



From 2D Images to Augmented Reality: Assessing the Effects on Consumer Purchase Intentions and Perceived Quality in Beauty Products

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ABSTRACT

From 2D Images to Augmented Reality: Assessing the Effects on Consumer Purchase Intentions and Perceived Quality in Beauty Products

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The beauty industry is transforming due to advancements in digital technology, with augmented reality emerging as a key tool for enhancing consumer experiences. AR try-on features, which enable consumers to virtually apply beauty products, offer a new level of interactivity and personalization in online shopping. This innovation addresses the e-commerce challenge of not being able to physically try products before purchase.

This thesis investigates the impact of AR try-on features on consumer purchase intentions in the beauty industry, focusing on lipstick and mascara. The study compares AR try-on features with traditional 2D product presentations on models to understand their influence on purchase intentions and perceived quality.

Using a posttest-only between-group experimental design, female participants were randomly assigned to one of three conditions: AR try-on without incentive, AR try-on with incentive, and standard 2D images on models. The primary objective was to determine whether AR try-on features enhance purchase intentions more effectively than traditional methods.

The findings indicate that AR try-on features do not significantly increase purchase intentions compared to 2D images. While AR enhances interactivity and engagement, these advantages do not translate into higher purchase intentions, possibly due to unmet consumer expectations regarding the realism and accuracy of AR representations. Additionally, the perceived quality offered by AR try-on features does not significantly contribute to increased purchase intentions. The study highlights the critical role of perceived quality and realism in shaping consumer behavior, suggesting that advancements in AR technology should focus on improving its features to meet consumer expectations.

Keywords

Augmented Reality, Purchase Intention, Perceived Quality, Product Category, AR try-on Feature

SUMÁRIO

Das Imagens 2D à Realidade Aumentada: Avaliação dos Efeitos nas Intenção de Compra e na Qualidade Percebida dos Produtos de Beleza

Yussra Ismael Issufo

O mundo da beleza transforma-se rapidamente devido aos avanços tecnológicos e digitais, com a realidade aumentada a tornar-se numa ferramenta essencial para melhorar as experiências dos consumidores torna-se essencial perceber o impacto que esta tem no percurso dos retalhistas.

Esta dissertação investiga o impacto das funcionalidades da AR nas intenções de compra dos consumidores na indústria da beleza, com foco em batons e máscara para olhos. O estudo compara as funcionalidades de experimentação em AR com apresentações tradicionais de produtos em imagens 2D, para compreender a sua influência nas intenções de compra e percepção de qualidade.

Utilizando um design experimental, as participantes femininas foram aleatoriamente atribuídas a uma de três condições: experimentação em AR sem incentivo, experimentação em AR com incentivo e o website sem alterações, com imagens tradicionais em 2D. O objetivo principal era determinar se as funcionalidades de experimentação em AR aumentam as intenções de compra de forma mais eficaz do que os métodos tradicionais.

Os resultados indicam que as funcionalidades de experimentação em AR não aumentam significativamente as intenções de compra em comparação com as imagens em 2D. Embora a AR melhore a interatividade e a envolvimento com o produto, essas vantagens não se traduzem diretamente em maiores intenções de compra, possivelmente devido a expectativas não satisfeitas dos consumidores em relação ao realismo e à precisão da representação dos produtos em AR. Adicionalmente, a qualidade percebida oferecida pelas funcionalidades de da AR não contribuem significativamente para o aumento das intenções de compra.

Palavras-Chave

Realidade Aumentada, Intenção de Compra, Qualidade Percebida, Categoria do produto, *AR try-on Feature*

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GLOSSARY OF ACRONYMS

AR: Augmented Reality

2D: Two Dimensions

AI- Artificial Intelligence

3D – Three Dimensions

TPB - Theory of Planned Behavior

TAM - Technology Acceptance Model

PII- Personal Involvement Inventory

1. INTRODUCTION

1.1. Background

The beauty industry is undergoing a significant transformation due to advancements in digital technology, with augmented reality (AR) emerging as a pivotal tool in reshaping consumer experiences. AR try-on features, which allow consumers to virtually apply beauty products such as lipstick and mascara, have introduced a new dimension of interactivity and personalization in online shopping. This innovation is meant to address one of the primary challenges of e-commerce: the inability to physically try products before purchase. (Scholz & Smith, 2016)

The integration of AR in retail, particularly within the beauty sector, aligns with the broader trend of enhancing customer engagement through immersive technologies. Studies indicate that AR can significantly influence consumer behavior by providing interactive and engaging experiences that traditional 2D images on models cannot match (Poushneh & Vasquez-Parraga, 2017a). This enhanced interactivity is believed to play a crucial role in shaping purchase intentions, as it allows consumers to make more informed decisions by visualizing the products on themselves in real-time (T.-L. Huang & Liao, 2017; T. L. Huang & Liao, 2015).

However, despite the promising potential of AR, there is a notable gap in the literature regarding its specific impact on consumer behavior in the beauty industry. Existing research primarily focuses on general consumer engagement and satisfaction (T.-L. Huang & Liao, 2017; T. L. Huang & Liao, 2015), with limited exploration of how AR try-on features influence purchase intentions compared to traditional 2D product presentations. This gap underscores the need for a deeper understanding of how interactivity, perceived authenticity, and perceived quality of products mediated by AR technology affect consumer decision-making processes (Pantano et al., 2017).

The central problem addressed by this research is the need to understand the differential impact of augmented reality (AR) try-on features versus 2D image presentations of beauty products on models in influencing consumer purchase intentions. Although AR is increasingly being adopted in the beauty industry, comprehensive insights into how this technology affects consumer decision-making are lacking (Javornik, 2016a). Specifically, there is limited

empirical evidence on how the enhanced interactivity of AR try-on features compares to traditional 2D images in terms of influencing purchase intentions, perceived authenticity, and perceived quality of beauty products (Poushneh & Vasquez-Parraga, 2017b).

This research aims to fill this gap by examining the effectiveness of AR in enhancing the shopping experience for beauty products. By focusing on three critical questions—how AR try-on features enhance interactivity and purchase intentions, how consumers perceive the authenticity and realism of beauty products through AR versus traditional images, and how AR influences the perceived quality of beauty products—this study seeks to provide valuable insights into the potential of AR technology to transform consumer behaviors in the beauty industry (Scholz & Duffy, 2018).

1.2. Problem Statement

The primary objective of this research is to investigate the impact of AR try-on features on consumer purchase intentions in comparison to traditional 2D product presentations. Additionally, the study aims to explore how factors like interactivity, authenticity, perceived quality, and product category mediate this relationship. The problem statement can be summarized as follows:

How do AR try-on features, as opposed to traditional 2D images, influence consumer purchase intentions, and what roles do product category and perceived quality play in this process?

This problem statement is addressed by the following research questions:

RQ1: Does the enhanced interactivity provided by AR try-on features lead to higher purchase intentions than viewing products on models?

RQ2: How do consumers perceive the authenticity and quality of beauty products through AR try-on versus traditional products on models?

RQ3: How does AR try-on technology influence consumers' perceived quality of beauty products compared to traditional model-based product presentations?

1.3.Relevance

This study is highly relevant as it addresses a critical gap in understanding the influence of emerging technologies, specifically AR try-on features, on consumer behavior and purchase

intentions compared to traditional 2D product presentations. By examining the impact of AR, this research provides valuable empirical evidence on how interactive technologies can enhance consumer engagement and satisfaction in the beauty industry.

The findings of this study contribute significantly to academic knowledge by elucidating the mechanisms through which AR affects consumer perceptions and decision-making processes. In particular, the study explores key factors such as interactivity, and perceived quality, offering a comprehensive understanding of how these elements contribute to purchase intentions.

From a practical perspective, this research offers actionable insights for retailers and beauty brands aiming to leverage AR technology for competitive advantage. By highlighting the benefits of AR in creating more personalized and engaging shopping experiences, it provides a roadmap for industry stakeholders to optimize their digital strategies. This is particularly crucial in the digital era, where consumer expectations are continuously evolving, and the ability to offer immersive and interactive shopping experiences can differentiate a brand in a crowded market.

1.4. Research Methods

This study employs an experimental design to investigate the impact of AR try-on features on consumer purchase intentions compared to traditional 2D product presentations. The experimental setup involves three distinct groups: one group exposed to the AR feature without any incentive to try on the products, another group exposed to the AR feature with an incentive to try on the products, and a third group exposed to a standard website with traditional 2D images of products applied on models. Participants were randomly assigned to one of these three groups to eliminate selection bias and ensure the validity of the results. Furthermore, the two product categories—lipstick and mascara—were randomly allocated to the participants within each group to account for potential differences in product type effects on consumer perceptions.

After experiencing the respective product presentations, participants responded to a survey designed to gather their perceptions about their experience.

This Survey includes sections to assess: (1) Participants Makeup Buying behavior, (2) their Perceptions towards the Experience and the inherent intention to purchase the product, (3) Their Perceived Quality towards the product, (4) Their Satisfaction towards the Product Viewing Experience, and (5) demographic characteristics.

Relevant academic papers were analyzed to identify key components related to this study. This literature review helped to define the research problem more clearly and informed the design of the primary data collection process.

For the primary data, quantitative data was collected using a structured questionnaire administered to the participants post-experience. The questionnaire was designed to test the impact of different types of product presentations (AR try-on vs. 2D images) and incentives on consumer perceptions and behaviors. The primary data focused on measuring purchase intentions, perceived quality, and perceptions of interactivity. Participants were asked to assess the likelihood of purchasing the product after the experience and their assessment of the product's quality based on the presentation format.

1.5. Dissertation Outline

This dissertation is organized into five chapters, each serving a distinct purpose in the research framework.

The opening chapter introduces the problem statement and research questions, outlining the study's objectives and significance in understanding the impact of AR try-on features versus traditional 2D product presentations on consumer purchase intentions.

Following this, chapter two provides a comprehensive literature review, including a critical analysis of existing research on Augmented Reality, Purchase Intention, and Perceived Quality in the context of the beauty retail world. Next, chapter three details the methodology employed in this study. It describes the experimental design, including the three groups exposed to different product presentation formats (AR with and without incentives and standard 2D images). This chapter explains how data was collected, measured, and analyzed, ensuring the study's replicability, and presents the survey results from participants post-experience. Chapter four then presents the findings from the study, discussing data interpretation and highlighting key results. It tests the validity of the proposed hypotheses and analyzes the differential impact of AR try-on features versus traditional 2D images on purchase intentions.

Finally, the last chapter provides a comprehensive conclusion. It summarizes the main findings, discusses the managerial and academic implications, addresses the study's limitations, and offers suggestions for future research. This chapter integrates the insights gained and proposes directions for further exploration in marketing and consumer behavior.

2. LITERATURE REVIEW

2.1. Augmented Reality

2.1.1. Definition and Characteristics

Augmented Reality is a technology that layers virtual elements over physical environments, blending virtual worlds with reality. These superimposed virtual elements, which can include videos, images, or other virtual items, are situated between the real-life environment and the user (Javornik, 2016a). AR enables consumers to interact with these virtual elements within the context of their real-life surroundings. Consumers can access AR on their mobile devices, such as smartphones, tablets, and laptops (Watson, Alexander, and Salavati, 2020).

The most accepted definition of AR, introduced by (Azuma et al., 2001), comes from the same area of research. According to (Azuma et al., 2001), an AR system supplements the real world with virtual (computer-generated) objects that appear to coexist in the same space as the real world. They define an AR system as having the following properties: it combines real and virtual objects in a real environment, runs interactively in real-time, and aligns real and virtual objects with each other. This definition emphasizes the combination of virtual and real elements and their real-time mutual alignment. In other words, AR enables an augmentation of reality with virtual elements (Javornik, 2016a).

While in a virtual environment (virtual reality), real elements are layered over virtual worlds, AR adds virtual elements to real elements, which include persons, products, or surroundings (Javornik, 2016a). In the context of retail, this means that AR can enrich retail products, consumers, or retail environments with virtual elements in real-time, potentially creating immersive consumer experiences (Watson et al., 2020).

(Dacko, 2017) suggested several potential benefits of AR apps for retailers. By enabling consumers to try on clothing and makeup virtually, such as in the case of the Rimmel app, AR can improve conversion and return rates. Additionally, by providing a more interactive and interesting experience, AR can enliven otherwise static shelf displays, as seen with the Walgreens app, and help drive store footfall. AR apps also enable a more personalized shopping experience, exemplified by apps like Converse or Topology Eyewear. However, while AR presents numerous potential benefits to retailers, the literature has predominantly focused on consumer adoption. Only recently has there been an exploration into how AR impacts consumers' emotional and behavioral responses.

2.1.2. AR features

To explore the potential impact of AR technologies on consumer response, recent researchers have considered its core characteristics, such as interactivity, hyper textuality, modality, connectivity, location-specificity, mobility, and virtuality, with a particular focus on interactivity (Javornik, 2016a; Poushneh & Vasquez-Parraga, 2017a), modality, and augmentation. Interactivity, which has been extensively investigated, refers to the "extent to which users can participate in modifying the form and content of a mediated environment in real-time" (Steuer, 1992, p. 84).

It has been suggested that interactivity entertains and immerses users, thus creating a positive affective response (Fiore et al., 2005). Several authors have explored how interactivity creates experiential value through its ability to create flow and the immersion of consumers into a highly absorbing state when using interactive features (van Noort, Voorveld, and van Reijmersdal, 2012). Modality, on the other hand, refers to the types of content provided by the medium, such as audio or visual formats (Javornik, 2016a). It is through this stimulation of the senses that consumers respond, with suggestions that stimulations to multiple senses will be more effective than those appealing to just one (Li et al., 2002).

The ability to create flow and complete immersion into the virtual consumption experience has also been explored from several perspectives (Riar et al., 2023). (T.-L. Huang & Hsu Liu, 2014) explored whether the persuasive effects of narrative (cause and effect simulations), media richness (environment simulations), and presence (object simulations) differ, finding that AR designed to create a narrative is critical in creating experiential value. (Javornik, 2016b) argued that AR has the ability to create immersive experiences through its defining characteristic of augmentation. This augmentation is unique to AR in its ability to enhance physical reality by overlaying physical environments with virtual elements. (Javornik, 2016b) emphasized that AR is more than just another interactive technology; its ability to modify the visual representation of reality in real-time creates a more immersive flow compared to other interactive experiences. Indeed, studies by (Javornik, 2016b) and (Poushneh & Vasquez-Parraga, 2017a) demonstrate the importance of augmentation in promoting immersion, playfulness, and excitement, resulting in enhanced experiential value creation. Therefore, the focus on augmentation is key when considering how AR retail apps influence consumer behavior.

2.1.3. Consumer Adoption of AR

When considering consumer adoption of new technologies, both hedonic and utilitarian features have been explored in keeping with the Technology Acceptance Model (TAM). Perceived usefulness and perceived ease of use capture the utilitarian features of AR, while perceived enjoyment captures the hedonic values (Watson et al., 2020). Indeed, several studies have found that enjoyment and experiential value significantly influence consumer behavior in virtual environments (T.-L. Huang & Hsu Liu, 2014; J. Kim & Forsythe, 2008; Lee et al., 2006). It seems that the hedonic value of AR potentially distinguishes it from other interactive technologies (Javornik, 2016a). To better understand the effect of AR technologies on consumer behavior, researchers have begun to explore its features and their role in creating utilitarian and hedonic value and how this impacts purchase intention rather than adoption per se (Watson et al., 2020).

2.1.4. AR in Retail

AR emerges as a groundbreaking marketing tool in retail, presenting businesses with opportunities to enhance purchase decisions and significantly boost user satisfaction and purchase intent by improving perceptions of product quality and offering enriched information and interactive experiences (Kostin, 2018; Poushneh & Vasquez-Parraga, 2017b). AR has the capability to support brands with a unique appeal or higher price points by reducing purchase hesitations, which underscores its role in broadening market access (Tan et al., 2022). The synergy of AI and AR technologies propels retail towards digital innovation, fostering omnichannel strategies that blend online and offline experiences, thereby revolutionizing customer engagement and retail paradigms (Aiolfi & Sabbadin, 2019).

AR's utility in fostering consumer loyalty and purchase intentions, particularly in fashion and beauty, through immersive experiences highlights its strategic importance in creating personalized shopping experiences (ERU et al., 2022). Furthermore, AR's impact on pre-purchase satisfaction, experiential value, and user satisfaction underscores its effectiveness in enhancing retail experiences (Poushneh & Vasquez-Parraga, 2017b; Yuan & Wu, 2008). It addresses key online retail challenges like low conversion rates and high return rates, indicating AR's potential to transform retail marketing strategies significantly (Janakiraman et al., 2016).

Lastly, AR's influence extends to modifying information search and decision-making processes, offering a novel method to stimulate product ownership feelings (Rejeb et al., 2023). (Caboni & Hagberg, 2019) identify three major applications of AR in retail: online web-based,

in-store, and mobile applications, concluding that AR benefits consumers by enhancing interaction with products and brands, augmenting the shopping experience, and involving product personalization.

2.1.5. AR in Marketing

AR technology enhances marketing strategies by fostering engagement levels that offer interactive and experiential values, aligning with relationship marketing theory (Rejeb et al., 2023). It facilitates a highly immersive environment, allowing for a rich exchange of information between brands and consumers, creating unforgettable experiences that deepen emotional involvement and offer hedonic benefits (Parise et al., 2016; Rauschnabel et al., 2019).

Privacy concerns emerge as a significant issue within AR marketing, with users expressing negative impressions toward perceived intrusiveness (Rejeb et al., 2023). The integration of AI into virtual brand communities represents a strategic approach to personalize consumer interactions, enhancing brand loyalty and transforming shopping habits by analyzing behavior and preferences, thus reinforcing the role of AR in revolutionizing retail landscapes (Casaló et al., 2008).

2.2. AR in beauty industry

Augmented Reality assists consumers in the complex task of mentally converting 2-D information into the 3-D world, offering an interface that complements natural information processing methods (Lavoye et al., 2021). AR introduces three distinct shopping modes: self-augmentation, environmental augmentation, and object augmentation, exemplified by applications like YouCam Makeup, IKEA Place, and interactive dessert menus, respectively (Lavoye et al., 2021).

This technology significantly enhances consumer perception by providing instant access to diverse visual information, including digital images and computer simulations (Hinsch et al., 2020). Specifically, AR makeover apps create a unique interaction by overlaying virtual product information on the user's reflection, fostering a deeper personal connection with brands through self-referencing, a key mechanism in developing brand-consumer relationships (Baek et al., 2018).

2.3.Theoretical Background

2.3.1. Purchase Intention

Purchase intention is a critical concept in consumer behavior research, referring to a consumer's plan or likelihood to buy a particular product or service. It serves as a key predictor of actual purchase behavior, making it a valuable metric for marketers and businesses. (Peña-García et al., 2020)

According to the Theory of Planned Behavior (TPB) proposed by (Ajzen, 1991), purchase intention is influenced by three main factors: attitudes toward the behavior, subjective norms, and perceived behavioral control. Together, these elements shape an individual's intention to engage in a specific action, such as making a purchase.

In addition to TPB, other models like the Technology Acceptance Model (TAM) developed by (Davis, 1989)also provide insights into purchase intention, particularly in the context of technology adoption. TAM suggests that perceived ease of use and perceived usefulness of technology can significantly impact a user's intention to adopt and use it, which can be extended to online shopping and digital marketing contexts. Understanding these theoretical frameworks helps businesses design effective marketing strategies to enhance consumer purchase intentions, ultimately driving sales and improving market performance.

2.3.2. Perceived Quality

Perceived quality is a critical determinant in consumer decision-making and significantly influences purchase intentions (Vo & Nguyen, 2015). (Zeithaml, 1988) defines perceived quality as the consumer's judgment about a product's overall excellence or superiority. It is a subjective assessment that can be shaped by various factors, including brand reputation, price, and marketing communications.

High perceived quality often leads to increased customer satisfaction, loyalty, and a greater likelihood of repeat purchases (Aaker, 1996). In the context of AR try-on features in the beauty industry, perceived quality can be enhanced through realistic and authentic representations of products, thereby positively impacting purchase intentions (T. L. Huang & Liao, 2015). Moreover, perceived quality has been found to mediate the relationship between visual advertising techniques and consumer purchase behavior, underscoring its importance in marketing strategies (Dodds et al., 1991).

2.3.3. Influence of Product Presentation

The influence of product presentation on consumer behavior is a well-documented aspect of marketing research. Effective product presentation can significantly enhance consumer perceptions of product quality, increase purchase intention, and positively affect the overall shopping experience (Cox & Cox, 2002). Visual merchandising, including the use of high-quality images, detailed product descriptions, and interactive features such as 360-degree views and AR, has been shown to engage consumers more deeply and increase their likelihood of purchase (Grewal et al., 2017). Additionally, the context in which products are presented, such as clean and aesthetically pleasing environments, can evoke positive emotions and reinforce brand perception (Chitturi et al., 2022).

Studies have also highlighted the role of AR in product presentation, with AR features allowing consumers to visualize products in their real-world context, reducing uncertainty and enhancing purchase confidence (Poushneh & Vasquez-Parraga, 2017b).

These findings align with initial research indicating positive consumer attitudes toward their interaction with branded AR systems, such as AR mobile applications like Ray-Ban Virtual Try-On and Night Sky, in the contexts of online shopping and entertainment services (Poushneh, 2018). (Gatter et al., 2022) demonstrated that touch-enabled AR features were associated with hedonic benefits for autotelic consumers, which also positively impacted instrumental outcomes, including consumer attitudes toward the store, products, and purchase intention. Overall, the strategic presentation of products, particularly through AR, is crucial in influencing consumer attitudes and behaviors, making it a vital component of effective marketing strategies.

2.3.4. Involvement in a product category

Involvement in product categories is a critical determinant of consumer behavior and decision-making in the beauty industry. (Zaichkowsky, 1985) developed the Personal Involvement Inventory (PII), which measures consumer involvement across different product categories, including cosmetics. Research by (Bloch & Richins, 1983) and (Park et al., 1986) further supports that consumers with high involvement in beauty products tend to exhibit greater interest in product attributes and are more responsive to detailed marketing efforts.

Additionally, exploring AR's impact on buying behavior within the fashion and beauty industry reveals that gender and product category significantly affect online shopping behaviors. Gender-specific differences in risk perception and purchase intentions influence

shopping patterns across product categories (Dai, 2014). This insight underlines the necessity for AR strategies to be adaptable to preferences and the specific nature of products, aiming to offer personalized shopping experiences that could enhance consumer engagement and increase purchase intentions. Understanding the level of consumer involvement with beauty products allows marketers to tailor their strategies, enhancing the effectiveness of both traditional and AR-based marketing approaches in driving purchase intentions. (Poushneh & Vasquez-Parraga, 2017b)

2.3.5. Buying behavior in the beauty industry

In the beauty industry, consumer buying behavior, which involves selecting, purchasing, and utilizing a variety of products like cosmetics and skincare, is influenced by a blend of psychological, social, and economic factors. This sector has seen a significant impact from social commerce and the growth of digital platforms, which facilitate enhanced information sharing among consumers (Maulid et al., 2022). The rise of hyper-informed consumers, who rely on social interactions and online data to inform their purchase decisions, marks a shift towards a more engaged and knowledgeable purchase process. This evolution highlights the critical importance of digital platform characteristics—familiarity, ease of use, and perceived utility—in shaping consumer choices and actions (Shirazi et al., 2022).

2.3.6. Consumer behavior in digital Retail Environments

AR significantly influences consumer decision-making in digital retail environments by offering immersive experiences that blend real and virtual worlds, enhancing sensory information quality and dissolving traditional boundaries (Suh & Prophet, 2018). This technology fosters increased competence and self-empowerment in consumers by adding virtual information to online purchasing opportunities (Hilken et al., 2020).

Additionally, virtual product testing enhances perceived control over shopping activities and encourages the development of vivid mental imagery (Rejeb et al., 2023). Consumer intentions to use AR can vary, with some preferring real shopping experiences due to concerns over evaluating product quality (Feng & Mueller, 2019), while others might be deterred by a lack of confidence in using new technologies (Hopp & Gangadharbatla, 2016). Research comparing AR modalities shows that web-based AR provides a more realistic experience than mobile-app-based AR, enhancing product purchase intentions through curiosity and engagement (Chen & Lin, 2022).

2.3.7. Segmenting customers

Segmenting customers is a pivotal strategy in marketing, allowing companies to identify and target specific groups of consumers with tailored messages and offers (Camilleri, 2018). This process involves dividing a broad consumer or business market, normally consisting of existing and potential customers, into sub-groups of consumers based on some type of shared characteristics (Kotler & Keller, 2019). Effective segmentation can enhance the precision of marketing efforts, improve customer satisfaction, and increase market share.

In the beauty industry, segmentation is particularly valuable due to the diverse preferences and needs of consumers (Wedel & Kamakura, 2002). AR try-on features offer a unique opportunity to gather data on consumer behavior and preferences, enabling more precise and dynamic segmentation (T.-L. Huang & Liao, 2017). For instance, AR can track which products consumers try on and how long they interact with each other, providing insights that can be used to segment customers based on their engagement levels, product preferences, and purchasing intentions. This technology-driven approach to segmentation allows for highly personalized marketing strategies that can significantly enhance consumer engagement and purchase intentions (Poushneh & Vasquez-Parraga, 2017a).

2.4.Hypothesis

Based on the presented literature, the following hypotheses were formulated:

H1: Consumers exposed to AR try-on features present higher purchase intentions compared to those who view products applied on 2D images on models.

H2: The perceived quality offered by AR try-on features contributes significantly to the increase in purchase intentions.

H3: Enhanced interactivity of AR try-on features positively affects the perceived quality of products.

H4: Product Category moderates the relationship between product presentation and on-line purchase intention.

H5: The relationship between type of product presentation and purchase intention is mediated by perceived quality.

2.5. Conceptual Framework

The following diagram outlines the relationships between variables and the underlying hypotheses being investigated

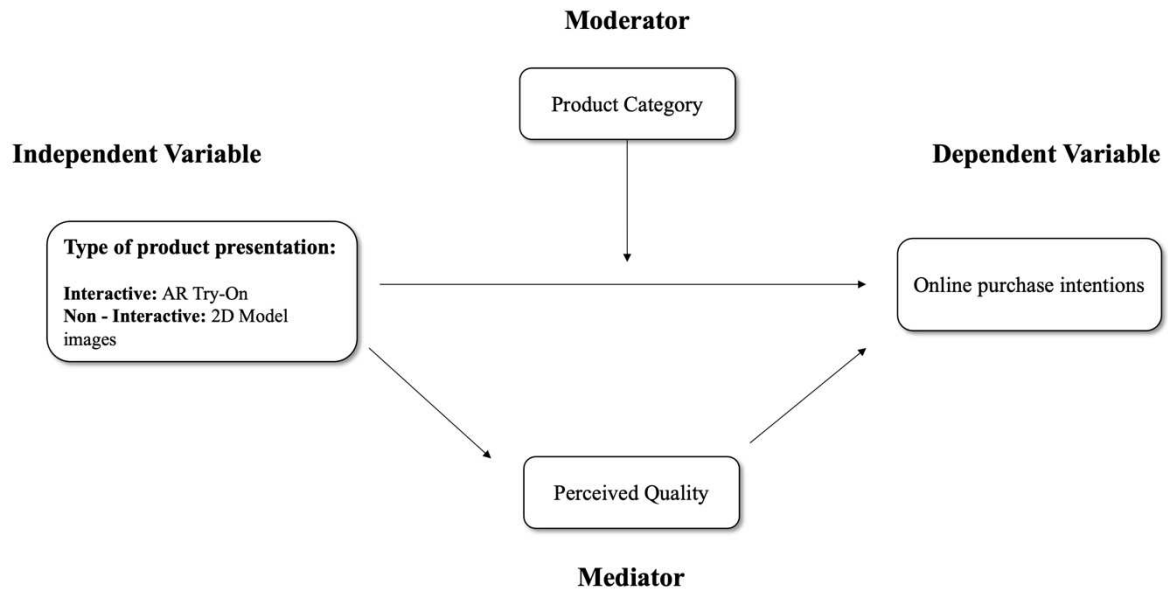


Figure 1: Conceptual Framework

3. METHODOLOGY

3.1. Research Approach

This study aimed to understand how AR try-on features influence consumer purchase intentions compared to traditional 2D product presentations. Using a posttest-only between-group experimental design, the research focused on female participants who were randomly assigned to one of three conditions: one group interacted with an AR try-on feature without any incentive, the second group interacted with an AR try-on feature with an incentive, and the third group viewed the product on 2D images. The product category (lipstick or mascara) was also analyzed to consider its potential influence on consumer behavior. This setup facilitated a direct comparison of these presentation methods' impacts on purchase intentions.

The goal was to investigate the potential of AR technology to enhance interactivity and purchase intentions. A comprehensive literature review provided the foundation for developing hypotheses and building the conceptual framework.

To answer the research questions and test the hypotheses, both exploratory and explanatory research methods were employed. The exploratory phase involved reviewing existing literature to identify key variables and hypothesize their connections. In the explanatory phase, participants engaged with their assigned product presentation format and then completed a post-experience survey. This survey gathered quantitative data on their perceptions, including purchase intentions and perceived quality.

By combining exploratory and explanatory approaches, this study provided insights into the effectiveness of AR try-on features in enhancing consumer engagement and driving purchase intentions in the beauty industry, offering valuable contributions to both academic knowledge and practical digital marketing strategies.

3.2. Primary Data

Primary data in this research was collected through an online survey, shared after the experience, designed to evaluate the impact of AR try-on technology versus traditional 2D image presentations on purchase intentions in the beauty industry. The survey included questions related to perceived quality, experience, and purchase intentions. Participants, specifically female consumers interested in beauty products, were randomly asked to participate in the experience. This approach allowed me to gather firsthand insights directly

from the target demographic, ensuring that the data is both relevant and specific to the study's objectives.

3.2.1. Experience: Stimuli and Procedure

For the experiment, participants were randomly selected to minimize bias and ensure equal representation in each group. They received a paper-based sheet explaining the procedures involved and were asked for consent for the filming procedure. The experiment was conducted at Colombo Shopping Center to facilitate access to a diverse and representative sample for the study.

The Estee Lauder Try-On feature served as the stimulus for the AR condition. Participants began by accessing a designated study website. Following this, they engaged in a simulated beauty product trial, using Estee Lauder's AR try-on feature to virtually apply two different beauty products: lipstick and mascara. This process allowed for a direct comparison of consumer purchase intention when using 2D image presentation versus the interactive AR try-on feature.

Participants assigned to the AR try-on condition were instructed on how to access the Estee Lauder website and familiarize themselves with its virtual product testing features. In contrast, those in the control group followed the same procedure to view beauty products in 2D images. Each participant received detailed guidelines tailored to their specific condition, ensuring they understood how to proceed with their task effectively, aiming for a uniform experience throughout the experiment.

In both conditions, participants had the opportunity to explore multiple variations of the products within the category, namely the colors available.

During the experiment, each participant was attentively observed and recorded. Their verbal and non-verbal reactions were carefully noted for subsequent analysis. Qualitative information was gathered regarding the ease of use of the technology, including any signs of frustration, confusion, or technical difficulties encountered. Additionally, any feedback or reactions expressed by the participants beyond the survey were considered. This included their interest in the product, level of enthusiasm displayed, and any other relevant observations made during the experiment.

3.2.2. Post Experience Survey: Main Study

The survey for this study was meticulously designed and developed using the Qualtrics platform, ensuring a comprehensive and structured approach to gathering data. The survey consisted of six blocks, each targeting specific aspects of participants' makeup buying behavior, experience with the product viewing conditions, perceived quality, and demographics.

Participants were first asked about their makeup buying habits, including the frequency of their purchases, familiarity with various makeup brands, and the types of makeup products they used most frequently. This block also included questions about their typical purchase locations. Additionally, participants were asked to rank the factors influencing their makeup purchase decisions, providing insight into their purchasing motivations.

In the second block, participants were allocated to one of two product conditions: lipstick or mascara. They were then asked to rate their agreement with several statements regarding their experience with the product viewing. This section aimed to measure the participants' engagement and focus during the activity, as well as their curiosity and overall interest. It also evaluated the enjoyment and ease of exploring the website.

Participants were asked to indicate their level of agreement with statements regarding the perceived quality of the product they viewed. This block included questions about the product's reliability, overall quality, and durability. They were also asked to rate the product's quality and workmanship on a scale from very poor to exceptional.

The fourth block focused on participants' satisfaction with the product viewing experience. They rated their satisfaction, the ease of navigation, and their likelihood of recommending the website to others. This section provided insights into the usability and effectiveness of the product viewing conditions.

Participants were then asked to confirm which experience they realized: the standard website or the AR try-on feature. Those who used the AR try-on feature were also asked if they noticed the "AR try-on" button, ensuring that the participants correctly identified and interacted with the AR functionality.

The final block collected demographic information, including gender, nationality, professional situation, age, and gross monthly income. This data helped contextualize the survey responses and ensured a comprehensive analysis of the participant demographics.

3.2.2.1. Measurements and Indicators

To measure the constructs of this study, a thorough literature review was conducted to understand participants' behavior when it comes to AR try-on features and purchase intention. Based on this review, a 7-point Likert scale was chosen to measure all variables, including purchase intention and perceived quality. The scale ranged from 1 ("Strongly disagree") to 7 ("Strongly agree").

Framework	Measure	Items	Scale	Reference	Cronbach
IV	Type of Product Presentation	Stimuli	na	na	na
Moderator	Product Category	Stimuli	na	na	na
Mediator	Perceived Quality	5	7-point Likert- scale	(Dodds et al., 1991)	0.95
DV	Purchase Intention	3	7-point Likert- scale	(Zhang, 2010)	0.97

Table 1: Operational Model

3.3.Data Analysis

Using SPSS software, the data analysis for this study began with data cleaning and the development of new variables relevant to the study. To ensure the quality and assess the consistency and stability of measurement instruments of the data, Mahalanobis distance was applied to detect the presence of outliers, and reliability analysis through the Cronbach Alpha test was also conducted.

Subsequently, several conditions were verified to determine the suitable test for each hypothesis: normal distribution of data, linearity of residuals, independence of observations, normal distribution of residuals, and homoscedasticity of residuals. After verifying these conditions, independent t-tests and a simple linear regression were conducted. Finally, the full model was run using PROCESS Model 5 by Hayes to understand the mediator and moderator effects within the dependent and independent variables.

Additionally, a test was conducted to understand if there were differences between the AR group with and without incentives. This was done to determine the relevance of using three groups (AR try-on with incentive, AR try-on without incentive, and the standard website) versus two AR try-on groups (with incentive) and the standard website group. The independent sample t-test revealed no statistically significant difference between the two groups exposed to the AR try-on feature. As a result, only the group with the incentive to try on and the standard website group were used for further analysis.

4. RESULTS AND DISCUSSION

4.1.Data Preparation process

The findings indicate that no missing data were discovered at the item or construct level, confirming that the questionnaire was well-understood and applicable to the research objectives. Consequently, there was no need to explore trends or devise solutions for missing data.

To ensure data integrity, Mahalanobis distance was conducted to determine the presence of outliers in the dataset. Results showed that there was no distance greater than 3, indicating that no outliers were found.

To evaluate the relevance of the three experimental groups and decide whether to simplify the analysis to two groups, an independent samples t-test was conducted to compare purchase intentions between the AR try-on group with an incentive and the AR try-on group without an incentive. The results showed similar mean purchase intention scores ($M = 3.93$, $SD = 0.95$ for AR without incentive and $M = 3.68$, $SD = 0.91$ for AR with incentive) (Appendix 2) and no significant difference in purchase intentions between the two groups ($p = 0.413$) (Appendix 3). Therefore, for further analysis, only the AR try-on group with an incentive will be used, as this group is more likely to have actively engaged with the AR feature.

4.2.Sample Characterization

As highlighted in Appendix 4, the sample for this study consisted of 59 participants, predominantly Portuguese, representing 78% of the sample, while the remaining 22% were from other nationalities. As expected, all participants were female since this was the target of the research. The age distribution was primarily young adults, with 62.7% aged between 18 and 24 years, 15.3% between 25 and 34 years, 13.6% between 35 and 44 years, 3.4% between 45 and 54 years, and 5.1% between 55 and 64 years. This suggests a younger demographic, which may be more inclined to engage with AR technology.

Regarding occupation, nearly half of the respondents were employed full-time (49.2%), while a significant portion were students (47.4%, combining both those with and without jobs). Additionally, 3.4% of the participants had part-time jobs, indicating a mix of individuals with different levels of financial independence and work experience. The income levels were diverse, with 20.3% reporting no income, 16.9% earning less than 500€, 25.4% earning between 500 and 999€, 16.9% earning between 1000 and 1499€, 6.8% earning between 1500

and 1999€, 10.2% earning between 2000 and 2999€, 1.7% earning between 3000 and 3999€, and 1.7% earning between 4000 and 4999€. This distribution reveals a substantial number of respondents had no or low income, representing a lower economic segment, which might influence their purchasing behavior and perceptions of value.

Participants were divided into three groups based on the type of product presentation they experienced: 32.2% had an AR experience without incentive, 33.9% had an AR experience with incentive, and 33.9% experienced a standard website with 2D images. The nearly equal distribution among these groups ensures a balanced representation for comparative analysis in the study. The buying habits varied, with 27.1% purchasing monthly, 44.1% purchasing occasionally, 16.9% purchasing rarely, and 3.4% never purchasing (Appendix 5).

Most participants were occasional or monthly purchasers, indicating they are not frequent buyers, which could affect the generalizability of findings related to purchase frequency.

Young adults (18-24) showed the highest variability in buying behavior, with a tendency towards occasional and monthly purchases (Appendix 6). Lower-income groups (no income, less than 500€, and 500-999€) tended to purchase occasionally or monthly, with very few daily or weekly purchasers. Middle-income groups (1000-1499€, 1500-1999€, and 2000-2999€) showed more variability in purchasing behaviors, including some daily and monthly purchasers. Higher-income groups (3000-3999€ and 4000-4999€) tended to purchase weekly or occasionally, with no daily purchasers (Appendix 7).

From the sample, we can also highlight that the group with AR Experience without Incentive has the highest mean purchase intention ($M = 3.93$, $SD = 0.95$), followed by the AR Experience with Incentive ($M = 3.68$, $SD = 0.91$), and lastly, the Standard Website group ($M = 3.35$, $SD = 0.95$) (Appendix 8). When comparing product categories, the mean purchase intentions for Lipstick and Mascara are very close, with Lipstick having a slightly higher mean ($M = 3.67$, $SD = 0.91$) than Mascara ($M = 3.63$, $SD = 1.01$) (Appendix 9).

These results suggest that AR experiences tend to result in higher purchase intentions compared to traditional 2D images, although the differences between product categories (Lipstick vs. Mascara) are minimal. This sample characteristic implies that a larger percentage of the respondents are well-qualified to provide knowledgeable and unbiased opinions on the research discussion.

4.3.Measure Reliability

To ensure the reliability of the scales used in this study, Cronbach's Alpha coefficient was employed, following the guidelines proposed by (Bonett & Wright, 2015).

The Purchase Intention scale, which includes items measuring purchase intention for both lipstick and mascara, demonstrated good internal consistency with an overall Cronbach's Alpha of 0.862. Similarly, the Perceived Quality scale, consisting of items assessing perceived quality for both product categories, also showed good internal consistency, with an overall Cronbach's Alpha of 0.833.

Both the Purchase Intention and Perceived Quality scales exhibit high internal consistency, with Cronbach's Alpha values indicating strong reliability. The analysis confirmed that each construct is measured reliably across the sample under investigation. There was no need for the deletion of any items from either construct, as the coefficient did not vary significantly (Appendix 10). This supports the use of these scales in the study, providing confidence in the reliability of the measurement instruments used.

CONSTRUCT	CRONBACH'S ALPHA	QUALITY	N° OF ITEMS
Purchase Intention	0.862	Good	3
Perceived Quality	0.833	Good	5

Table 2: Cronbach's Alphas

4.4.Results From the Hypothesis Testing

The nature of the hypotheses presupposed a comparison between two groups (H1, H2, and H3) in terms of their perceived quality and purchase intentions of beauty products. Each participant was exposed to only one product category (lipstick or mascara) and one type of product presentation (AR try-on with an incentive or Standard website), ensuring the independence of observations.

To determine the appropriateness of the statistical tests, a preliminary check of their assumptions was made before each hypothesis test. Given that the sample size is greater than 30, the Central Limit Theorem was used to test the hypothesis, justifying the use of parametric tests even if the normality assumption was violated. (Hair et al., 2014)

For all three hypotheses, preliminary tests were conducted to verify the assumptions necessary for hypothesis testing. The sample size consisted of 59 observations, each independently and identically distributed. A histogram and a normal P-P plot were examined to verify the normal distribution of residuals for H1. The histogram showed a roughly bell-shaped distribution with a mean close to zero ($M = -1.72E-16$) and a standard deviation close to 1 ($SD = 0.991$) (Appendix 11). The normal P-P plot indicated that the points lie approximately along the diagonal line, confirming the normal distribution of residuals.

Linearity was assessed by reviewing the scatterplot of residuals versus predicted values, which showed a random scatter of points around the horizontal axis without any obvious patterns or curves. Homoscedasticity was confirmed through Levene's Test, with significance values all greater than 0.05 (0.805, 0.776, 0.776, 0.822) (Appendix 12), indicating no significant difference in variances between groups. These results confirmed that the assumptions for normality, linearity, and homoscedasticity of residuals were met, allowing us to proceed with hypothesis testing for H1.

For H2, similar tests were conducted. The histogram showed a bell-shaped distribution, and the normal P-P plot indicated the points lie approximately along the diagonal line, confirming the normal distribution of residuals. The mean of the residuals was very close to zero ($M = 1.40E-15$), and the standard deviation was close to 1 ($SD = 0.991$) (Appendix 14). Linearity was confirmed through a scatterplot of residuals versus predicted values, showing a random scatter of points around the horizontal axis with no clear patterns. Homoscedasticity was verified with Levene's Test, with significance values (0.407, 0.819, 0.813, 0.424) (Appendix 15) all greater than 0.05, indicating no significant difference in variances between groups. These preliminary tests confirmed that the residuals were approximately normally distributed, exhibited linearity, and were homoscedastic.

For H3, the histogram of the residuals showed a roughly bell-shaped distribution, suggesting that the residuals were approximately normally distributed. The mean of the residuals was very close to zero ($M = -2.46E-15$), and the standard deviation was close to 1 ($SD = 0.991$) (Appendix 19). The normal P-P plot further confirmed the normal distribution of residuals. Linearity was assessed through a scatterplot of residuals versus predicted values, which showed a random scatter of points around the horizontal axis with no clear patterns, indicating that the assumption of linearity is met. Homoscedasticity was confirmed through Levene's Test, with significance values (0.603, 0.522, 0.522, 0.579) (Appendix 20) all greater than 0.05, indicating no significant difference in variances between groups. These results

confirmed that the assumptions for normality, linearity, and homoscedasticity of residuals were also met.

The results of the hypothesis tests are detailed in this section, providing insights into how the different modes of product presentation influenced consumer perceptions and purchase intentions.

H1: Consumers exposed to AR try-on features present higher purchase intentions compared to those who view products applied on 2D images on models

To test the hypothesis, an independent samples t-test was conducted comparing the purchase intention scores between two groups: consumers exposed to AR try-on features with incentives (Group 1) and those who view products on a standard website with 2D images (Group 2). The test was carried out using SPSS, and the results were analyzed to determine if there was a statistically significant difference between the two groups.

Levene's Test for Equality of Variances yielded a significance value of 0.511 (Appendix 13), indicating that the assumption of equal variances is met ($p > 0.05$). The t-test for equality of means showed a t-value of 1.133 with 38 degrees of freedom and a two-tailed significance value of 0.264 (Appendix 13). Since the p-value is greater than the significance level of 0.05, we fail to reject the null hypothesis.

These results suggest that there is no statistically significant difference in purchase intentions between consumers exposed to AR try-on features with incentives and those who view products applied on 2D images on models. The analysis concludes that AR try-on features do not significantly increase purchase intentions compared to the standard website with 2D images. Despite the small to moderate effect size, the lack of statistical significance implies that the AR try-on feature's impact on purchase intention is minimal. Therefore, the hypothesis (H1) that consumers exposed to AR try-on features present higher purchase intentions compared to those who view products on models is not supported.

H2: The perceived quality offered by AR try-on features contributes significantly to the increase in purchase intentions.

An analysis was conducted to examine the relationship between perceived quality and purchase intention among participants who used the AR try-on features. The dataset was filtered to include only participants in the AR try-on features group, and correlation and regression analyses were then performed.

The hypothesis formulated was that the perceived quality offered by AR try-on features contributes significantly to the increase in purchase intentions.

The correlation analysis revealed a Pearson correlation coefficient of 0.508 (Appendix 16), indicating a moderate positive correlation between perceived quality and purchase intention. This correlation was statistically significant, with a two-tailed p-value of 0.022 and a sample size of 20 participants. These results suggest that higher perceived quality is associated with higher purchase intentions.

Further analysis using regression confirmed these findings. The regression model was statistically significant with a p-value of 0.022, indicating that perceived quality is a significant predictor of purchase intention. The regression coefficient for perceived quality was 0.630 (Appendix 17), also with a significance value of 0.022. This indicates that for every unit increase in perceived quality, the purchase intention increases by 0.630 units. The model explained 25.8% of the variance in purchase intention ($R^2 = 0.258$) (Appendix 18).

These results lead us to reject the null hypothesis and accept the alternative hypothesis that the perceived quality offered by AR try-on features contributes significantly to the increase in purchase intentions. This finding underscores the importance of enhancing perceived quality through AR try-on features to positively influence consumer purchase behavior.

H3: Enhanced interactivity of AR try-on features positively affects the perceived quality of products.

An independent samples t-test was conducted to compare the perceived quality scores between the AR try-on feature group and the standard website group. The average perceived quality score for the AR experience group was 5.3700 (Appendix 21), while for the standard website group, it was 5.5400. The standard deviations were 0.73205 and 0.60210, respectively.

The t-test for equality of means showed a t-value of -0.802 with a significance value of 0.427. Since the p-value is greater than 0.05, we fail to reject the null hypothesis. Equal variances were assumed, as ($p = 0.312$) (Appendix 22).

The results indicate that there is no statistically significant difference in perceived quality between the two groups. Therefore, the enhanced interactivity of AR try-on features does not significantly affect the perceived quality of products compared to the standard website. The perceived quality scores are similar between both groups, suggesting that the added interactivity does not lead to a significant improvement in perceived quality.

H4: Product Category moderates the relationship between product presentation and on-line purchase intention.

Based on the results of the moderation analysis using the PROCESS macro in SPSS (Appendix 23), we investigated whether product category moderates the relationship between product presentation and online purchase intention (H4). The model summary revealed an R-squared value of 0.0627, indicating that the model explains approximately 6.27% of the variance in online purchase intention. However, the F-test result ($F = 1.2270$, $p = 0.3086$) suggests that the overall model is not statistically significant, meaning the predictors together do not significantly explain the variance in the dependent variable.

Examining the coefficients, the constant (4.2303) is significantly different from zero ($p = 0.0001$), indicating the baseline level of purchase intention when all predictors are zero. The coefficient for product presentation is -0.2697 ($p = 0.5730$), suggesting that the type of product presentation alone does not significantly affect online purchase intention. Similarly, the coefficient for product category is 0.0030 ($p = 0.9964$), indicating that product category alone does not significantly affect online purchase intention. The interaction term (Product Presentation x Product Category) has a coefficient of -0.0136 ($p = 0.9643$), meaning there is

no significant moderating effect of product category on the relationship between product presentation and online purchase intention.

Additionally, the test of the highest order unconditional interaction revealed an R-squared change of 0.0000, with an F value of 0.0020 ($p = 0.9643$), indicating that the interaction term does not explain any additional variance in online purchase intention and is not statistically significant. Therefore, we conclude that product category does not significantly moderate the relationship between product presentation and online purchase intention. The effect of product presentation on online purchase intention does not differ significantly across different product categories, and we fail to reject the null hypothesis for H4.

H5: The relationship between type of product presentation and purchase intention is mediated by perceived quality.

To test the mediation effect of perceived quality (AVG_PQ) on the relationship between type of product presentation (EXP) and purchase intention (AVG_PI), a mediation analysis was conducted using Hayes' PROCESS model 4 (Hayes & Preacher, 2014), which led to the matrix presented in Appendix 24.

The analysis first examined whether the type of product presentation influences perceived quality. The model summary shows an R-squared value of 0.0039 and the results showed that type of product presentation does not significantly predict perceived quality ($B = 0.0552$, $p = 0.6399$), indicating no significant effect of product presentation type on perceived quality.

Next, the analysis examined whether type of product presentation and perceived quality predict purchase intention. The model summary shows an R-squared value of 0.3230 and the results indicated that the type of product presentation has a significant negative direct effect on purchase intentions ($B = -0.3272$, $p = 0.0132$), and perceived quality significantly predicts purchase intentions ($B = 0.6684$, $p < 0.001$).

The direct effect of the type of product presentation on purchase intentions was significant and negative. However, the indirect effect of type of product presentation on purchase intentions through perceived quality was not significant, as the bootstrapped confidence interval included zero ($B = 0.0369$, 95% CI $[-0.0966, 0.2365]$).

This indicates that the direct effect of the type of product presentation on purchase intention is significant and negative, but the indirect effect through perceived quality is not significant, as the bootstrapped confidence interval includes zero.

In conclusion, the mediation analysis results indicate that while the type of product presentation directly impacts purchase intention negatively, perceived quality does not significantly mediate this relationship. Thus, the hypothesized mediation effect of perceived quality on the relationship between type of product presentation and purchase intention is not supported.

4.4.1. Full Model

To evaluate the mediation effect of perceived quality on the relationship between the type of product presentation (AR try-on with incentive vs. Standard website) and purchase intention, along with the moderation effect of product category, Hayes' PROCESS model 5 was employed (Hayes & Preacher, 2014). This model helps to understand both mediation and moderation effects in the context of this study. The hypothesis tested was that the perceived quality offered by AR try-on features mediates the effect of the type of product presentation on purchase intention, with the product category moderating the relationship between the type of product presentation and perceived quality.

The mediation and moderation analysis were conducted using the PROCESS macro in SPSS. The variables used in the model were the independent variable (type of product presentation: AR try-on with incentive vs. Standard website), the mediator (perceived quality), the dependent variable (purchase intention), and the moderator (product category: lipstick vs. mascara).

The analysis produced the following results (Appendix 25). The coefficient for the effect of AR try-on with incentive on perceived quality was 0.21, with a standard error of 0.35. The t-value was 0.60, and the p-value was 0.554. These results indicate that the effect of AR try-on with incentive on perceived quality is not statistically significant ($p > 0.05$). The coefficient for the effect of perceived quality on purchase intention was 0.03, with a standard error of 0.38. The t-value was 0.08, and the p-value was 0.938. This suggests that the effect of perceived quality on purchase intention is not statistically significant ($p > 0.05$). The direct effect of AR try-on with incentive on purchase intention, controlling for perceived quality, had a coefficient of 0.48, with a standard error of 0.62. The t-value was 0.77, and the p-value was 0.446. This result indicates that the direct effect of AR try-on with incentive on purchase

intention is not statistically significant ($p > 0.05$). The indirect effect of AR try-on with incentive on purchase intention through perceived quality had a coefficient of -0.01, with a bootstrapped standard error of 0.14 and a bootstrapped confidence interval ranging from -0.32 to 0.26. Since the confidence interval includes zero, the indirect effect is not statistically significant.

Based on the mediation and moderation analysis results, the enhanced interactivity provided by AR try-on features does not significantly affect the perceived quality of products. The effect of perceived quality on purchase intention is also not significant. Additionally, the indirect effect of enhanced interactivity on purchase intention through perceived quality is not significant. Therefore, the hypothesis that enhanced interactivity of AR try-on features positively affects the perceived quality of products is not supported by the data. Furthermore, the product category does not significantly moderate the relationship between the type of product presentation and perceived quality. These findings suggest that while AR try-on features with incentives might be an innovative approach, they do not significantly enhance the perceived quality of products in a way that influences purchase intentions. This insight can help in understanding consumer behavior and refining marketing strategies for beauty products.

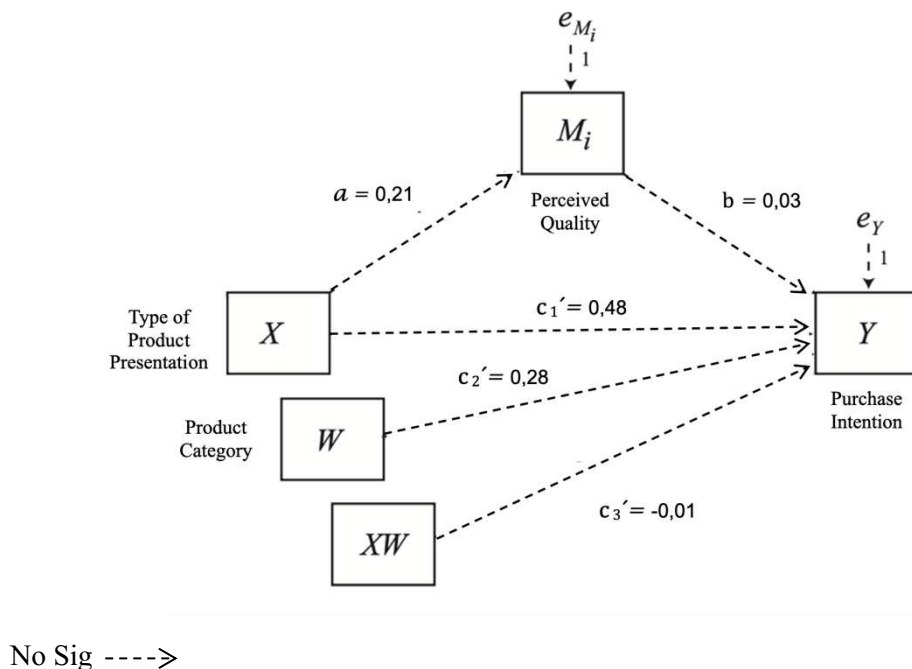


Figure 2: Statistical Diagram- Model 5

4.4.2. Discussion

The hypothesis that consumers exposed to AR try-on features present higher purchase intentions compared to those who view products on 2D images was not supported. Despite the innovative nature of AR try-on features, the results indicated no statistically significant difference in purchase intentions between the AR and 2D image groups, which aligns with research by (Rauschnabel, 2018), and also highlights that while AR can improve decision comfort and reduce misinformation, these benefits do not always lead to higher purchase rates.

This finding is intriguing, given the literature that emphasizes AR's potential to enhance consumer engagement and decision-making (Poushneh & Vasquez-Parraga, 2017a). One possible explanation for this discrepancy is that while AR provides a novel and interactive experience, it may not sufficiently overcome other factors influencing purchase decisions, such as brand loyalty, product familiarity, or price sensitivity. This was also studied by (Merle et al., 2012). Qualitative feedback from participants supports this notion, as several individuals mentioned they would consider buying the product because of the brand rather than the AR experience itself, or they expressed skepticism about the realism of the AR features, with some thinking it had filters incorporated or found previous experiences with AR not realistic. This suggests that the novelty of AR alone may not be enough to drive higher purchase intentions, and further research is needed to identify additional elements that could enhance its effectiveness.

Contrary to Hypothesis 1, the study found that perceived quality significantly contributes to the increase in purchase intentions when using AR try-on features. This aligns with the findings of (T. L. Huang & Liao, 2015) and (Flavián, Ibáñez-Sánchez, & Orús, 2019), who highlighted the role of realistic and authentic representations in enhancing perceived quality. The significant correlation between perceived quality and purchase intentions underscores the importance of focusing on the quality of AR experiences. This result is particularly relevant for marketers and retailers, as it suggests that efforts to improve the perceived quality of AR features could have a tangible impact on consumer purchase behavior. Enhancing the realism and authenticity of AR presentations could thus be a key strategy for increasing purchase intentions. Some qualitative feedback indicated that participants found the lipstick try-on feature interesting and useful for future purchases, pointing to the potential of well-executed AR features to positively influence consumer perceptions and behaviors.

The hypothesis that enhanced interactivity of AR try-on features positively affects the perceived quality of products was not supported. The results showed no significant difference

in perceived quality between the AR try-on and standard website groups. This finding challenges the assumption that interactivity alone is sufficient to enhance perceived quality.

While interactivity is a core characteristic of AR, the results suggest that it does not necessarily translate into higher perceived quality, which aligns with research by (Jiang et al., 2022) that found while interactivity in mobile AR applications, such as virtual shoe try-ons, significantly affects users' attitudes and intentions to continue using the technology, it does not necessarily enhance perceived quality.

Additionally, the study by (Liu & Shrum, 2002) on interactivity in virtual reality environments further supports this notion. They found that while high interactivity can enhance user engagement and immersion, it must be seamlessly integrated with realistic and trustworthy content to positively influence perceived quality and, subsequently, purchase intentions. Participants also highlighted concerns about the perceived authenticity of AR features, with some participants feeling that the AR try-on feature for mascara gave a fake lashes sensation and others doubting the realism of digitally presented products. This insight is crucial for developers and marketers, indicating that simply adding interactive features may not be enough; the overall quality and execution of the AR experience must also be carefully considered. Ensuring that AR features provide a realistic and trustworthy representation of products is essential for enhancing their quality and, subsequently, purchase intentions.

Regarding the moderation analysis (H4), we conclude that product category does not significantly moderate the relationship between product presentation and online purchase intention. The effect of product presentation on online purchase intention does not differ significantly across different product categories, and we fail to reject the null hypothesis for H4. For the mediation analysis (H5), the direct effect of the type of product presentation on purchase intention is significant and negative. However, the indirect effect through perceived quality is not significant, as the bootstrapped confidence interval includes zero. This indicates that while the type of product presentation directly impacts purchase intention negatively, perceived quality does not significantly mediate this relationship. Therefore, the hypothesized mediation effect of perceived quality on the relationship between type of product presentation and purchase intention is not supported.

5. CONCLUSIONS AND LIMITATIONS

The concluding chapter of this master's thesis will encapsulate the main findings, drawing conclusions from the data collection and analysis. Furthermore, it will identify managerial and academic implications and outline limitations for potential future research.

5.1. Main Findings and Conclusions

For this research, the product categories chosen were lipstick and mascara, based on the availability of the AR try-on feature on the Estée Lauder website. The Estée Lauder website was selected because it allowed for the necessary stimuli modifications through website editing. It is important to note that using an existing brand like Estée Lauder could introduce bias into the experience.

The study employed three experimental groups: the first group exposed to an AR try-on feature without any incentive, the second group with an incentive to try the AR feature, and the third group viewing the products on a standard website.

During initial testing, it was observed that the first group failed to notice or use the AR try-on feature effectively, possibly due to insufficient visibility or lack of engagement (Appendix 26). Therefore, the analysis focused on the second group, which was incentivized to use the AR feature, and the third group, which interacted with the standard website.

The stimuli modification images used are available in Appendix 27.

RQ1: Does the enhanced interactivity provided by AR try-on features lead to higher purchase intentions than viewing products on models?

Our hypothesis testing results indicate no statistically significant difference in purchase intentions between consumers exposed to AR try-on features and those who view products on 2D images. Consequently, our hypothesis that consumers exposed to AR try-on features present higher purchase intentions compared to those who view products on models is not supported.

While the literature highlights AR's potential to enhance consumer engagement and interactivity (T. L. Huang & Liao, 2015; Poushneh & Vasquez-Parraga, 2017b), these advantages do not necessarily translate into higher purchase intentions. The increased interactivity provided by AR try-on features may not sufficiently enhance perceived

authenticity and quality, which are crucial for influencing purchase intentions (Pantano et al., 2017).

According to the Technology Acceptance Model (TAM), perceived usefulness and ease of use are pivotal for technology adoption (Davis, 1989). In this context, AR try-on features, while perceived as useful, might not meet consumer expectations regarding ease of use and accuracy, thus not significantly affecting purchase intentions. Additionally, the hedonic value provided by AR try-ons might not outweigh the utilitarian concerns (Javornik, 2016a).

The lack of significant impact on purchase intentions could also be attributed to the current technological limitations of AR. Enhancements in AR's accuracy, ease of use, and integration with other immersive technologies like AI could address these shortcomings (Poushneh & Vasquez-Parraga, 2017a). Retailers should focus on improving the realism and usability of AR try-on features to better represent real-world conditions, potentially influencing purchase intentions more effectively.

Furthermore, the effectiveness of AR try-on features may vary depending on specific product categories and individual consumer behavior. For instance, consumers might find AR more beneficial for certain beauty products (e.g., lipstick) compared to others (e.g., mascara), which could influence overall purchase intentions (Dai, 2014).

The findings from H4 indicate that product category does not significantly moderate the relationship between product presentation and online purchase intention. This suggests that the type of product being viewed through AR does not alter its effectiveness in driving purchase intention. Additionally, the insights from H5 highlight that while the type of product presentation directly impacts purchase intention negatively, perceived quality does not significantly mediate this relationship. This indicates that even though AR try-on features may influence purchase intention, this effect is not significantly channeled through perceived quality.

In conclusion, while AR try-on features provide an innovative and engaging way for consumers to interact with beauty products, our research indicates that this enhanced interactivity does not significantly increase purchase intentions compared to traditional 2D product presentations, which is also proved by (Riar et al., 2023). Traditional product presentation methods remain effective in influencing consumer purchase behavior. (J. H. Kim et al., 2023) suggests that traditional 2D presentations still play a significant role in influencing consumer decisions, particularly when consumers have high product knowledge or are in a searching mode rather than a browsing mode. Future research and technological advancements

may further unlock the potential of AR try-ons, making them a more powerful tool for enhancing consumer purchase intentions.

RQ2: How do consumers perceive the authenticity and quality of beauty products through AR try-on versus traditional products on models?

Based on the findings from Hypothesis 2 and the supporting literature, it is evident that augmented reality (AR) try-on features significantly enhance the perceived quality of beauty products compared to traditional 2D images on models. This enhancement in perceived quality substantially contributes to increased purchase intentions among consumers. However, the findings from H5 indicate that while the type of product presentation directly impacts purchase intention negatively, perceived quality does not significantly mediate this relationship. This suggests that although AR try-on features enhance perceived quality, this enhanced perception does not translate into higher purchase intentions through the mediation of perceived quality alone.

AR try-on features provide an interactive and immersive experience that allows consumers to visualize beauty products in real time. This real time interaction creates a sense of realism and authenticity, which traditional 2D images on models often lack. The ability of AR to superimpose virtual products onto real-world images of the consumer enhances the perceived quality by making the product experience more personal and relevant. This finding is supported by studies indicating that realistic and authentic representations of products via AR significantly improve consumer perceptions of product quality (T. L. Huang & Liao, 2015; Poushneh & Vasquez-Parraga, 2017a).

The interactive nature of AR try-on features also plays a crucial role in fostering trust and credibility among consumers. As consumers can see the immediate effects of the products on themselves, they are less reliant on potentially misleading 2D images, thereby reducing uncertainty and perceived risk associated with online beauty purchases. This reduction in uncertainty is critical for improving purchase intentions, as it increases consumer confidence in the product and the brand (Javornik, 2016a; Poushneh & Vasquez-Parraga, 2017a).

However, qualitative feedback from users reveals mixed perceptions regarding the realism and authenticity of AR try-on features. While some users find the AR try-on experience interesting and useful for future purchases, others express skepticism about its realism, with concerns that the try-on feature may incorporate filters or appear unrealistic. Additionally, some users prefer evaluating the texture and feel of products physically, indicating a limitation

of digital evaluations. These insights suggest that while AR try-on features enhance perceived quality for many users, there is still room for improvement in addressing consumer skepticism and enhancing the realism of AR experiences.

In conclusion, AR try-on features significantly enhance the perceived quality and authenticity of beauty products, leading to increased purchase intentions. To maximize the potential of AR technology, beauty brands should focus on improving the realism and transparency of AR experiences and addressing consumer concerns about digital evaluations. By doing so, they can further leverage AR to drive consumer purchase behavior and create more engaging and trustworthy shopping experiences.

RQ3: How does AR try-on technology influence consumers' perceived quality of beauty products compared to traditional model-based product presentations?

The investigation into how AR try-on technology influences consumers' perceived quality of beauty products compared to traditional model-based presentations revealed insightful findings. Despite the theoretical advantages of AR technology, such as its ability to create immersive and interactive experiences, the hypothesis testing for H3 showed no statistically significant difference in perceived quality between the group exposed to AR try-on features and the group exposed to traditional model-based presentations.

This lack of significant difference suggests that the enhanced interactivity provided by AR try-on technology does not necessarily lead to an improvement in perceived quality. This result aligns with existing literature, where (T.-L. Huang & Liao, 2017) found that while AR can increase engagement, it may not always impact perceptions of quality. Several factors may contribute to this outcome.

Firstly, there may be a disparity between consumer expectations and the actual experience provided by AR try-on features. Consumers might expect AR to offer a highly realistic and superior experience, and when the technology does not meet these high expectations, it fails to enhance perceived quality as anticipated (Poushneh, 2018; Poushneh & Vasquez-Parraga, 2017a). The qualitative feedback further supports this, with participants indicating that AR try-on features, such as the Mascara try-on, often felt unrealistic and gave a sensation of fake lashes.

Secondly, perceived quality in beauty products is closely tied to visual realism and authenticity (Hinsch et al., 2020). If the AR try-on feature does not provide an accurate and authentic representation of the product, it may not enhance perceived quality. This highlights

the need for advancements in AR technology to improve visual fidelity and realism, potentially influencing perceived quality positively in the future.

Additionally, contextual factors, such as the user interface design and the seamless integration of AR features into the shopping experience, play a crucial role. Improving these factors could enhance the effectiveness of AR in influencing perceived quality (Dacko, 2017; Watson et al., 2020). Consumer familiarity with AR technology might also impact perceptions. As AR becomes more commonplace and consumers become more accustomed to its use, their perceptions of quality might evolve (Watson et al., 2020).

The qualitative feedback provides further context. Some participants indicated a preference for physical evaluation of products, such as assessing the texture, which AR cannot currently replicate. Others expressed skepticism towards AR try-on features, believing they incorporated filters that could distort the product's true appearance. Conversely, a subset of participants found the lipstick AR try-on feature interesting and useful for future purchase decisions, highlighting variability in consumer responses.

While AR try-on technology offers enhanced interactivity, it does not significantly affect perceived quality compared to traditional model-based product presentations. The qualitative feedback underscores challenges related to visual realism, authenticity, and the preference for physical product evaluation. Future advancements in AR technology, better contextual integration, and increased consumer familiarity with AR could potentially enhance the perceived quality of beauty products presented through AR.

5.2. Managerial Implications

The research findings provide critical insights into the managerial implications for beauty brands integrating AR try-on features. Despite the innovative nature of AR technology, the hypothesis that consumers exposed to AR try-on features would have higher purchase intentions compared to those viewing products on 2D images was not supported. This result challenges the assumption that AR's interactivity alone can significantly enhance purchase intentions. However, the study offers valuable lessons for improving AR implementations and maximizing their potential impact.

A key takeaway is the significant role of perceived quality in driving purchase intentions. Consumers prioritize realistic and authentic representations of products. Therefore, beauty brands should invest in advanced AR technologies that enhance visual fidelity and realism. Collaborations with AR tech developers can help create high-definition, accurate

virtual representations of products. Continuous improvement through machine learning algorithms based on user feedback can ensure the AR features evolve to meet consumer expectations and reach the right segment of customers.

Consumer skepticism about the realism of AR features indicates a need for greater transparency and education. Brands should develop comprehensive educational campaigns explaining the technology behind AR try-ons and emphasizing their accuracy and transparency. Engaging content, such as behind-the-scenes videos and interactive demos, can demystify AR technology and build consumer trust.

Integrating AR with AI-driven personalization can significantly enhance its effectiveness. Personalized AR experiences that adapt to individual preferences and behaviors offer more relevant and engaging interactions. Implementing AI algorithms to analyze consumer data and suggest specific products based on past purchases or browsing behavior can enhance the customer segmentation and relevance of AR features, as well as provide insights to help in marketing strategies, product development, and customer service improvements. AR's potential extends beyond virtual try-ons. Expanding AR applications to include virtual tutorials, product information overlays, and in-store navigation can provide additional value. A multi-faceted AR strategy can differentiate a brand by offering unique, immersive shopping experiences across multiple touchpoints.

Encouraging users to create and share their AR experiences can serve as powerful social proof. Creating platforms or campaigns that motivate consumers to share their AR try-on experiences on social media, perhaps through incentives like discounts or loyalty points, can amplify brand reach and credibility.

Ensuring that AR experiences are accessible across a range of devices, including lower-end smartphones, is crucial. Optimizing AR applications to function effectively on various devices can broaden the technology's reach, ensuring that more consumers benefit from AR features.

Effectively leveraging AR can position a brand as innovative and tech-savvy, appealing to modern consumers who value cutting-edge experiences. This image can attract a tech-oriented customer segment and enhance market positioning. As AR technology evolves, managers must remain adaptable and proactive in adopting new features and capabilities. Staying abreast of technological trends and integrating them into the business model will ensure the brand remains relevant and competitive.

The research underscores the complexity of integrating AR try-on features to influence consumer purchase intentions. While current AR technology may not significantly boost

purchase intentions compared to traditional 2D images, its potential remains substantial. By addressing the identified gaps—enhancing realism, educating consumers, personalizing experiences, expanding AR applications, leveraging user-generated content, and improving accessibility—brands can unlock new opportunities for consumer engagement and sales growth. Managers must adopt a forward-thinking approach, continuously investing in and evolving their AR strategies to stay ahead in the dynamic beauty industry.

The findings also suggest that while the type of product presentation negatively impacts purchase intention directly, perceived quality does not significantly mediate this relationship. This means that improving perceived quality alone through AR may not be enough to drive higher purchase intentions. Additionally, the effect of product presentation on online purchase intention is consistent across different product categories. Therefore, AR strategies should be uniformly enhanced across all product lines to maintain consistent consumer perceptions and impact.

5.3.Academic Implications

This study provides several significant academic implications, advancing the understanding of augmented reality (AR) technology in the context of consumer behavior in the beauty industry. By critically analyzing both the literature and the data, this research contributes to existing academic discussions and opens avenues for future investigations.

The study addresses a notable gap in the literature regarding the specific impact of AR try-on features on consumer purchase intentions compared to traditional 2D images. Previous research primarily focused on general consumer engagement and satisfaction with AR (Huang & Liao, 2015; Poushneh & Vasquez-Parraga, 2017a), with limited exploration of purchase intentions. This study provides empirical evidence that AR try-on features do not significantly increase purchase intentions over 2D images, challenging the prevalent assumption in the literature that AR's interactivity directly translates to higher purchase intentions.

The findings contribute to the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM) by integrating the concepts of perceived quality and interactivity into these frameworks. The research demonstrates that while AR enhances interactivity, this alone is insufficient to influence purchase intentions significantly. Instead, perceived quality emerged as a critical determinant. This nuanced understanding enriches TPB and TAM by highlighting the need to consider perceived quality and authenticity when evaluating new technologies' impact on consumer behavior.

The study underscores the importance of realistic and authentic representations in AR applications, aligning with previous findings (Huang and Liao, 2015). By showing that perceived quality significantly contributes to purchase intentions, this research emphasizes the need for future studies to focus on the realism of AR experiences. It also suggests that advancements in AR technology should aim to enhance visual fidelity and authenticity to better meet consumer expectations.

The research methodology, which involved experimental groups and the use of both quantitative and qualitative data, provides a robust framework for future studies. The use of control and experimental groups to compare AR and 2D images offers a valuable methodological approach to examining the effects of new technologies. Future research can build on this by incorporating a larger sample and diverse product categories to validate and extend the findings.

The study's findings have implications beyond marketing and consumer behavior, extending to fields such as human-computer interaction, psychology, and digital technology. Interdisciplinary research that combines insights from these fields can provide a more comprehensive understanding of how AR influences consumer behavior and how technological advancements can be leveraged to enhance user experiences.

In conclusion, this study makes significant academic contributions by challenging existing assumptions, integrating theoretical frameworks, and providing a nuanced understanding of AR's impact on consumer behavior. It highlights the importance of perceived quality and realism in AR applications, addresses consumer skepticism, and suggests new directions for future research. By expanding the scope of AR research and adopting interdisciplinary approaches, academics can further explore the transformative potential of AR technology in retail and beyond.

5.4.Limitations and Further Research

This study, while providing valuable insights into the impact of augmented reality (AR) try-on features on consumer behavior, has several limitations that must be acknowledged. Addressing these limitations will pave the way for further research, enhancing our understanding of AR technology's potential in the beauty industry and beyond.

One significant limitation is the sample size and demographics. The sample may not be sufficiently large or diverse to highlight precise differences in the findings. Participants predominantly represented specific demographics, which may not accurately reflect the entire

consumer base of the beauty industry. Future studies should aim to include a larger and more diverse sample to enhance the accuracy of the results.

Technological constraints also posed a limitation. The AR try-on features used in the study were subject to current technological limitations, which may have affected the realism and interactivity experienced by participants. As AR technology continues to evolve, future research should utilize more advanced AR applications to better understand their potential impact on consumer behavior.

Additionally, the study focused on two specific product categories: lipstick and mascara. While these products are representative of the beauty industry, they may not capture the full range of consumer interactions with AR technology. Future research should explore a wider variety of product categories to determine if the findings are consistent across different types of beauty products.

Another limitation is the short-term nature of the interaction measured. The study assessed the immediate effects of AR try-on features on purchase intentions without considering long-term impacts. Consumer behavior may evolve with prolonged exposure to AR technology.

Longitudinal studies that track consumer interactions with AR over time could provide deeper insights into its sustained influence on purchase intentions and perceived quality. Understanding the long-term impact of AR on purchase intentions, brand loyalty, and consumer satisfaction will provide a more comprehensive view of its effectiveness.

Moreover, participants in the study might not have been fully engaged or involved in the AR experience due to the experimental environment. Future research should consider more appropriate and naturalistic settings to better capture genuine consumer interactions and responses. This could involve conducting studies in actual retail environments or using more immersive and engaging setups.

While qualitative feedback provided valuable insights into consumer perceptions, it was limited in scope. A more extensive qualitative approach, including in-depth interviews or focus groups, could offer a richer understanding of consumer attitudes toward AR technology. This observation also revealed consumer skepticism toward AR's realism and authenticity. Analyzing this insight is crucial for future academic research to explore the psychological and perceptual barriers to technology adoption. Understanding the factors that drive skepticism can inform strategies to improve consumer acceptance and trust in AR technologies.

Examining how different consumer segments respond to AR try-on features can provide valuable insights for personalized marketing strategies. Research should explore

demographic, psychographic, and behavioral factors that influence the effectiveness of AR technology.

Cross-cultural studies are also recommended to understand how cultural differences impact consumer responses to AR. This can inform global marketing strategies and ensure that AR applications are tailored to diverse consumer needs and preferences.

Investigating the integration of AR with other emerging technologies, such as artificial intelligence and virtual reality, can uncover new ways to enhance consumer experiences. Research could explore how these technologies can work together to create more immersive and engaging shopping environments. While the study focused on AR try-on features, it suggests the potential for expanding AR applications in retail. Exploring other AR applications in retail, such as virtual tutorials and product information overlays, to understand their impact on consumer behavior can broaden the scope of AR research and identify new areas where AR can enhance the shopping experience.

Lastly, as AR technology becomes more prevalent, understanding its impact on consumer trust and privacy concerns is crucial. Future research should examine how data privacy issues and the perceived intrusiveness of AR applications affect consumer acceptance and usage.

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7. APPENDIX

Appendix 1: Survey

BLOCK 1: Makeup Buying Behavior

How often do you purchase new makeup products?

- Daily
- Weekly
- Monthly
- Occasionally
- Rarely
- Never

Which makeup brands are you most familiar with?

(Not familiar at all, familiar, Moderately familiar, Very Familiar, Extremely familiar)

Maybelline

L'Oréal Paris

MAC Cosmetics

Estée Lauder

Revlon

NARS

Which makeup products do you use most frequently? (please select all that apply)

- Lipstick/Lip Gloss
- Mascara
- Foundation
- Eyeliner
- Eyeshadow
- Blush
- Highlighter
- Concealer
- Setting Powder/Spray
- Others (please specify)

Where do you typically purchase makeup products? (Please select all that apply)

- Drugstores/Pharmacies
- Specialty Beauty Stores (e.g., Sephora, Douglas)
- Brand Websites
- Online Retailers (e.g., Amazon, Primor)
- Social Media Shops (e.g., Instagram, Facebook)
- Department Stores
- Other (please specify)

Please rank the following factors based on their influence on your decision to purchase makeup products (1 being the most influential and 8 being the least influential)

Product Quality

Price

Brand Reputation

Product Reviews

Visual Appearance when Applied on Face

Packaging

Influencer/celebrity endorsements

Sustainability/ethical considerations

AFTER THIS THEY WOULD BE ALOCATED TO 1 OF THE 2 PRODUCTS (LIPSTICK OR MASCARA)

BLOCK 2: Experience

Please indicate your level of agreement with the following statements regarding your experience

(1strongly disagree; 7strongly agree)

- I felt in control
- I was aware of distractions
- I thought about other things
- I was totally absorbed in my activity

- I was focused
- I felt curious
- It was very interesting
- It was fun to explore the website

Please indicate your level of agreement with the following statements regarding the product you just viewed: (1-strongly disagree; 7-strongly agree)

- The probability that I would consider buying this product is high
- The likelihood that I would purchase this product is high.
- I have the intention to purchase this product

BLOCK 3: Perceived Quality

Please indicate your level of agreement with the following statements regarding the product you just viewed:

(1-strongly disagree; 7-strongly agree)

- The probability that the product is reliable is high
- The product seems to be of high quality
- The product appears to be durable

Please rate the following statements regarding the product you just viewed:

(1-Very Poor; 7-Exceptional)

- In terms of quality, how would you rate this product
- How would you rate the workmanship of this product

BLOCK 4: Product Viewing

How satisfied were you with the product viewing experience?

- Extremely dissatisfied
- Somewhat dissatisfied
- Neither satisfied nor dissatisfied
- Somewhat satisfied
- Extremely satisfied

How easy was it for you to navigate and explore the product?

- Extremely difficult
- Somewhat difficult
- Neither easy nor difficult
- Somewhat easy
- Extremely easy

How likely are you to recommend this website to others?

- Extremely unlikely
- Somewhat unlikely
- Neither likely nor unlikely
- Somewhat likely
- Extremely likely

BLOCK 5: Experience confirmation

Could you please confirm which of the 2 experiences you realised?

- Experience with standard website
- Experience with AR Try on feature

If realized AR Try on feature:

Did you notice the "AR Try On" button?

- No
- Yes

BLOCK 6: Demographics

Gender

- Male
- Female

What is your nationality?

- Portuguese
- Other

What is your current professional situation ?

- Student without a job
- Student with a job
- Full-time job

- Part-time job
- Jobseeker
- Retired

How old are you?

- Under 18
- 18 - 24
- 25 - 34
- 35 - 44
- 45 - 54
- 55 - 64
- 65 or older

What is your gross monthly income

- No income
- Less than 500€
- 500-999€
- 1000-1499€
- 1500-1999€
- 2000-2999€
- 3000-3999€
- 4000-4999€
- >5000€

Appendix 2: Data preparation: Group Statistics

	Experience Realized	N	Mean	Std. Deviation	Std. Error Mean
Average Purchase Intention (Lipstick + Mascara)	AR Experience without incentive	19	3.9298	.95309	.21865
	AR Experience with incentive	20	3.6833	.90789	.20301

Appendix 3: Data Preparation: T test for AR Groups

	t	df	Sig. (1- tailed)	Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference (Lower)	95% Confidence Interval of the Difference (Upper)
Equal variances assumed	0.827	37,000	0.207	0.413	0.24649	0.29799	-0.35729	0.85027
Equal variances not assumed	0.826	36.625	0.207	0.414	0.24649	0.29837	-0.35827	0.85125

Appendix 4: Demographics

Nationality	Frequency	% Frequency
Portuguese	46	78.0
Other	13	22.0
Current Professional Situation		
Student without a job	16	27.1
Student with a job	12	20.3
Full-time job	29	49.2
Part-time job	2	3.4
Age		
18 - 24	37	62.7
25 - 34	9	15.3
35 - 44	8	13.6
45 - 54	2	3.4
55 - 64	3	5.1
Gross monthly income		
No income	12	20.3

Less than 500€	10	16.9
500-999€	15	25.4
1000-1499€	10	16.9
1500-1999€	4	6.8
2000-2999€	6	10.2
3000-3999€	1	1.7
4000-4999€	1	1.7
Product Category		
Lisptick	30	50.8
Mascara	29	49.2
Experience Realized		
AR Experience without incentive	19	32.2
AR Experience with incentive	20	33.9
Experience with standard website (2D image)	20	33.9

Appendix 5: Buying Habits

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Daily	3	5.1	5.1	5.1
	Weekly	2	3.4	3.4	8.5
	Monthly	16	27.1	27.1	35.6
	Occasionally	26	44.1	44.1	79.7
	Rarely	10	16.9	16.9	96.6
	Never	2	3.4	3.4	100.0
	Total	59	100.0	100.0	

Appendix 6: Crosstab Buying Habits x Age

Buying habits		Age					Total
		18 - 24	25 - 34	35 - 44	45 - 54	55 - 64	
Daily	Count	2	0	1	0	0	3
	Expected Count	1.9	.5	.4	.1	.2	3.0
	% within Buying habits	66.7%	0.0%	33.3%	0.0%	0.0%	100.0%
	% within Age	5.4%	0.0%	12.5%	0.0%	0.0%	5.1%
	% of Total	3.4%	0.0%	1.7%	0.0%	0.0%	5.1%
Weekly	Count	1	0	1	0	0	2
	Expected Count	1.3	.3	.3	.1	.1	2.0
	% within Buying habits	50.0%	0.0%	50.0%	0.0%	0.0%	100.0%
	% within Age	2.7%	0.0%	12.5%	0.0%	0.0%	3.4%
	% of Total	1.7%	0.0%	1.7%	0.0%	0.0%	3.4%
Monthly	Count	11	1	1	1	2	16
	Expected Count	10.0	2.4	2.2	.5	.8	16.0
	% within Buying habits	68.8%	6.3%	6.3%	6.3%	12.5%	100.0%
	% within Age	29.7%	11.1%	12.5%	50.0%	66.7%	27.1%
	% of Total	18.6%	1.7%	1.7%	1.7%	3.4%	27.1%
Occasionally	Count	14	7	3	1	1	26
	Expected Count	16.3	4.0	3.5	.9	1.3	26.0
	% within Buying habits	53.8%	26.9%	11.5%	3.8%	3.8%	100.0%
	% within Age	37.8%	77.8%	37.5%	50.0%	33.3%	44.1%
	% of Total	23.7%	11.9%	5.1%	1.7%	1.7%	44.1%
Rarely	Count	8	1	1	0	0	10
	Expected Count	6.3	1.5	1.4	.3	.5	10.0
	% within Buying habits	80.0%	10.0%	10.0%	0.0%	0.0%	100.0%
	% within Age	21.6%	11.1%	12.5%	0.0%	0.0%	16.9%
	% of Total	13.6%	1.7%	1.7%	0.0%	0.0%	16.9%
Never	Count	1	0	1	0	0	2
	Expected Count	1.3	.3	.3	.1	.1	2.0
	% within Buying habits	50.0%	0.0%	50.0%	0.0%	0.0%	100.0%
	% within Age	2.7%	0.0%	12.5%	0.0%	0.0%	3.4%
	% of Total	1.7%	0.0%	1.7%	0.0%	0.0%	3.4%
Total	Count	37	9	8	2	3	59
	Expected Count	37.0	9.0	8.0	2.0	3.0	59.0
	% within Buying habits	62.7%	15.3%	13.6%	3.4%	5.1%	100.0%
	% within Age	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	% of Total	62.7%	15.3%	13.6%	3.4%	5.1%	100.0%

Appendix 7: Crosstab Buying Habits x Income

Buying habits		Income								Total
		No income	less than 500	500-999€	1000-1499€	1500-1999€	2000-2999€	3000-3999€	4000-4999€	
Daily	Count	1	0	1	0	0	1	0	0	3
	Expected Count	.6	.5	.8	.5	.2	.3	.1	.1	3.0
	% of Total	1.7%	0.0%	1.7%	0.0%	0.0%	1.7%	0.0%	0.0%	5.1%
Weekly	Count	1	0	0	0	0	0	0	1	2
	Expected Count	.4	.3	.5	.3	.1	.2	.0	.0	2.0
	% of Total	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	3.4%
Monthly	Count	2	4	2	4	1	2	1	0	16
	Expected Count	3.3	2.7	4.1	2.7	1.1	1.6	.3	.3	16.0
	% of Total	3.4%	6.8%	3.4%	6.8%	1.7%	3.4%	1.7%	0.0%	27.1%
Occasionally	Count	6	5	8	4	1	2	0	0	26
	Expected Count	5.3	4.4	6.6	4.4	1.8	2.6	.4	.4	26.0
	% of Total	10.2%	8.5%	13.6%	6.8%	1.7%	3.4%	0.0%	0.0%	44.1%
Rarely	Count	2	0	4	1	2	1	0	0	10
	Expected Count	2.0	1.7	2.5	1.7	.7	1.0	.2	.2	10.0
	% of Total	3.4%	0.0%	6.8%	1.7%	3.4%	1.7%	0.0%	0.0%	16.9%
Never	Count	0	1	0	1	0	0	0	0	2
	Expected Count	.4	.3	.5	.3	.1	.2	.0	.0	2.0
	% of Total	0.0%	1.7%	0.0%	1.7%	0.0%	0.0%	0.0%	0.0%	3.4%
Total	Count	12	10	15	10	4	6	1	1	59
	Expected Count	12.0	10.0	15.0	10.0	4.0	6.0	1.0	1.0	59.0
	% of Total	20.3%	16.9%	25.4%	16.9%	6.8%	10.2%	1.7%	1.7%	100.0%

Appendix 8: Experience Realized x Purchase Intention

Experience Realized * Purchase Intention			Statistic	Std. Error
AR Experience without incentive	Mean		3.9298	.21865
	95% Confidence Interval for Mean		Lower Bound	3.4704
			Upper Bound	4.3892
	5% Trimmed Mean		4.0331	
	Median		4.0000	
	Variance		.908	
	Std. Deviation		.95309	
AR Experience with incentive	Mean		3.6833	.20301
	95% Confidence Interval for Mean		Lower Bound	3.2584
			Upper Bound	4.1082
	5% Trimmed Mean		3.7407	
	Median		3.6667	
	Variance		.824	
	Std. Deviation		.90789	
Experience with standart website (2D image)	Mean		3.3500	.21285
	95% Confidence Interval for Mean		Lower Bound	2.9045
			Upper Bound	3.7955
	5% Trimmed Mean		3.3519	
	Median		3.5000	
	Variance		.906	
	Std. Deviation		.95191	

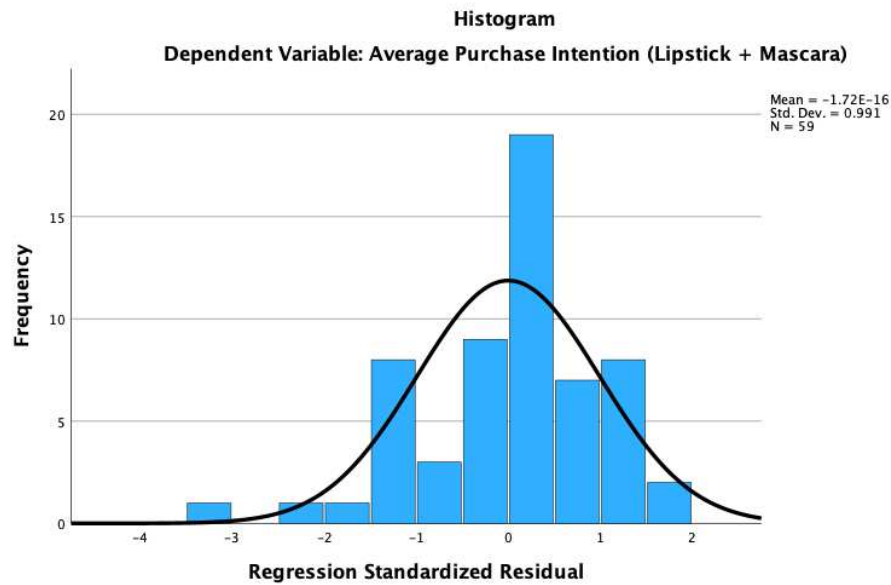
Appendix 9: Product Category x Purchase Intention

Product Category * Purchase Intention			Statistic	Std. Error
Lipstick	Mean		3.6667	.16609
	95% Confidence Interval for Mean	Lower Bound	3.3270	
		Upper Bound	4.0064	
	5% Trimmed Mean		3.7099	
	Median		3.6667	
	Variance		.828	
	Std. Deviation		.90972	
Mascara	Mean		3.6322	.18742
	95% Confidence Interval for Mean	Lower Bound	3.2483	
		Upper Bound	4.0161	
	5% Trimmed Mean		3.6909	
	Median		3.6667	
	Variance		1.019	
	Std. Deviation		1.00926	

Appendix 10: Cronbach's Alphas

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Perceived Quality 1	41.5718	40.630	.656	.894
Perceived Quality 2	41.4531	42.198	.546	.901
Perceived Quality 3	41.4023	44.676	.479	.904
Perceived Quality 4	42.2497	40.714	.650	.895
Perceived Quality 5	42.5040	40.729	.676	.893
Purchase Intention 1 (Lipstick + Mascara)	43.3853	40.520	.735	.890
Purchase Intention 2 (Lipstick + Mascara)	43.5040	40.249	.675	.893
Purchase Intention 3 (Lipstick + Mascara)	44.0124	38.650	.625	.899

Appendix 11: Preliminary Test H1-Normal Distribution of Residuals



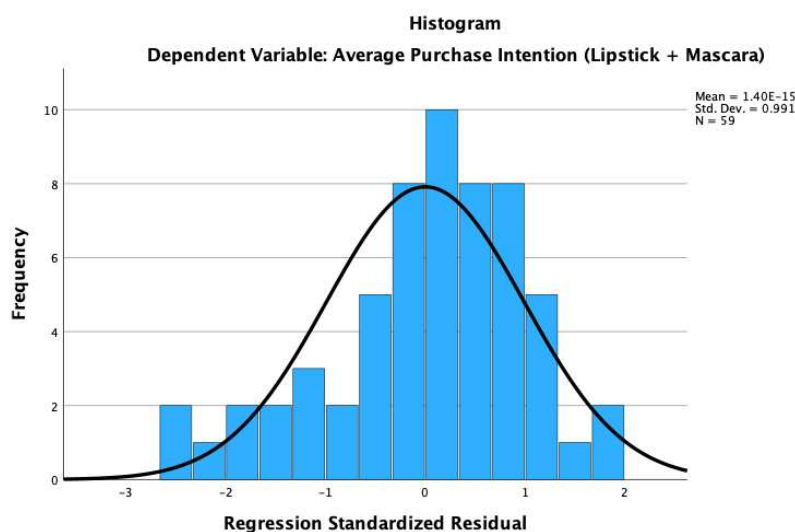
Appendix 12: Preliminary Test H1- Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Average Purchase Intention (Lipstick + Mascara)	Based on Mean	.218	2	56	.805
	Based on Median	.255	2	56	.776
	Based on Median and with adjusted df	.255	2	54.745	.776
	Based on trimmed mean	.197	2	56	.822

Appendix 13: H1: Test Statistics

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the	
						One-Sided p	Two-Sided p			Lower	Upper
AVG_Purchase_Intention_ALL	Equal variances assumed	.440	.511	1.133	38	.132	.264	.33333	.29414	-.26213	.92880
	Equal variances not assumed			1.133	37.915	.132	.264	.33333	.29414	-.26217	.92884

Appendix 14: Preliminary Test H2-Normal Distribution of Residuals



Appendix 15: Preliminary Test H2- Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Average Purchase Intention (Lipstick + Mascara)	Based on Mean	1.064	9	45	.407
	Based on Median	.563	9	45	.819
	Based on Median and with adjusted df	.563	9	23.654	.813
	Based on trimmed mean	1.040	9	45	.424

Appendix 16: Test Statistics – Correlations

		Average Perceived Quality	AVG_Purchase_Intention_ALL
Average Perceived Quality	Pearson Correlation	1	.508*
	Sig. (2-tailed)		.022
	N	20	20
AVG_Purchase_Intention_ALL	Pearson Correlation	.508*	1
	Sig. (2-tailed)	.022	
	N	20	20

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix 17: Test Statistics – Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.303	1.364		.222	.827
	Average Perceived Quality	.630	.252	.508	2.500	.022

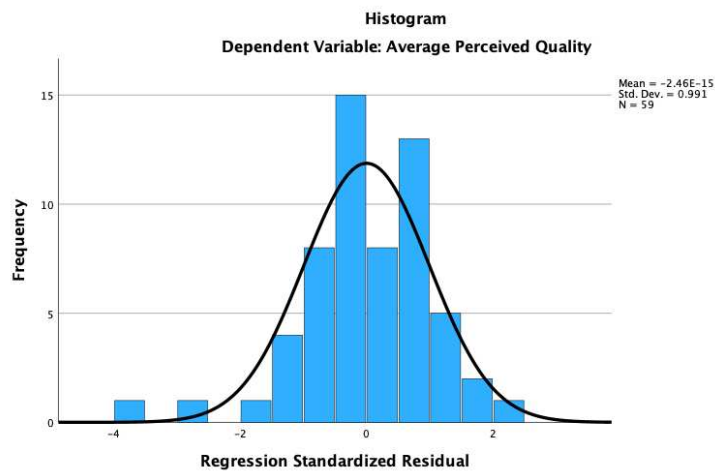
a. Dependent Variable: AVG_Purchase_Intention_ALL

Appendix 18: Test Statistics – Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.508 ^a	.258	.216	.80366

a. Predictors: (Constant), Average Perceived Quality

Appendix 19: Preliminary Test H3 -Normal Distribution of Residuals



Appendix 20: Preliminary Test H3- Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Average Perceived Quality	Based on Mean	.510	2	56	.603
	Based on Median	.658	2	56	.522
	Based on Median and with adjusted df	.658	2	49.874	.522
	Based on trimmed mean	.552	2	56	.579

Appendix 21: H3 – Group Statistics

	Experience Realized	N	Mean	Std. Deviation	Std. Error Mean
Average Perceived Quality	AR Experience with incentive	20	5.3700	.73205	.16369
	Experience with standard website (2D image)	20	5.5400	.60210	.13463

Appendix 22: Test Statistics

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
Average Perceived Quality	Equal variances assumed	1.050	.312	-.802	38	.214	.427	-.17000	.21195	-.59906	.25906
	Equal variances not assumed			-.802	36.636	.214	.428	-.17000	.21195	-.59959	.25959

Appendix 23: H4- Matrix Procedure – Moderator Analysis

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 4.2

Written by Andrew F. Hayes, Ph.D.
www.afhayes.com
Documentation available in Hayes (2022).
www.guilford.com/p/hayes3

Model : 1
Y : AVG_PI
X : EXP
W : PROD_CT

Sample
Size: 59

OUTCOME VARIABLE:
AVG_PI

Model Summary					
	R	R-sq	MSE	F	df1
df2	p				
	.2505	.0627	.8953	1.2270	3.0000
55.0000	.3086				

Model					
	coeff	se	t	p	
LLCI	ULCI				
constant	4.2303	1.0305	4.1051	.0001	
2.1651	6.2955				
EXP	-.2697	.4757	-.5670	.5730	-
1.2230	.6836				
PROD_CT	.0030	.6597	.0046	.9964	-
1.3190	1.3251				
Int_1	-.0136	.3033	-.0450	.9643	-
.6214	.5941				

Product terms key:
Int_1 : EXP x PROD_CT

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0000	.0020	1.0000	55.0000	.9643

***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:
95.0000

----- END MATRIX -----

Appendix 24: H5- Matrix Procedure – Mediator Analysis

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 4.2

Written by Andrew F. Hayes, Ph.D.
www.afhayes.com
Documentation available in Hayes (2022).
www.guilford.com/p/hayes3

Model : 4
Y : AVG_PI
X : EXP
M : AVG_PQ

Sample
Size: 59

OUTCOME VARIABLE:
AVG_PQ

Model Summary					
	R	R-sq	MSE	F	df1
df2	p				
	.0622	.0039	.5373	.2212	1.0000
57.0000		.6399			

Model					
	coeff	se	t	p	
LLCI	ULCI				
constant	5.3361	.2553	20.9007	.0000	
4.8248	5.8473				
EXP	.0552	.1174	.4703	.6399	-
.1799	.2903				

OUTCOME VARIABLE:
AVG_PI

Model Summary					
	R	R-sq	MSE	F	df1
df2	p				
	.5683	.3230	.6352	13.3578	2.0000
56.0000		.0000			

Model		coeff	se	t	p	
LLCI	ULCI					
constant		.6685	.8170	.8182	.4167	-
		.9682	2.3052			
EXP		-.3272	.1279	-2.5584	.0132	-
		.5834	-.0710			
AVG_PQ		.6684	.1440	4.6415	.0000	
		.3799	.9569			

***** DIRECT AND INDIRECT EFFECTS OF X ON Y

Direct effect of X on Y						
	Effect	se	t	p	LLCI	
ULCI						
	-.3272	.1279	-2.5584	.0132	-.5834	-
	.0710					

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
AVG_PQ	.0369	.0842	-.0966	.2365

***** ANALYSIS NOTES AND ERRORS

Level of confidence for all confidence intervals in output:
95.0000

Number of bootstrap samples for percentile bootstrap
confidence intervals:
5000

----- END MATRIX -----

Appendix 25: Matrix Procedure – Model 5

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 4.2

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2022). www.guilford.com/p/hayes3

Model : 5
Y : EXP
X : AVG_PI
M : AVG_PQ
W : PROD_CT

Sample
Size: 59

OUTCOME VARIABLE:
AVG_PQ

Model Summary	R	R-sq	MSE	F	df1	df2
p	.4938	.2439	.4079	18.3821	1.0000	57.0000
.0001						

Model	coeff	se	t	p	LLCI
ULCI					
constant	4.0687	.3322	12.2494	.0000	3.4036
4.7338					
AVG_PI	.3778	.0881	4.2874	.0001	.2013
.5542					

Covariance matrix of regression parameter estimates:

	constant	AVG_PI
constant	.1103	-.0283
AVG_PI	-.0283	.0078

OUTCOME VARIABLE:
EXP

Model Summary	R	R-sq	MSE	F	df1	df2
p	.3316	.1099	.6425	1.6674	4.0000	54.0000
.1710						

Model	coeff	se	t	p	LLCI
ULCI					
constant	1.1911	1.7250	.6905	.4929	-2.2674
4.6495					
AVG_PI	-.2218	.3614	-.6138	.5419	-.9464
.5028					
AVG_PQ	.2906	.1728	1.6820	.0983	-.0558
.6370					
PROD_CT	.2784	.8690	.3204	.7499	-1.4639
2.0207					
Int_1	-.0668	.2307	-.2894	.7734	-.5293
.3958					

Product terms key:

Int_1 : AVG_PI x PROD_CT

Covariance matrix of regression parameter estimates:

	constant	AVG_PI	AVG_PQ	PROD_CT	Int_1
constant	2.9757	-.5080	-.1837	-1.3302	.3448
AVG_PI	-.5080	.1306	.0054	.2855	-.0780
AVG_PQ	-.1837	.0054	.0299	.0403	-.0108
PROD_CT	-1.3302	.2855	.0403	.7552	-.1946
Int_1	.3448	-.0780	-.0108	-.1946	.0532

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0014	.0837	1.0000	54.0000	.7734

Focal predict: AVG_PI (X)
Mod var: PROD_CT (W)

Data for visualizing the conditional effect of the focal predictor:
Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/

AVG_PI	PROD_CT	EXP	.
BEGIN DATA.			
2.6667	1.0000	2.2830	
3.6667	1.0000	1.9944	
4.6667	1.0000	1.7058	
2.6667	2.0000	2.3834	
3.6667	2.0000	2.0280	
4.6667	2.0000	1.6727	

END DATA.

GRAPH/SCATTERPLOT=

AVG_PI WITH EXP BY PROD_CT .

***** DIRECT AND INDIRECT EFFECTS OF X ON Y

Conditional direct effects of X on Y

PROD_CT	Effect	se	t	p	LLCI
ULCI					
1.0000	-.2886	.1666	-1.7325	.0889	-.6225
.0454					

2.0000 -.3553 .1770 -2.0073 .0497 -.7103
 -.0004

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
AVG_PQ	.1098	.0785	-.0294	.2791

***** BOOTSTRAP RESULTS FOR REGRESSION MODEL PARAMETERS

OUTCOME VARIABLE:

AVG_PQ

	Coeff	BootMean	BootSE	BootLLCI	BootULCI
constant	4.0687	4.0994	.4870	3.1913	5.0694
AVG_PI	.3778	.3697	.1223	.1248	.5972

OUTCOME VARIABLE:

EXP

	Coeff	BootMean	BootSE	BootLLCI	BootULCI
constant	1.1911	1.2670	1.6756	-1.9185	4.7371
AVG_PI	-.2218	-.2093	.3590	-.9386	.4715
AVG_PQ	.2906	.2646	.1739	-.0925	.5890
PROD_CT	.2784	.3419	.8624	-1.4235	2.0060
Int_1	-.0668	-.0796	.2301	-.5255	.3965

***** ANALYSIS NOTES AND ERRORS

Level of confidence for all confidence intervals in output:
 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
 5000

----- END MATRIX -----

Appendix 26: Descriptive Statistics - Experience Realized * Did you notice the "AR Try On" button

		Did you notice the "AR Try On" button?		Total
		No	Yes	
Experience Realized	AR Experience without incentive	14	4	18
	AR Experience with incentive	3	17	20
Total		17	21	38

