediation analysis

Based on the findings from Studies 1 and 2, we predicted that perceived similarity should mediate consumption intention. The analysis we conducted through Hayes’ (2013) SAS macro with 5000 bootstrapped samples provided support for the mediation mechanism. Specifically, the indirect effect of type of experience on consumption intention through the hypothesized mediator (perceived similarity) was significant ($b = 0.09$, SE = 0.05; 95% confidence interval [CI] = 0.02 to 0.22).

To summarize, Study 3 showed that a virtual experience of a tourist destination led to greater intentions to visit in future than did that of a museum, and this was the case particularly for individuals with low EI. It is noteworthy that the VR experiences of the museum and the tourist destination were equivalent with respect to interactivity and vividness because they were both delivered via Google platform. However, because they deal with experiential activities that pursue different goals (“novelty” vs. “cognitive simulation,” respectively), they lead to different levels of perceived similarity between virtual and actual experiences and thus future consumption intention. Specifically, because for leisure travel Google technologies can bring to life only the “getting there” component, but not the unique component of “getting away,” the virtual experience is not deemed to approximate reality. As a result, for leisure travel, VR experience increases, rather than decreases, interest in the real experience (as the consumption intention score was always greater than zero meaning a positive post-VR consumption intention, see the red line in Fig. 3A). This obviously is good news for those in the leisure travel or related businesses wherein the core product or experience is difficult to simulate well, as it suggests that marketers can use VR freely to promote their products without being concerned about its potential negative effect on interest in real experiences.

Studies 2 and 3 together provided consistent evidence that perceived similarity between virtual and actual experiences is the underlying mechanism of the effect observed. Specifically, Study 2 showed that for people who are more (vs. less) able to perceive the subtle differences between virtual and actual experiences, post-VR consumption intention was greater, and was mediated by self-reported perceived similarity. Study 3 found that, for activities in which the virtual experience is perceived as less (vs. more) similar to the actual experience, post-VR consumption intention was greater, and again, was mediated by perceived similarity. In the final study, we compare perceived similarity to a possible alternative mechanism, that in which virtual experience is considered a substitute for real experience, to provide additional support for our proposed mediator.
7. Study 4: Similarity versus substitutability

7.1. Methods

Study 4 was computer-mediated as well. Ninety-nine undergraduate students participated in the study for course credit. Similar to Study 1, participants spent 10 min on a “virtual visit” to the Art Institute of Chicago via either the ARTIC or GAP website. Orthogonal to this factor, a second factor was “self” versus “friend” consumption. In the “self” condition, participants reported their own intention to visit the museum; in the “friend” condition, participants imagined that a good friend who would be in Chicago for a couple days asked them to recommend places to visit and indicated how much they would like to recommend the Art Institute of Chicago. Thus, this study used a 2 × 2 between-subjects design in which participants were assigned randomly to one of the four conditions. The procedure was similar to that of Study 1, in that we measured pre- and post-VR consumption intention separately.

7.2. Results and discussion

As in Study 1, we created an index for each participant by subtracting the pre- from the post-VR consumption intention rating to capture the change in future intention to visit attributable to the VR experience. A 2 (ARTIC vs. GAP) × 2 (self vs. friend) ANOVA conducted on this index revealed only a significant interaction effect (F(1, 95) = 4.7, p = .032). Planned comparisons showed that the website with high interactivity and vividness (ARTIC) led to a greater consumption intention than did the website with high interactivity and vividness (GAP) only in the “self” condition (MARTIC = 0.92 vs. MGAP = 0.04; t(95) = 2.4, p = .019), but not in the “friend” condition (MARTIC = 0.70 vs. MGAP = 0.96; t(95) = 0.7, p = .480).

This pattern of results supported similarity (vs. substitutability) as the mechanism underlying the effect of website experience on consumption intention. If substitutability was the mechanism, we should have found the same negative effect of GAP (vs. ARTIC) on consumption intention in the “friend” condition as well, because if GAP was deemed a substitute for real museum experiences, even the friend would not need to spend the money and time to visit the museum physically. The fact that participants still were willing to recommend the museum to their friends indicated that, although their perceived similarity between the virtual and actual museum experiences affected their own decision to visit the museum, it was judged irrelevant to the decision of those who had not experienced the VR.

This obviously is good news for marketers interested in using VR to promote their products and services as it indicates that the negative effect of VR we observed in previous studies will not apply to consumers who have not had the VR experience. If, however, this negative effect is driven by substitutability, it should be more general and thus more damaging to marketers’ VR investment. Another good news to marketers is that perceived similarity as the underlying process suggests that the negative effect of VR is fleeting. Specifically, this mechanism implies that VR experiences decrease people’s interest in real experiences because the virtual experience gratifies their need, leads to satiation, and renders a subsequent actual experience less desirable. If this is true, then this negative effect should be relatively short-lived, such that, given time, people’s feelings of satiation will dwindle and their consumption intention will rebound to the pre-VR level (Galak, Kruger, & Loewenstein, 2011). At that time, to their refreshed minds, the real experience no longer will be considered a “repetition,” as the VR experience is now a distant memory.

8. General discussion

Recent advances in VR technologies enable marketers to design websites that simulate experiential consumption (e.g., museum visits, leisure travel) very closely. While the motivation to design such VR-style websites is to attract people to engage in the experience in real life, in this research, we proposed and found that highly interactive and vivid websites may dissuade them from future consumption compared to traditional websites (Study 1). We argued that perceived similarity (between virtual and real experiences) is the mediator and provided evidence for its mediating role in several ways (Studies 2–4). Study 2 suggested that because a person’s EI with the experience promoted influences his/her ability to discern differences between virtual and real experiences, it causes variation both in perceived similarity and consumption intention; moreover, the former mediates the latter. Study 3 indicated that for experiences (e.g., leisure travel) that are difficult to simulate online, interactive and vivid VR experiences are not perceived to be similar to the real experiences, and thus do not decrease, but actually increase, future consumption intentions. Study 4 showed that VR experiences that simulate reality well reduce only the self-consumption intention, but not the intention to recommend the experience to others, which supported perceived similarity as the underlying mechanism.

8.1. Theoretical contributions

Insofar as consumers preview and assess experiential products online before making purchase decisions, our research makes significant contributions to the marketing literature. First, while existing research has focused primarily on the positive effects of VR applications in promoting products and services (Coyle & Thorson, 2001; Shih, 1998; Suh & Lee, 2005), our studies demonstrated their negative influence. Specifically, we found that VR experiences do not always lead to favorable future consumption intentions. While traditional websites often induce a greater desire to engage in the experience promoted, VR-style websites that provide consumption experiences that approximate reality well weaken this desire.

Second, building upon the literature on satiation and habituation, our research shed light on the mechanism that underlies the detrimental effect of VR experiences on future consumption intention. Relative to VR experiences that are not similar to reality, the reason that those that are decrease future consumption intentions is because such experiences are deemed similar to the actual experiences, and thereby satiate consumers and reduce their desire to engage in future consumption. We provided convergent and compelling evidence for this mediator (Studies 2–3). We also ruled out a competing process, whether the VR experience is considered a good substitute for the real experience (Study 4).

Third, based on the theory of EI, our research identified a moderator of the negative effect of VR experiences on subsequent consumption intention, in that the ability to find and enjoy differences between similar episodes of product experiences increases with one’s EI with the target product. Thus, this individual difference variable should affect both the self-reported perceived similarity between virtual and real experiences and the intention to engage in the real experience. Indeed, we found that consumers with high (vs. low) EI had a greater post-VR consumption intention that was mediated by their lower level of perceived similarity. Thus, these people focused on the differences, rather than similarities, between virtual and actual experiences.

Finally, drawing from the literature on leisure activities, our work specified another boundary condition of the effect we observed. Specifically, for leisure activities that are difficult to approximate online (e.g., traveling), even when the VR experience is highly interactive and vivid, it will not decrease, but increase, the desire to engage in the actual activity, because the VR experience fails to close the gap between virtual and physical reality, and therefore is unlikely to lead to a high level of perceived similarity between virtual and real experiences.

8.2. Managerial insights

This research provides important insights for marketers of
experiential products who are interested in using VR technologies to promote their products. Results from our studies suggested that for this strategy to be effective, they should consider (1) website design, (2) experience type, and (3) consumer characteristics. First, counter-intuitively, in some cases, marketers are advised to use websites with low (vs. high) interactivity and vividness to provide consumers with product experiences. Although VR-style websites are engaging and signal the company’s competence, the findings from this research suggested that using them to simulate consumption experience is not always effective because they can weaken consumers’ future consumption intentions compared to traditional websites. Results from Studies 2–3 showed that this is particularly a concern for consumers with low or moderate EI with the experience promoted, as they perceive the virtual experience to be similar to the real experience—a process that can lead to satiation. Thus, for these consumers, marketers should reveal less of the real consumption experience to keep the level of mystery high and the likelihood of satiation low. For consumers with high EI, results from Studies 2–3 suggested that marketers should use VR-style websites to offer product experiences.

They also must consider the type of experience. For activities in which the need is for vigorous outdoor activity and/or things that are missing from one’s daily life, interactive and vivid VR experiences generally promote future consumption. Specifically, in the leisure travel domain, because current VR technologies still cannot capture the essence of the experience, i.e., getting away from “here and now,” consumers will not perceive that the VR and real experiences are equivalent. Therefore, VR experiences are not satiating and do not lead to the desire for the real experience. In contrast, for activities in which the primary need is for content that generates intellectual and/or emotional stimulation (e.g., shows, museum exhibitions), VR experiences can reduce future consumption intention. In this case, because these technologies are capable of delivering the content fully in high-fidelity digital format, VR experiences that are very similar to reality are likely to satiate consumers, especially those with low or moderate EI, and therefore reduce their desire to view the content in person.

Thus, when dealing with content-oriented experiential products, marketers should target VR experience opportunities only to consumers who demonstrate a certain level of EI with the product promoted. Museum and gallery marketers should use customers’ past patronage histories, membership status, or a short survey to determine their level of EI, and provide VR experience opportunities only to those with high EI. Our studies showed that VR experiences will sensitize people with high EI and make them want to consume the experience even more.

8.3. Implications for consumers

Experiential products play an important role in consumers’ lives, providing them with entertainment and an outlet for emotion and fantasy (Holbrook & Hirschman, 1982). Research on happiness has shown that purchases of experiential goods (e.g., theater, concerts, and vacations) make consumers happier than do material purchases (e.g., electronics, appliances). Further, while this research focuses on experiential consumption, future work could investigate whether the negative effect of VR found in the domain of experiential consumption (specifically museum visit) extends to other, “non-experiential” domains. Companies increasingly employ VR to engage consumers. If experiencing and interacting with the product promoted via VR renders consumers satiated with the product, then using VR as a marketing tool can backfire.

Since the negative effect of VR is short-lived, companies must design VR products that are engaging and interactive. This can be achieved by (1) providing high-quality content that is similar to the real experience, (2) targeting consumers with high EI who are interested in using VR technologies to promote their products, and (3) using websites with low interactivity and vividness to provide consumers with product experiences. Although VR-style websites are engaging and signal the company’s competence, the findings from this research suggested that using them to simulate consumption experience is not always effective because they can weaken consumers’ future consumption intentions compared to traditional websites. Results from Studies 2–3 showed that this is particularly a concern for consumers with low or moderate EI with the experience promoted, as they perceive the virtual experience to be similar to the real experience—a process that can lead to satiation. Thus, for these consumers, marketers should reveal less of the real consumption experience to keep the level of mystery high and the likelihood of satiation low. For consumers with high EI, results from Studies 2–3 suggested that marketers should use VR-style websites to offer product experiences.

8.4. Future research

Our research suggests a number of potential directions for future research. First, if perceived similarity between virtual and real experiences is the mechanism underlying the negative effect of VR experience on the interest in real experience, future studies could be conducted to explore if instructing users to focus on differences, rather than similarities, between virtual and real experiences can mitigate this negative effect, especially among those with low EI with the simulated experience. For example, “getting away” is a component that is missing in all VR experience because, by definition, VR simulates the feeling of being in “another place” without actually transporting the users to that place. Although the centrality of “getting away” varies across different types of experience (i.e., it is central for activities in the “agency” and “novelty” categories but much less so for those in the “cognitive stimulation” category), it still marks VR’s most salient departure from actual reality. Marketers of content-oriented experiential products can emphasize this difference to increase the users’ interest in actual reality.

Second, as we discuss earlier, the perceived similarity account suggests that the negative effect of VR may be short-lived. That is, the users’ feeling of satiation (due to their expectation of consuming a future experience highly similar to the one simulated by VR) can be recovered given sufficient time. Future studies could be conducted to discern the role of time lapse in recovering the negative effect of VR. Along this line, memory about previous VR experiences should also play a role and be examined.

Third, while in this research we study EI, a chronic factor that represents consumers’ motivation and ability to find and enjoy differences between virtual and real experiences, future research could look into other factors affecting consumers’ motivation to engage in VR (e.g., “searcher” vs. “browser,” Schlosser, 2003). While searchers concentrate on efficiently acquiring needed information, browsers tend to focus on the experience itself and adopt an aesthetic stance. It would be interesting to see if the negative effect of VR exists only among browsers (vs. searchers) as browsers (vs. searchers) are more likely to be satiated by interactive and vivid VR experiences.

Further, while this research focuses on experiential consumption, future work could investigate whether the negative effect of VR found in the domain of experiential consumption (specifically museum visit) extends to other, “non-experiential” domains. Companies increasingly employ VR to engage consumers. If experiencing and interacting with the product promoted via VR renders consumers satiated with the product, then using VR as a marketing tool can backfire.

Last but not least, it is interesting to explore whether the perceived similarity account underlying the negative effect of VR can predict similar effects for technologies other than VR. As technologies in artificial intelligence and consumer robotics advance, consumers will be exposed to a flurry of new products that simulate actual interaction with real humans. To some extent, using these products contributes to constructing a virtual reality since consumers are essentially interacting with machines. As consumers are able to incorporate these products into their day-to-day lives in the near future, it’s important to examine if adopting these products will increase people’s tendency to avoid human contact on a societal level. This research topic is novel and has implications for consumers, marketers, and public policy makers.

Appendix A. Appendix

A.1. Enduring involvement scale

Please describe your attitudes toward visiting museums.

1. Visiting museums is … (−3 = important; 3 = unimportant to me)*
2. Visiting museums is … (−3 = of no concern; 3 = of concern to me)
3. Visiting museums is … (−3 = irrelevant; 3 = relevant to me)
4. Visiting museums is … (−3 = means a lot to me; 3 = means nothing to me)*
5. Visiting museums is … (−3 = matters to me; 3 = doesn’t matter)
Please describe your feelings about visiting museums.

6. Visiting museums is ... (−3 = fun; 3 = no fun)*
7. Visiting museums is ... (−3 = boring; 3 = interesting)
8. Visiting museums is ... (−3 = unexciting; 3 = exciting)
9. Visiting museums is ... (−3 = appealing; 3 = unappealing)*

Please describe whether (and to what extent) visiting museums is self-expressive in your opinion.

10. Visiting museums ... (−3 = says something about me; 3 = says nothing about me)*
11. Visiting museums ... (−3 = tells me about a person; 3 = shows nothing)*

*Reverse-coded.

References


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