



The Effect of Presence on Consumers' Responses to Virtual Mirror Technology

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Purpose/Rationale: Today, online retailers are increasingly adopting augmented reality (AR) as a digital marketing tool to create a “virtual mirror technology” through which consumers can view interactive 3-D product images of themselves wearing products such as jewelry, clothing, shoes, and eyeglasses. For example, a clothing company H&M has recently released an AR mobile application in which shoppers can virtually try on outfits, as if in the fitting room at a brick-and-mortar store. Unlike virtual reality (VR) where users are completely immersed within a virtually simulated environment (Haller, Billingham, & Thomas, 2006), AR partially imposes computer-generated information such as sensory images and sounds on a user’s real-world view (Baek, Yoo, & Yoon, 2017). Previous literature has focused on identifying the most effective virtual product presentation formats such as picture quality (Jeong et al., 2009), product image rotation (Park, Stoel, & Lennon, 2008), and interactivity and vividness (Jiang & Benbasat, 2007). However, little is known about the effectiveness of AR- versus VR-based virtual product presentations on consumer responses. Central to the current investigation is presence—the sense of “being there” inside a virtual environment (Biocca 1997)—because individuals who feel a strong sense of presence tend to have virtual product experiences favorably (Li, Daugherty, & Biocca, 2001). To fill this gap, this study aims to propose and develop a conceptual model explaining the effect of presence on consumers’ responses to AR- (versus VR-) based virtual mirror technology.

Conceptual Framework/Hypothesis Development: According to telepresence theory (Steuer 1992) and narrative transportation theory (Gerring, 1993), presence is theoretically connected to mental imagery, which refers to a process by which sensory information is represented in working memory (MacInnis & Price, 1987). It is suggested that feelings of presence can lead consumers to visualize themselves using virtual product presentations by facilitating their imagination (Rodríguez-Ardura & Martínez-López, 2014). There is also empirical evidence that presence in a 3-D virtual environment positively influences product attitudes, thereby leading to greater purchase intentions (Suh & Chang, 2016). Thus, the following hypotheses are proposed.

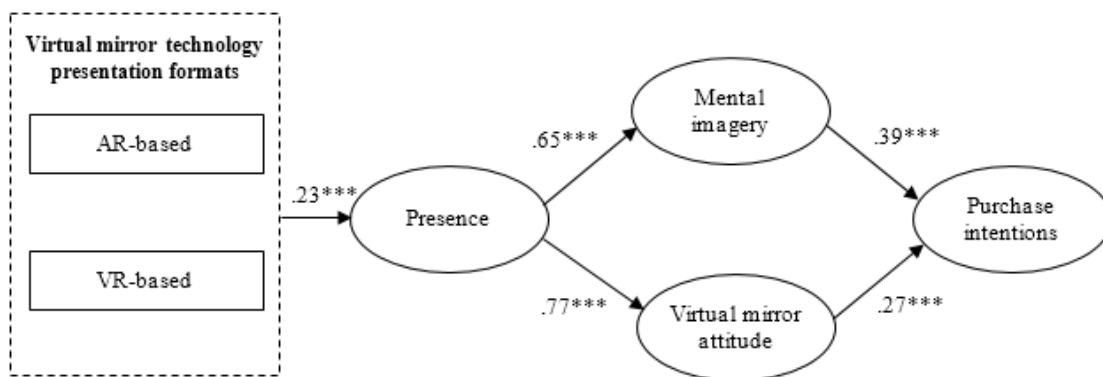
H1: *AR-based presentation will elicit a higher level of presence than VR-based presentation.*
H2: *Presence will be positively related to mental imagery.*
H3: *Presence will be positively related to virtual mirror attitude.*
H4: *Mental imagery will be positively related to purchase intentions.*
H5: *Virtual mirror attitude will be positively related to purchase intentions.*

Research Design/Procedure: Participating in the study for partial course credit were 247 undergraduate students (46.2% men and 53.8% women, average age: 19.8) from a northeastern U.S university. Participants were provided a URL link for competing the online experimental

task. They were randomly assigned to one of two conditions in a between-subjects experiment through a virtual mirror technology (www.Ray-Ban.com): (1) AR-based product presentation and (2) VR-based product presentation. In the AR-based presentation condition, participants were asked to use a webcam to see themselves wearing five pairs of sunglasses. In the VR-based product presentation condition, participants were instructed to overlay computer-generated images of five pairs of sunglasses on a virtual model. After then, participants completed a questionnaire including demographics and dependent measures—presence (Yim, Cicchirillo, & Drumwright, 2012), virtual mirror attitude (Yim, Cicchirillo, & Drumwright, 2012), mental imagery (Escalas 2004), and purchase intentions (Dodds, Monroe, & Grewal, 1991).

Findings: We found that participants in the AR-based presentation condition ($M = 4.60$, $SD = 1.09$) reported greater presence than those in the VR-based presentation condition ($M = 4.09$, $SD = 1.31$, $t(245) = 3.32$, $p < .01$), supporting H1. To assess the hypothesized relationships among the latent constructs, structural equation modeling (SEM) using AMOS 23 was employed. a Confirmatory factor analysis (CFA) results indicated that convergent validity was achieved because all factor loadings were statistically significant ($p < .05$) within an acceptable range (from .75 to .93) and the AVE values were greater than .50 for all constructs. Furthermore, discriminant validity was established because all AVE estimates were greater than the squared correlations between all constructs. As show in Figure 1, the fit indices in the full structural model showed a good fit for the model: $\chi^2(86) = 284.89$, $CFI = .94$, $IFI = .94$, $TLI = .93$, $RMSEA = .08$, and $SRDR = .05$. Each of the path coefficients was statistically significant ($p < .001$), supporting all hypothesized paths and directions.

Figure 1. Results of the Proposed Model



Discussion: Theoretically, our findings suggest that AR-based presentation is more likely to induce presence than VR-based presentation, thereby leading to greater mental imagery, favorable virtual mirror attitude, and stronger purchase intentions. From a practical standpoint, given that AR technologies offer new ways to pseudo-realistically experience fashion products through vivid images and rich sensory cues that can engender the optimal level of presence, understanding the effect of AR-based product presentation have practical and strategic implications for online retailers in the apparel industry.

References available upon request