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Moderating Effects of Mindset Types on the Relationship Between Experience and Perceived Quality in VR Contexts

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Abstract

Purpose: This study investigates the moderating effect of mindset types on experience and perceived quality in virtual reality (VR) contexts and identify the relationships among mindset types, experience, perceived quality, attitude, and purchase. Research design, data and methodology: Using a survey, a total of 250 participants were recruited from South Korea. Participants were asked whether they have been VR users who had experienced VR before participating in the survey. We used the partial least squares method to test the hypotheses based on structural equation modeling. **Results:** The results show that experience, including spatial, reality, and sensory experiences, has positive effects on perceived quality. Additionally, the mindset moderates the relationship between experience and perceived quality such that consumers with experience are more likely to have greater perceived quality when they have a growth mindset compared to those with a fixed mindset. The VR context's perceived quality exerts positive effects on attitude toward the VR context, while attitude has positive effects on purchase intention. **Conclusion:** We suggest that the consumer's mindset might work as an essential moderating factor that influences the relationship between experience and perceived quality. Our findings can help marketers plan promotion strategies more effectively and cater to the different objectives of their contexts.

Keywords : Mindset Types, Fixed Mindset, Growth Mindset, Experience, Perceived Quality, Virtual Reality (VR)

JEL Classification Code: M30, M31, M37

1. Introduction

Mindset types (i.e., fixed and growth) can result in different learning behaviors and outcomes. From the perspective of a fixed mindset, abilities are fixed, innate, or fully developed during one's early life stages; thus, a person cannot change his or her abilities. Conversely, from the perspective of a growth mindset, abilities can be developed

through learning and practice. That is, when one puts in more effort in learning, one's abilities can grow via practice.

Several previous studies have indicated that consumers with a growth mindset process experience in newer platforms, such as virtual reality (VR) differently from those with a fixed mindset (Lee et al., 2012). These differences are likely to affect perceptions and evaluations of quality in the VR context.

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In recent times, as a prevalent technology-driven experience, the VR experience has become increasingly important. The global VR market has experienced a phenomenal growth, as its value increased from \$1.8 billion in 2016 to \$5 billion in 2017, an increase of 168%. Additionally, within the next three years, the VR market is expected to be worth \$38 billion. Thus, this study explores the moderating effects of different mindset types and the relationship between experience and perceived quality. In particular, this study focuses on how the fixed and growth mindsets moderate the relationship between experience and perceived quality in VR marketing contexts, which could offer important implications for both researchers and practitioners.

2. Theoretical Framework and Hypotheses Development

2.1. Relationship Between Experience and Perceived Quality in the VR Context

Consumer experiences are key elements in the marketing context (Fazio & Zanna, 1978, 1981; Smith & Swinyard, 1983). Recently, virtual reality (VR) has offered new avenues for experience (Lee, 2020; Zhang & Dholakia, 2018), thus making VR experiences critical features in evaluating a medium (Kober & Neuper, 2013). VR is a real or simulated environment in which a perceiver experiences telepresence (Steuer, 1992; Biocca, 1997; Klein, 2003). VR enables consumers to achieve a subjective sense of “being there” in a virtual environment (Reeves & Nass, 1996; Steuer, 1992). That is, based on sensory stimuli conveyed by a VR interface, users can create an artifice of being present and highly engaged in a mediated VR environment (Biocca, 1997). Accordingly, it is considered a psychological phenomenon occurring in the human mind, rather than in a specific technology (Kober & Neuper, 2013; Usoh & Slater, 1995).

Additionally, VR offers new senses and experiences that users can control in the form and content of a mediated VR environment in real time. Users achieve interactivity when they receive immediate feedback based on their input in the mediated environment (Klein, 2003). In this process, users can adapt information according to their individual interests and concerns and be active, rather than passive, while engaging with such information (Pimentel & Teixeira, 1994). Further, the immersive, computer-generated interactive 3D environment of VR (Wexelblat, 1993) offers media richness and interactivity. This high media richness is evidenced by the sensory depth and breadth of the interface (Steuer, 1992) and offers high levels of representational quality and volume of content in a mediated environment. Depth involves the

quality of information within each channel, while breadth involves the number of sensory dimensions. VR increases sensory depth, especially in the visual sense, as it can transmit more detailed 3D images than static 2D images, particularly through zoom and rotation functions (Klein, 2003). VR increases the breadth of a sensory interface as it often stimulates multiple sensory channels with vision and hearing.

2.2. Experience in the VR Context

Experience in the VR context can be conceptualized as the consumers’ reality, spatial, tactile, and sensory responses to VR-related stimuli from marketing activities (Ding & Tseng, 2015; Martins et al., 2017).

Reality experience refers to the visual sense in a VR experience that accomplishes a high level of realism (Martins et al., 2017). VR technology displays a big portion of the dynamic luminance range available in the real world (Martins et al., 2017). The human eye can see in a range of four orders of magnitude and differentiate 12 million colors (Chalmers et al., 2009). The VR technology via head-mounted displays (HMDs) or panoramic displays stimulates this sense of reality (Martins et al., 2017). VR visual stimulation controlling the settings related to resolution, quality, and number of frames per second of the visual content offers a reality experience.

Spatial experience refers to the 3D auditory stimulus responsible for the VR quality and intensity levels (Martins et al., 2017). VR sound stimuli, which handle spatial sound rendering in 3D environments, offer spatial experience (Martins et al., 2017). The spatial sound undergoes similar changes according to the user’s head movements. Using headphones or properly calibrated sound setups ensures a 360-degree 3D sound experience and delivers a spatial experience (Martins et al., 2017).

Tactile experience refers to haptic responses in VR environments that offer a large, active, and multidisciplinary experience (Martins et al., 2017). However, recent VR touch devices are limited to restricted haptic response capabilities compared to the tactile sense of human beings, since recent VR haptic interfaces provide fewer than 10 tactile feedback motors, whereas the human hand can work with multiple tactile sensors simultaneously. Currently, VR touch devices have other limitations, including high prices, heavy weight and large size, bandwidth limitations, latency between the human operator and the force feedback, and instability in cases where the update rate is much less than 1 kHz (Robles-De-La-Torre, 2006; Saddik, 2007).

Sensory experience refers to sensations arising from a consumer’s five senses in relation to VR technology. It has been validated in a variety of product and service settings, such as tourism destinations (Beckman et al., 2013),

consumer events (Zarantonello & Schmitt, 2013), personal care products (Francisco-Maffezzoli et al., 2014), airlines (Lin, 2015), and coffeehouses (Choi et al., 2017).

2.3. Experience and Perceived Quality in the VR Context

Many marketers in the service industry have recently emphasized the service quality perceived by customers. As a result of the intangibility, perishability, and high customer participation in products supplied by the service industry, the service quality perceived by customers has become a key factor in determining the sustainable operation of an enterprise in the service industry (Barcia & Striuli, 1996; Sasser et al., 1978). Etzel et al. (2001) argued that service quality is evaluated by customers who compare expected service with the service actually received. Lewis and Booms (1983) stated that service quality perceived by customers is a value derived from assessing the quality delivered and the degree of fulfilling customer expectations. Parasuraman et al. (1988) noted that the perception of service quality, which is similar to customers' attitudes, is used to provide an entire evaluation of the products chosen by customers.

The intensity of customers' prior experiences with service providers influences perceived service quality (Urban, 2010). The customers' experiences are specified by the length of their relationships with service providers, while the frequency with which they use the providers' services do not influence all aspects of service quality. However, there are some aspects of service quality that are affected by customers' longitudinal experiences: expectations of service assurance, perceptions concerning reliability and responsiveness, and the quality gap concerning assurance.

Perceived service quality refers to service quality from the customers' viewpoint. There is a general consensus in the literature that service quality is a critical determinant of companies' performance and long-term growth (Bolton & Drew, 1991; Gale, 1994). The customers' experiences influence perceived service quality, thereby creating the gap between customers' expectations and customers' perceptions (Parasuraman et al., 1985; Parasuraman et al., 1988; Urban, 2010). For example, an empirical investigation conducted in the auto service industry showed that the intensiveness of customers' prior experiences with the same service provider and other providers from the same sector affects perceived service quality.

The service encounters and/or service processes that create consumer experiences in their memories stay with them for a relatively long time (Edvardsson, 2005). Therefore, customers' experiences have a strong impact on their perceptions of quality (Edvardsson, 2005). For example, Ikea and Volvo designed service components for physical products, stressing experience-based quality and

the idea that physical products are platforms for service experiences (Edvardsson, 2005). Thus, we propose the following hypothesis:

H1: Experience positively influences perceived quality in VR contexts.

2.4. Mindset as Moderator: Fixed Mindset vs. Growth Mindset

The mindset refers to the malleability of one's ability in various activities, which can result in different learning behaviors and outcomes. From the perspective of a fixed mindset, abilities are fixed, innate, or fully developed during one's early life stages. Hence, a person cannot do much to change his or her abilities. From the perspective of a growth mindset, abilities can be developed through learning and practice. That is, when one exerting more effort in learning, his or her abilities can grow via practice.

Depending on the mindset type (i.e., fixed and growth,) people act differently when facing challenges (Choi et al., 2018). People with fixed mindsets regard each challenge as an evaluation of their abilities. They are more concerned about how competent they appear than learning. Thus, people with a fixed mindset tend to seek familiar challenges while avoiding challenges in which they might fail. They also avoid exerting effort because they believe that success is based on intelligence, and smart people should succeed without much effort.

In contrast, people with a growth mindset perceive challenges as learning opportunities. They seek tough challenges and regard an easy task as boring because it does not help them learn. One can hypothesize that players with a growth mindset are more likely to seek challenges in the VR context than players with a fixed mindset.

Growth-mindset consumers will devote more time to VR activities than fixed-mindset participants, as the former will enjoy the VR challenges and pay more attention to learn from the feedback. Thus, the mindset types (i.e., growth and fixed) may differently influence how the quality of a VR context is perceived. Nevertheless, it is important to note that mindsets are domain-specific. In other words, consumers can simultaneously hold different mindsets in different domains.

Consumers with growth mindsets exhibit the relationship between experience and perceived quality (Meyers-Levy & Zhu, 2007). Since the growth mindset welcomes challenges (Griskevicius et al., 2006), their perceptions of quality in a challenging environment, such as VR contexts, will be enhanced. Specifically, consumers with a growth mindset can find new and creative ways to connect the VR experience and the perceived quality of the VR context, thus devoting more effort and time for engaging in VR experiences (attention to feedback for learning)

compared to fixed-mindset participants. Therefore, we propose the following hypothesis:

H2: Mindsets (i.e., growth and fixed) moderate the relationship between experience and perceived quality in the VR context, such that consumers with experience are more likely to have greater perceived quality when they have a growth mindset compared to those with a fixed mindset.

2.5. Influence of Perceived Quality on Attitude

Service quality perceived by customers positively influences their attitude toward the consumptive services (Parasuraman et al., 1988). Perceived quality is a measure that reflects consumers' opinions about the superiority of an enterprise after comparing consumers' expectations of a given service and their perceptions of it (Eisingerich & Bell, 2008; Parasuraman et al., 1988). A customer's perception of service quality provided by one channel formulates his or her attitude toward this channel (Eisingerich & Bell, 2008; Ekinci et al., 2008; Parasuraman et al., 1988). In this study, attitude refers to an individual's overall evaluations, sense of feeling, and intentions to like or dislike a VR context (Kotler, 1997). An estimation of customers' attitudes toward a VR context can be derived through evaluations of perceived quality (Bitner, 1992). Thus, we put forward the following hypothesis:

H3: Perceived quality positively influences consumers' attitudes toward VR contexts.

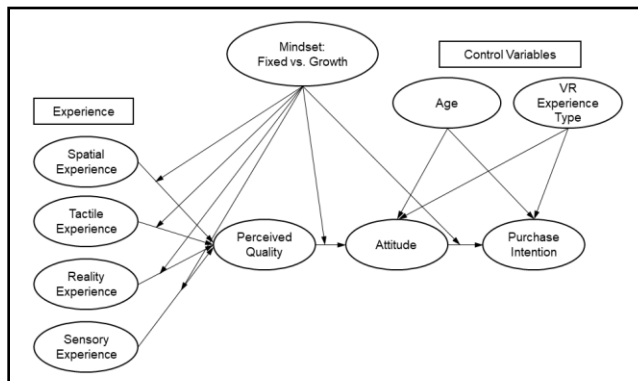


Figure 1: Research Model

2.6. Influence of Attitudes on Purchase Intentions

Attitude involves consumers' consistent favorable or unfavorable responses to a certain object and can change their intention to purchase (Etzel, 1997; Kim et al., 2014; Lee et al., 2007). Purchase intention refers to an individual's plan to buy a product (Dodds et al., 1991; Spears & Singh, 2004). Ajzen and Fishbein (1980) stated that attitude has a direct influence on consumers' purchase intention and behavior, which constitute an inseparable purchase process

that indicates a consumer's psychological intention and realistic action. Lee et al. (2007) pointed out that consumers' positive attitude is followed by a stronger purchase intention for online travel or shopping behavior. Similarly, consumers' positive attitude leads to strong and frequent purchase intentions and online shopping behavior (Frag et al., 2007). Thus, we propose the research model (Figure 1) and formulate the following hypothesis:

H4: Attitude toward VR contexts positively influences purchase intention.

3. Methods

We used a survey to investigate key questions about the relationships between mindsets, experience, perceived quality, attitude, and purchase intention. A total of 250 VR users were recruited from South Korea to participate in the survey by a professional survey company.

Participants were asked whether they have been VR users who had experienced VR before participating in the survey. In the screening process, respondents were asked whether they were VR users were asked to respond to all the questions.

A VR context explanation was offered to the participants before participating in the survey. The full survey only allowed VR users to respond to all questions. The sample consisted of 157 men (62.8%) and 93 women (37.2%) aged between 20 and 39 years (mean = 28.91 years).

3.1. Measurements

Experience: Experience was measured using a five-point Likert scale indicating spatial experience, tactile experience, reality experience, and sensory experience in the VR context (Japutra & Molinillo, 2019).

Perceived quality: Perceived quality was measured using a five-point Likert scale (Armbrüster et al., 2008) indicating how participants perceive the quality of the VR context.

Attitude: Attitude toward VR contexts was measured using a seven-point semantic scale (good/bad, favorable/unfavorable, positive/negative) (Nysveen et al., 2005), indicating whether participants liked the VR context.

Purchase intention: Purchase intention was measured by three seven-point semantic differential scales (likely/unlikely, probable/improbable, possible/impossible) (Nysveen et al., 2005) indicating whether participants would purchase products promoted by the VR context.

Mindsets: Mindsets were measured using a six-point Likert scale (Lee et al., 2012) indicating fixed and growth mindsets. The median split analysis identified two groups of respondents based on mindsets. The hypothesis testing kept

respondents in the top split (growth mindset) and bottom split (fixed mindset). The results show statistically significant differences between the top (growth mindset) and bottom (fixed mindset) ($\chi^2 = 8.85, p < .05$).

4. Results

The measurement model had an acceptable overall goodness-of-fit (Chi-square 676.14, $df = 338, p < 0.001, GFI = 0.838, CFI = 0.914, TLI = 0.902, RMSEA = 0.065$) as shown in Appendix 1. The reliability coefficients of the experience measures, including spatial, tactile, reality, and sensory experiences, were 0.857, 0.776, 0.829, and 0.844, respectively. The reliability coefficient of all perceived quality measures was 0.839. The reliability coefficient of the attitude measures was 0.924. The reliability coefficient of the purchase intention measures was 0.848. The reliability coefficient of the mindset measures was 0.820. The reliability coefficients of intelligence mindset, morality mindset, and world mindset measures were 0.763, 0.818, and 0.838, respectively. The coefficients indicate acceptable reliability of the measures with CR (> 0.7) and AVE (> 0.5). The values of all AVE were greater than the squared correlations. Thus, discriminant validity was also acceptable.

Table 1: AVE Analysis for Discriminant Validity

	SPE	TAE	REE	SEE	PQ	AT	PI	Mean	S.D.
SPE	0.932							3.443	.613
TAE	0.625	0.877						2.883	.823
REE	0.482	0.448	0.781					3.221	.727
SEE	0.411	0.385	0.706	0.864				3.724	.695
PQ	0.367	0.292	0.68	0.535	0.825			3.364	.642
AT	0.383	0.338	0.651	0.588	0.593	0.737		4.815	.960
PI	0.400	0.392	0.491	0.453	0.456	0.581	0.825	4.565	1.040

Note 1: The value in the diagonal cell is the square rooted AVE.
 Note 2: SPE = Spatial Experience, TAE = Tactile Experience, REE = Reality Experience, SEE = Sensory Experience, PQ = Perceived Quality, AT = Attitude, PI = Purchase Intention.

We used partial least squares (PLS) to test the hypotheses based on structural equation modeling. The attitude toward or intention to purchase VR experience can be affected by age or the type of VR experience. Therefore, in this research, age and genre of VR experience were proposed as control variables to control for the impact on attitudes and purchasing intentions. Thus, the effects of age and VR experience on attitudes and purchase intentions were insignificant. Experience in the VR context, including spatial experience ($\beta = 0.205, p < 0.05$), reality experience ($\beta = 0.442, p < 0.001$), and sensory experience ($\beta = 0.371, p < 5.343$) showed statistically positive effects on perceived quality, thus partially supporting H1 (see Table 2, Figure 2). To understand the moderating effect in more detail, we

employed a multi-group analysis. Specifically, a confirmatory analysis of multiple groups was used to estimate the measurement invariance between the growth mindset and fixed mindset groups. The results of measurement invariance showed insignificant differences between the unconstrained model and the measurement weights model ($\Delta\chi^2[21] = 22.57, p > .05$). Additionally, the results showed an insignificant difference between the unconstrained model and structural covariances ($\Delta\chi^2 [49] = 62.05, p > .05$). Further, an insignificant difference was found between the unconstrained model and the measurement residuals model ($\Delta\chi^2 [40] = 90.38, p > .05$), thus supporting the use of, measurement invariance to test the differences between groups.

Table 2: Model Estimates

Path	SRW	t	p value		
SPE → QLT	.205	2.622	**	Supported	
TAE → QLT	.001	0.013	$p > .05$	Rejected	
REE → QLT	.442	6.662	***	Supported	
SEE → QLT	.371	5.343	***	Supported	
PQ → AT	.521	8.247	***	Supported	
AT → PI	.638	11.906	***	Supported	
Control Variable s	Age → AT	.014	.253	.801	Rejected
	Age → PI	.038	.782	.801	Rejected
	VRG → AT	-.010	.207	.836	Rejected
	VRG → PI	-.072	.873	.383	Rejected

$\chi^2 = 786.11$ ($df = 338, p < .001$), $GFI = .854, CFI = .924, TLI = .915, RMSEA = .064$

Note 1: ** $p < .01$; *** $p < .001$
 Note 2: SRW = Standardized Regression Weight, QLT = Quality, SPE = Spatial Experience, TAE = Tactile Experience, REE = Reality Experience, SEE = Sensory Experience, PQ = Perceived Quality, AT = Attitude, PI = Purchase Intention, VRG = VR Genre.

Table 3: Testing for Measurement Invariance of Multigroup Analysis

Model	χ^2	df	GFI	CFI	RMSEA	TLI	$\Delta\chi^2$	Δdf	SoD
UNC	1160.892	658	0.801	0.916	0.049	0.903			
MW	1177.269	679	0.798	0.917	0.048	0.907	22.57	21	NS
SC	1222.946	707	0.791	0.914	0.048	0.908	62.05	49	NS
MR	1251.275	735	0.785	0.914	0.047	0.911	90.38	89	NS

Note 1: UNC = Unconstrained, MW = Measurement Weights, SC = Structural Covariances, MR = Measurement Residuals, SoD = Significance of Difference, NS = Not Significant.

The path between spatial experience and quality showed a significant difference between the baseline model and the restricted model ($\Delta\chi^2[1] = 5.055, p < .05$). For the growth mindset group, the relationship between spatial experience and quality was significantly positive, whereas for the fixed mindset group, the path was not significant. The path between reality experience and quality was significantly

different between the baseline model and the restricted model ($\Delta\chi^2[1] = 9.062, p < .05$), as shown in Table 4. The path in the growth mindset group was more positive than that in the fixed mindset group, thus partially supporting H2.

Table 4: The Result of Multigroup Analysis

Paths	$\Delta\chi^2$	Fixed Mind		Growth Mind		
		SRW	p	SRW	p	
SPE → QLT	5.055	.033	.748	.418	**	Supported
TAE → QLT	1.7	.049	.510	-.128	.250	Rejected
REE → QLT	0.453	.447	***	.452	***	Supported
SEE → QLT	9.062	.243	***	.541	***	Rejected
PQ → AT	0.996	.485	***	.555	***	Rejected
AT → PI	1.366	.712	***	.549	***	Rejected

Note 1: **: $p < .01$, ***: $p < .001$

Note 2: SRW = Standardized Regression Weight, QLT = Quality, SPE = Spatial Experience, TAE = Tactile Experience, REE = Reality Experience, SEE = Sensory Experience, PQ = Perceived Quality, AT = Attitude, PI = Purchase Intention.

Perceived quality had a statistically positive effect on attitude ($\beta = 0.521, p < 0.001$), thus supporting H3, while attitude showed statistically positive effects on purchase intention ($\beta = 0.638, p < 0.001$), thus supporting H4 (see Table 2, Figure 2)

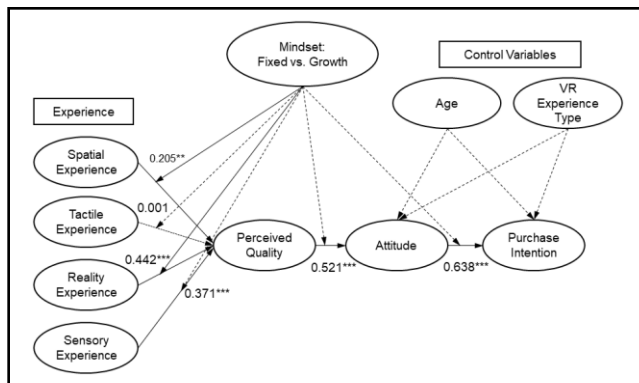


Figure 2: Summary of Results

5. Conclusions

Based on the concept of mindset (i.e., growth and fixed), this study investigates the relationship between mindsets, experience, perceived quality, attitude, and purchase intention in VR contexts. The results show that experience, including spatial, reality, and sensory experiences has positive effects on perceived quality. Additionally, the mindset moderates the relationship between experience, including spatial and reality experiences, and perceived

quality. In addition, the VR context’s perceived quality exerts positive effects on attitude toward the VR context, while attitude has positive effects on purchase intention.

VR allows consumers to generate and share new experiences (Trusov et al., 2009) thus generating spatial, reality, and sensory experiences. Considering the experience in the VR context, this study investigates mind sets, growth, and fixed mindset as one of the evident moderating factors. This study focuses on mindsets as a noticeable moderator when consumers gain new experiences in the VR venue. We suggest that the consumer’s mindset might work as an essential moderating factor that influences the relationship between experience and perceived quality. Regarding mindsets as moderators, this study found the relationship between spatial experience and perceived quality to be significantly different between the baseline model and the restricted model. Similarly, the relationship between reality experience and perceived quality is significantly different between the baseline model and the restricted model. Further, this study indicates that the mindset moderates the relationship between experience and perceived quality such that consumers with experience are more likely to have greater perceived quality when they have a growth mindset compared to those with a fixed mindset.

5.1. Theoretical Contributions

This research generates substantial theoretical contributions to VR technology-driven marketing research. Given the importance of mindsets in shaping consumers’ experience and perceived quality (Brooks 1957; Brown & Reingen 1987; Woodside & Delozier, 1976). Marketing researchers have studied extensively the role of experience (Cho et al., 2014; Roy et al., 2017).

However, newer technology-driven venues, such as VR, offer the possibility of a completely new experience. As such, this paper offers some initial insights into the importance of considering new experiences (i.e., narrowcasting and broadcasting) and how to enhance the consumers’ perceived quality. This study demonstrates that priming consumers’ mindsets can help improve their experience and perceived quality as a significant moderator. It is noteworthy that the mindset type (i.e., growth vs. fixed) play a significant moderating role in the VR experience process.

Second, the findings contribute to the experience literature by identifying mindset as a moderating variable, and their effect on perceived quality. Previous research has suggested that VR experience is one of the most critical features for VR evaluation (Kober & Neuper, 2013). VR delivers a subjective sense of “being there” in a virtual environment as a psychological phenomenon occurring in the user’s mind, rather than in a specific technology (Kober

& Neuper, 2013; Usoh & Slater, 1995). The findings indicate different effects of growth and fixed mindsets on the relationship between VR experience and perceived quality. Our findings show that spatial, reality, and sensory experiences have positive effects on perceived VR quality. This provides an understanding of the influence of embodied VR experience on perceived quality.

5.2. Managerial Implications

This study offers several practical implications for effectively managing VR contexts. First, since the growth and fixed mindsets are adopted by current consumers, and since marketers have the opportunity to facilitate the activation of such mindsets using ad strategies, our findings can help marketers plan promotion strategies more effectively and cater to the different objectives of their contexts. In particular, understanding the moderating effect of mindset types on the relationship between consumer experience and perceived quality can help marketers develop VR strategies that maximize the effectiveness of their VR contexts.

In addition, our research can help practitioners identify how VR technology boosts experiences by reflecting on the type of VR experience, including spatial, reality, and sensory experiences. The results show that enabling users to reach spatial, reality, and sensory experiences will foster the perceived quality of VR, thus enhancing the user's positive attitude toward a VR context and their purchase intention for products promoted by the VR context.

Further, since perceived quality plays a key role in engendering a positive attitude toward the product, which can subsequently lead to purchase intention, practitioners might also want to focus particularly on VR users with growth mindsets. These users' spatial and reality experiences enhance their perceived quality of a VR context, which leads to greater purchase intention.

5.3. Limitations and Future Research Directions

Regarding the vital role of newer technologies, especially VR experiences, future studies can investigate the influence of technology-related factors on the VR presence experience that we have not covered in this study. As future research directions, they can investigate how screen size, image motion, stereoscopic presentation, and realistic and detailed designs can influence the sense of being in a VR environment (Freeman et al., 2000).

In the future VR environment, mixed reality including both AR and VR can leverage marketing performance because mixed reality can expand consumer experiences to extended reality. Although this study focuses on VR experience, which is the main marketing context, future

research should be broadened to extended reality.

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Appendixes

Appendix 1: Measurement

Factor	Items	Factor Loading	Cronbach α	CR	AVE	
Spatial Experience	This VR context makes me feel like I was inside the environment.	.778	.857	.892	.869	
	This VR context makes me feel involved in the environment.	.645				
	This VR context makes me feel as if I visited another place.	.766				
	This VR context makes me feel immersed in the environment.	.799				
	This VR context makes me feel surrounded by the environment.	.755				
	This VR context makes me feel a sense of being really there inside the environment.	.600				
	This VR context makes me feel intense in the environment.	.791				
Tactile Experience	This VR context makes me want to touch something inside the environment.	.749	.776	.864	.681	
	This VR context makes me feel addictive in the environment.	.852				
	This VR context makes me try to touch something I saw inside the environment.	.869				
Reality Experience	This VR context makes me feel things and people in the environment sound like the real world.	.811	.829	.898	.747	
	This VR context makes me feel things and people in the environment look like the real world.	.892				
	This VR context makes me things and people in the environment feel like the real world.	.887				
Sensory Experience	This VR makes a strong impression on my visual sense or other senses.	.830	.844	.895	.681	
	This VR makes a strong impression on my senses.	.859				
	I find this VR interesting in a sensory way.	.832				
	I find this VR new in a sensory way.	.779				
Perceived Quality	The quality of the graphical presentation was satisfying.	.740	.839	.886	.609	
	I had the feeling of being in a virtual room/space.	.790				
	I could imagine the virtual space.	.743				
	The virtual environments and the displayed objects seem to be realistic.	.801				
	I had the feeling that I could reach into the virtual world and touch the objects.	.825				
Attitude	good/bad	.930	.924	.952	.869	
	favorable/unfavorable	.935				
	positive/negative	.931				
Purchase Intention	likely/unlikely	.902	.848	.909	.770	
	probable/improbable	.936				
	possible/impossible	.786				
Mindset	Intelligence	You have a certain amount of intelligence and you really can't do much to change it.	.720	.763	.857	.668
		Your intelligence is something about you that you can't change very much.	.861			
		You can learn new things but you can't really change your basic intelligence.	.862			
	Morality	A person's moral character is something very basic about them and it can't be changed much.	.907	.818	.850	.696
		Whether a person is responsible and sincere or not is deeply ingrained in their personality. It cannot be changed very much.	.894			
		There is not much that can be done to change a person's moral traits (e.g., conscientiousness, uprightness and honesty).	.681			
	World	Though we can change some phenomena, it is unlikely that we can alter the core dispositions of our world.	.847	.838	.890	.731
		Our world has its basic or ingrained dispositions and you really can't do much to change them.	.952			
		Some societal trends may dominate for a while, but the fundamental nature of our world is something that cannot be changed much.	.754			

$\chi^2 = 676.14$ (df= 338, $p < .001$), GFI=.838, CFI=.914, TLI = .902, RMSEA=.065