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Effects of Product Type on Persuasion Mechanisms of Human and Virtual Influencers

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ABSTRACT

The emergence of virtual influencers (VIs) as an alternative to human influencers (HIs) for product promotion raises questions about the psychological mechanisms that determine their effectiveness and whether this varies depending on the product type. This study contributes to understanding the factors that shape influencer effectiveness by conducting a 2 (VIs vs. HIs) × 2 (utilitarian vs. hedonic product) experiment, using Instagram-based stimuli and a sample of 1681 social media users. The results indicate that both HIs and VIs positively impact the intention to follow recommendations and purchase intention, but through different persuasive processes. HIs foster greater identification and parasocial relationships (i.e., intimacy, friendship), which are particularly relevant in promoting hedonic products and enhancing brand credibility. In contrast, VIs are perceived as more objective, excelling in promoting utilitarian products, although their ability to establish parasocial relationships is more limited. Product type moderates these effects, highlighting the importance of aligning influencer strategy with product characteristics. These findings provide an incremental refinement of existing theoretical models of social influence by demonstrating that identification with the influencer remains comparatively stable across product types. In contrast, parasocial relationships are more sensitive to whether the endorsed product is hedonic or utilitarian. In doing so, the study also provides actionable guidance for brands and digital marketing professionals. Limitations and avenues for future research are discussed, particularly with respect to the inclusion of other types of influencer profiles and platforms.

1 | Introduction

Influencers play a central role in shaping consumer behavior and decision-making in digital environments (Pan et al. 2025). Industry reports indicate that a large majority of marketing professionals consider influencer collaborations an effective strategy, and a substantial proportion of consumers report following influencers and purchasing products they promote (The Influencers Marketing Factory 2022; Molenaar 2025; Pangarkar 2025). The influencer profession has also expanded within the digital economy, with tens of millions of individuals identifying as influencers and an influencer marketing industry

that reached 16.4 billion dollars in 2022 and is projected to continue growing (Santora 2025; Spörl-Wang et al. 2025).

Parallel to this, recent technological advances have enabled a new category of endorsers: virtual influencers (VIs) powered by artificial intelligence tools. VIs are synthetic digital characters that range from stylized avatars to hyper-realistic human-like figures and interact with large audiences on social media in ways similar to human influencers (HIs) (Mouritzen et al. 2024). Their artificial nature offers brands several advantages, including full control over image and messaging, reduced reputational risk, and the absence of physical limitations such as

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fatigue or illness (Ozdemir et al. 2025). As a result, many brands (e.g., BMW, Heinz, IKEA, Prada, Samsung, Vogue) have incorporated VIs into their campaigns, and some profiles (e.g., Lu do Magalu, Lil Miquela, Shudu) have achieved global visibility (Molenaar 2025).

Despite their growing adoption, recent research questions whether VIs are as effective as HIs. Empirical evidence often portrays VIs as less authentic, trustworthy, credible, and appealing, and as lacking in proximal sensory capacities (Thomas and Fowler 2021; Franke et al. 2023; Lou et al. 2023; Ozdemir et al. 2023; Zhou, Li, et al. 2024; Zhou, Yan, and Jiang 2024; Liu et al. 2025). VIs tend to elicit lower emotional engagement, interest, and purchase intention, and to create greater sociopsychological distance (Zhou, Li, et al. 2024; Kholkina et al. 2025). These findings suggest an inherent relational disadvantage for VIs, usually interpreted through Social Identity Theory, which emphasizes homophily and human-based social categorization (Tajfel and Turner 1979).

However, the literature is not consistent. Evidence shows that product type can alter the relative effectiveness of VIs and HIs. VIs appear more effective for utilitarian, technological or highly innovative products, whereas HIs perform better in hedonic categories (Belanche et al. 2024; Liu et al. 2025). Moreover, several recent studies report results that challenge a simple dichotomy. Stein et al. (2024) find limited differences in parasocial responses between VIs and HIs. Lee et al. (2025) show that, under some conditions, VIs can be perceived as more authentic and trustworthy than HIs. Wang et al. (2025) demonstrate that high-arousing language can be more effective when used by VIs, while low-arousing language suits HIs better.

Taken together, these findings indicate that literature is fractured and that a key contingency has not been systematically examined. A central unresolved question is how product type shapes the divergence between theories that favor HIs (e.g., Social Identity Theory) and those that highlight the fit between source and product (“match-up hypothesis”) (Kamins and Gupta 1994) by selectively activating distinct psychological mechanisms. The present research addresses this issue by examining how influencer type (VIs vs. HIs) and product type (utilitarian vs. hedonic) jointly influence identification with the influencer, parasocial relationships, brand credibility, and brand-related outcomes, including intention to follow recommendations and purchase intention.

Building on Social Identity Theory (Tajfel and Turner 1979), the parasocial interaction paradigm (Horton and Wohl 1956), and Source Credibility Theory (Hovland et al. 1953; Ohanian 1990), this study focuses on three psychological mechanisms that are central in the debate on VIs: identification with the influencer, parasocial relationships, and perceived brand credibility. These mediators respond directly to the main deficits attributed to VIs in prior research, namely lower authenticity, weaker emotional bonds, and reduced trust and credibility (Lou et al. 2023; Ozdemir et al. 2023; Liu et al. 2025). The study proposes that influencer type, moderated by product type, influences the extent to which consumers identify with the influencer and develop parasocial

relationships, which in turn affect brand credibility and behavioral responses.

In line with the literature gap defined above, this research investigates how influencer type and product type interact through these three mechanisms to produce distinct persuasive routes. Identification captures cognitive and symbolic alignment with the influencer. Parasocial relationships capture the depth of the affective bond. Brand credibility reflects the evaluative assessment of the endorsed brand as competent and reliable. Together, they allow a fine-grained examination of how VIs and HIs differ not only in overall performance but also in the mechanisms through which they exert influence and how these mechanisms depend on product type. Accordingly, this study aims to answer the following research questions:

RQ1. Are there differences in the impact of influencer type (VIs vs. HIs) on the psychological mechanisms of Identification, parasocial relationships, and perceived brand credibility? If so, how do these differences influence consumers' intention to follow the influencer's recommendations and purchase intention?

RQ2. How does product type (utilitarian vs. hedonic) moderate the effectiveness of influencer type (human vs. virtual)?

This research offers an incremental contribution to the influencer marketing literature by explicitly comparing an emerging type of influencer (VIs) with the traditional type (HIs) and incorporating the moderating role of product type. Rather than resolving the theoretical inconsistency outlined above, the study helps clarify how each influencer type activates distinct psychological processes and demonstrates that the social categorization of the endorser triggers different persuasive routes, shaping brand perceptions and consumer behavioral intentions. In particular, the results highlight that identification with the influencer operates as a comparatively stable, cognitively grounded judgment that is only weakly affected by product type. In contrast, parasocial relationships are much more sensitive to whether the endorsed product is hedonic or utilitarian.

From a managerial standpoint, the study provides actionable guidance for companies and marketing professionals. It shows that both VIs and HIs can enhance product promotion by influencing consumer behavior and, crucially, guides the selection of influencer type based on product type and the required persuasive mechanisms, enabling practitioners to leverage each type's advantages (e.g., cost, flexibility, control, personalization). The article integrates a comparison of influencer types, the moderating role of product type, and the underlying psychological mechanisms, offering an incremental yet theoretically meaningful refinement of existing models by clarifying why identification appears relatively insensitive to product type, while parasocial relationships are strongly contingent on it.

The remainder of this article is organized as follows: First, a literature review on digital influence and the psychological mechanisms involved is presented. Second, the theoretical model and derived hypotheses are developed. Next, the methodological design of the experimental study is described, and the results are

analyzed using partial least squares structural equation modelling. Finally, the theoretical and practical implications of the study are discussed, along with its limitations and directions for future research.

2 | Theoretical Framework

2.1 | Background on VIs vs. HIs

Research on influencers has become firmly established over the past decade as an interdisciplinary field relevant to marketing, communication, and the social sciences, integrating psychological and sociological perspectives that help explain how different types of endorsers shape consumer responses (Byun and Ahn 2023; Laszkiewicz and Kalinska-Kula 2023). Within this body of work, comparisons between VIs and HIs have revealed systematic differences in credibility, attitude formation, and purchasing behavior, particularly in sensory or hedonic categories where authenticity and empathy are fundamental (Barari 2023; Li et al. 2023; Ozdemir et al. 2023; Yang et al. 2023; Yan et al. 2024; Zhou, Yan, and Jiang 2024; Liu et al. 2025) (see Appendix A in Supporting Information). These differences are mainly explained through Source Credibility Theory, which breaks down credibility into expertise, trustworthiness, and attractiveness (Hovland et al. 1953; Ohanian 1990); the role of parasocial relationships (Horton and Wohl 1956); and Social Identity Theory, which underscores the importance of homophily and belongingness (Hsieh et al. 2023).

Empirical evidence confirms that HIs have an advantage when trust and sincerity are central to the decision-making process, as they convey greater perceived authenticity (Lou and Yuan 2019; Sokolova and Kefi 2020; Filieri et al. 2023; Yang et al. 2023). However, the “match-up hypothesis” (Kamins and Gupta 1994) qualifies this pattern by showing that VIs can match or even surpass their human counterparts in the promotion of technological, utilitarian, or highly innovative products, where their perceived objectivity and high technical competence become more relevant (Franke et al. 2023; Belanche et al. 2024; Yan et al. 2024; Meng et al. 2025). Semantic congruence enhances cognitive elaboration and the transfer of positive attitudes toward the brand, facilitating alignment between the influencer, product, and consumer (Belanche et al. 2021).

The degree of anthropomorphism is another decisive factor. Mind Perception Theory and the uncanny valley hypothesis indicate that moderate humanization increases the attribution of agency and experience without eliciting rejection (Mori et al. 2012). Recent studies confirm that subtle human cues, credible facial expressions, or congruent body language enhance identification with VIs and improve content enjoyment (Deng and Jiang 2023; Liu and Lee 2024). Nonetheless, even under these conditions, parasocial bonds are generally weaker than with HIs, except when VIs display explicit markers of authenticity and vulnerability, elements that tend to humanize them beyond their synthetic nature (Mirowska and Arsenyan 2023; Dondapati and Dehury 2024; Zhou, Li, et al. 2024). In fact, perceived authenticity of both the influencer and the content is confirmed as a key mediating variable in transmitting credibility (Audrezet et al. 2020; Koles et al. 2024).

Persuasive effectiveness is also shaped by the platform environment and individual characteristics of the influencer. The affordances of each channel, interactivity, visual richness, degree of synchronicity, shape attention, message processing, and willingness to share (Casaló et al. 2020; Barta et al. 2023). Likewise, attributes such as physical attractiveness, perceived expertise, or similarity to the audience can amplify or attenuate purchase intention (Trivedi and Sama 2020; Jin and Ryu 2020). However, the high levels of superficial engagement often generated by VIs, likes, comments, or shares do not necessarily guarantee higher conversion rates, as these metrics rarely translate into brand trust or loyalty if consumers perceive low authenticity (Li et al. 2023; Zhou, Li, et al. 2024). The stimulus-organism-response (SOR) framework has helped unravel these processes by demonstrating that influencer attributes (stimulus) trigger cognitive and affective responses, as well as utility, enjoyment, and parasociality, which ultimately shape behavior (Dondapati and Dehury 2024).

From the perspective of Social Comparison Theory and Social Identity Theory, VIs and HIs have differential effects on self-concept and group belonging (Festinger 1962; Tajfel and Turner 1986). VIs can reduce appearance-related anxiety by limiting upward comparisons but often provide lower homophily and a weaker sense of belonging (Barari 2023; Belanche et al. 2024; Mrad et al. 2025). HIs promote social cohesion and lifestyle emulation but may also intensify social pressure (Lee and Watkins 2016). The rise of immersive environments, augmented reality, and metaverse platforms, together with regulatory concerns, highlights the need to revisit effectiveness indicators and ethical standards for VIs and HIs alike (De Jans et al. 2018; Kim and Kim 2021).

Existing evidence suggests that VIs can be as effective as HIs under certain conditions, particularly when their appearance, product category, and audience expectations are aligned. Credibility, perceived authenticity, and parasocial relationship quality emerge as central mechanisms, while contextual factors, product type, platform, and anthropomorphism moderate the magnitude of effects. The three mediators in our model address these core psychological dimensions. Identification captures cognitive and symbolic alignment, parasocial relationships capture affective depth, and brand credibility captures trust in the endorsement.

2.2 | Hypotheses Development

Consumer identification with an endorser serves as a key psychological mechanism in persuasion, as it increases the likelihood of internalizing the source's beliefs or behaviors (Kelman 1961; Lim and Lee 2023). In influencer marketing, this process is reinforced when followers perceive affinity with the influencer's values, lifestyle, or emotional experiences, which fosters aspirational or similarity-based bonds (Ki et al. 2020; Farivar and Wang 2022). HIs tend to elicit stronger identification because they disclose personal experiences and convey authenticity and closeness (Audrezet et al. 2020; Koles et al. 2024). By contrast, VIs often struggle to generate genuine identification due to their artificial origins and limited capacity to project lived experiences, which are central to forming this bond (Franke

et al. 2023; Belanche et al. 2024). Although VIs can attract attention or curiosity, their nonhuman nature constrains the emergence of meaningful identification (Lou et al. 2023; Kim and Baek 2024). Therefore, the following hypothesis is proposed:

H1. *Consumer identification with human influencers is higher than with virtual influencers.*

Parasocial relationships formed through social media enhance trust in the endorser and increase the likelihood of purchase (Chung and Cho 2017). In the case of HIs, factors such as self-disclosure, perceived interaction, and authenticity help foster these one-sided relationships. Followers often view influencers as familiar and trustworthy (Ki et al. 2020; Hsieh et al. 2023). However, the rise of VIs raises questions about their ability to create similar parasocial bonds. While VIs mimic human behavior and tell emotional stories (Lim and Lee 2023), their artificial nature often limits the emotional depth of these connections. The perception of humanness and authentic life stories are crucial for forming parasocial relationships (Lim and Lee 2023; Liu and Wang 2025). Factors such as a lack of real-life experiences and the uncanny valley effect diminish the quality of relational closeness (Mori 1970; Kim et al. 2024). Although VIs can generate engagement (Lou et al. 2023), HIs excel in the characteristics that are most essential for forming parasocial attachments. Even in enjoyable digital contexts where VIs might have certain advantages, consumers tend to attribute lower mental similarity to them, ultimately reducing their persuasive effectiveness (Stein et al. 2024). Thus, the following hypothesis is proposed:

H2. *Consumers' parasocial relationship with human influencers is greater than with virtual influencers.*

The purchase decision process reflects both functional and experiential considerations (Holbrook and Hirschman 1982). Batra and Ahtola (1991) distinguish utilitarian products, valued for functionality and practical benefits, from hedonic products, valued for sensory, symbolic and emotional attributes. Product type influences how consumers process information and evaluate endorsements. Congruence between influencer and product enhances attitudes, engagement and purchase intention (Belanche et al. 2021; Pan et al. 2025). Identification can arise from perceived affinity with an influencer's lifestyle, values or esthetic cues, which can evolve into parasocial relationships characterized by closeness and inspiration (Jin et al. 2019; Sokolova and Kefi 2020). For utilitarian products, identification is more closely linked to competence or technical expertise, leading to more cognitively grounded connections (Thakur et al. 2016).

Empirical evidence suggests that VIs often show stronger congruence with technical or functional products, whereas HIs align more closely with symbolic and experiential categories such as cosmetics (Franke et al. 2023). Hedonic products tend to trigger emotional and symbolic processing, while utilitarian products invite more functional evaluations and weaker affective responses (Hartmann and Goldhoorn 2011; Sokolova and Pérez 2021; Kapitan et al. 2022). Thus, product type moderates the influence of key variables such as identification and perceived utility (Belanche et al. 2024). VIs are often perceived

as more competent for functional assessments, and consumers may rely more on their advice for utilitarian products (Huang and Rust 2018; Longoni and Cian 2022; Li et al. 2023; Belanche et al. 2024).

To clarify the expected pattern, it is useful to distinguish the psychological nature of identification and parasocial relationship. Identification reflects a cognitive, value-based process that emerges from perceived similarity and symbolic alignment and tends to be relatively stable and less dependent on immediate context. Parasocial relationships represent a more affective, experiential bond that is more sensitive to contextual cues. Hedonic products activate symbolic and emotionally charged processing and therefore provide a more favorable context for parasocial relationship development than utilitarian products. We therefore anticipate that product type will exert a stronger moderating effect on parasocial relationships than on identification. Accordingly, this study proposes the following hypothesis:

H3a. *Product type moderates H1, such that consumers' identification with human influencers will be more strongly reinforced for hedonic products than for utilitarian products.*

H3b. *Product type moderates H2, such that consumers' parasocial relationship with human influencers will be more strongly reinforced for hedonic products than for utilitarian products.*

Identification strengthens the perceived meaningfulness of interactions with an influencer and facilitates the development of parasocial relationships. Prior research shows that identification increases the likelihood of forming strong parasocial relationships characterized by perceived friendship and emotional support (Sokolova and Kefi 2020). Identification also enhances perceptions of authenticity and credibility, reduces social distance, and reinforces emotional connection (Casaló et al. 2020). Evidence indicates that parasocial relationship intensity increases when VIs display more human-like cues that facilitate identification, especially in digital environments with frequent and personalized interactions. Based on the above, the following hypothesis is presented:

H4. *Direct and positive identification with the influencer has a direct and positive effect on the parasocial relationship.*

Identification with an influencer also increases message receptivity and fosters favorable evaluations of recommended brands. Consumers tend to attribute the values they associate with the influencer to the brand, such as honesty or authenticity (Audrezet et al. 2020; Schouten et al. 2020), thereby strengthening brand credibility, which is understood as perceived capability and reliability (Erdem and Swait 2004; Chen et al. 2021). Identification thus facilitates symbolic transfer and enhances perceptions of competence and value congruence. Consequently, the following hypothesis is formulated:

H5. *Identification with the influencer has a positive and significant effect on the credibility of the recommended brand.*

According to the internalization mechanism of influence (Kelman 1961), identification with a source leads individuals to perceive its recommendations as aligned with their own

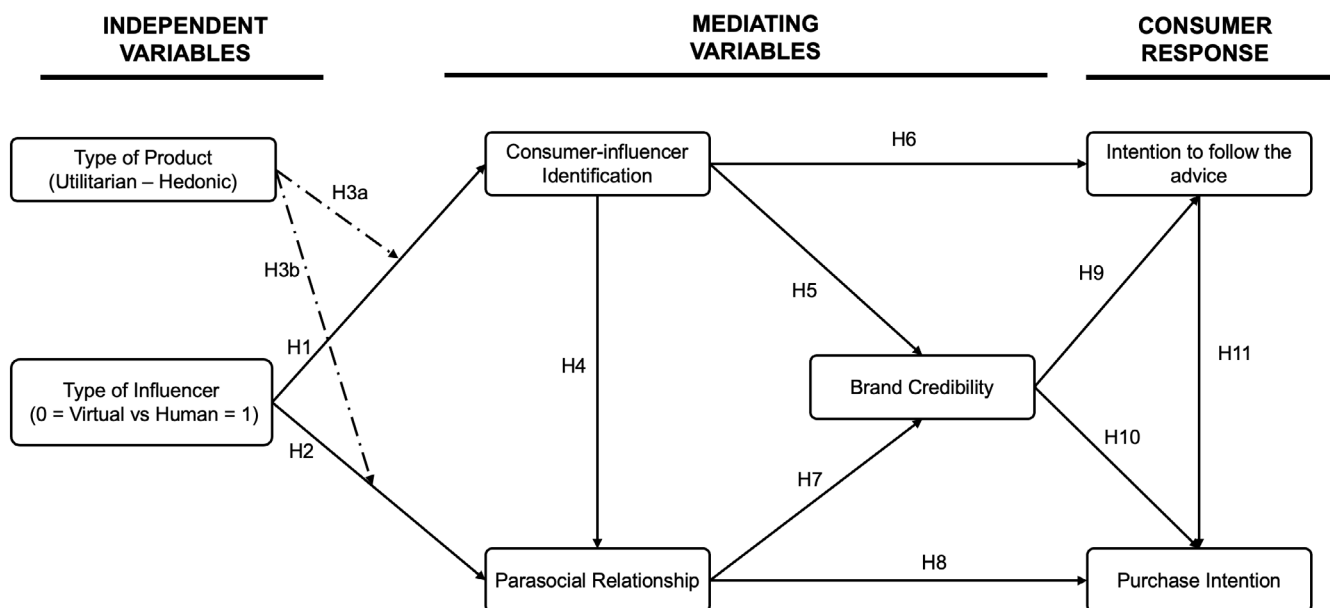


FIGURE 1 | Conceptual model.

values, increasing message relevance and receptivity (Lou and Yuan 2019; Casaló et al. 2020). This increases the likelihood of engaging in behaviors such as sharing content, commenting, or following purchase suggestions (Sanz-Blas et al. 2019; Schouten et al. 2020; Croes and Bartels 2021). In digital contexts, personalization and frequent interactions amplify this effect. Accordingly, the following hypothesis is proposed:

H6. *Identification with the influencer directly and positively affects the intention to follow their recommendation.*

Brand credibility, defined as perceived competence and reliability in fulfilling promises, is a central driver of persuasion in digital environments (Erdem and Swait 2004; Dwivedi et al. 2021). Followers with strong parasocial relationships tend to view the influencer as close and trustworthy (Ki et al. 2020; Sokolova and Kefi 2020), which can enhance brand credibility. This emotional bond facilitates message internalization, reduces skepticism, and increases the perceived genuineness of recommendations (Labrecque 2014; Belanche et al. 2024). Therefore, the following hypothesis is presented:

H7. *The parasocial relationship with the influencer positively and significantly affects brand credibility.*

Parasocial relationships also strengthen receptivity to influencer messages by generating familiarity and emotional connection, which reduces resistance to promotional content and increases spontaneous acceptance (Jin et al. 2019). According to affective response mechanisms, parasocial relationships foster positive attitudes and behavioral intentions (Lou and Yuan 2019), motivating followers to consider purchase recommendations and engage more deeply with the influencer (Schouten et al. 2020; Lee and Kim 2025). Thus, the following hypothesis is proposed:

H8. *The parasocial relationship positively and directly affects purchase intention.*

In context of information overload, brand credibility operates as a heuristic that facilitates the acceptance of promotional content (Lou and Yuan 2019). When a brand endorsed by an influencer is perceived as competent and trustworthy, consumers are more willing to follow the influencer's advice (Casaló et al. 2020; Sokolova and Pérez 2021). Credibility reduces perceived risk, strengthens message alignment with consumer values, and increases willingness to purchase (Djafarova and Rushworth 2017; Dwivedi et al. 2021). Based on the above, the following hypotheses are proposed:

H9. *The credibility of the recommended brand has a positive and direct effect on the intention to follow the influencer's advice.*

H10. *The credibility of the recommended brand has a positive and direct effect on the intention to purchase the product promoted by the influencer.*

The intention to follow an influencer's advice represents an intermediate step between positive evaluation and purchase behavior, and is recognized as a key predictor of digital consumer action (Lou and Yuan 2019; Casaló et al. 2020). In influencer marketing, this intention reflects trust, identification, and the internalization of the influencer's judgment (Djafarova and Rushworth 2017). It also mediates the relationship between message influence and purchase outcomes, particularly for symbolic or low-risk products (Schouten et al. 2020). Thus, the following hypothesis is presented:

H11. *The intention to follow the influencer's advice positively and directly affects purchase intention.*

The proposed model (Figure 1) specifies the following causal sequence: Influencer type → Identification → Parasocial relationships → Brand credibility → Behavioral outcomes (i.e., intention to follow advice, purchase intention). Influencer type is the experimental factor that triggers social categorization processes,

leading to identification (H1) and parasocial relationship (H2) (Tajfel and Turner 1979, 1986). Product type moderates the effect of influencer type on identification (H3a) and parasocial relationship (H3b). Then, identification fosters deeper emotional connections in the form of parasocial relationships (H4), consistent with evidence that perceived similarity and symbolic alignment precede parasocial attachment (Sokolova and Kefi 2020). Identification and parasocial relationships influence brand credibility (H5 and H7) by reducing skepticism and increasing perceived reliability and competence (Labrecque 2014). Brand credibility and these relational mechanisms then drive intentions to follow advice and to purchase (H6, H8–H11), in line with the Source Credibility Model (Hovland et al. 1953) and the Theory of Reasoned Action (Fishbein and Ajzen 1975). The three mediators were chosen because they capture the specific cognitive, affective and evaluative mechanisms through which the unresolved tension between Social Identity Theory and the “match-up hypothesis” manifests in influencer–audience interactions.

3 | Methods

3.1 | Experiment Design

To empirically test the proposed conceptual model, a 2×2 between-subjects experiment was conducted, manipulating two independent factors: influencer type (VIs and HIs) and product type (utilitarian vs. hedonic). For the HIs condition, internationally renowned artists and public figures were selected: @Rosalia.vt (27.6 million followers) and @AitanaX (4 million followers). In line with Arsenyan and Mirowska (2021), for the VIs condition, two of the most globally recognized virtual avatars were chosen: @Lilmiquela (2.5 million followers) and @BermudaIsbae (224,000 followers). The selection of these figures, all considered macro-influencers/celebrities, aimed to ensure experimental realism and adequate participant familiarity with prominent figures in their respective spheres, while controlling for gender and visual style. A nutritional supplement was used as a utilitarian product, and cosmetic cream as the hedonic product.

Data was collected in 2024 using computer-assisted personal interviewing (CAPI). Non-probabilistic sampling randomly approached participants in public spaces across various Spanish cities. In the Spanish market, 89% of consumers follow at least one influencer, and 55% have made a purchase based on influencer recommendations (IABSpain 2025). The inclusion criteria required participants to be active social media users and to have had contact with or knowledge of at least one VI within the past 12 months. The final sample comprised 1681 valid social media users. The sample size far exceeds the minimum required for analysis with the PLS-SEM technique (Hair et al. 2017). Moreover, it ensures adequate statistical power according to Cohen's square root method heuristics, as verified with G*Power 3.1. The sample consisted of 57.5% women, with a mean age of 26 years (SD = 9.59). A total of 81.6% reported more than 6 years of social media experience, and 91.5% indicated using social media several times a day; 47.3% spent more than four h daily on these platforms. Additionally, 45% reported having no fixed monthly income, while 17% reported a monthly income between 1001 and 1500 euros.

3.2 | Procedure and Measures

Before the experiment began, participants received detailed information about the study procedures and context, in accordance with the guidelines of the research ethics committee at the authors' affiliated university. All participants provided informed consent prior to taking part in the study. Screening questions were asked regarding their use of the Internet and social media, as well as their knowledge of and interaction with VIs over the past year. Participants were randomly assigned to one of the four experimental conditions, resulting in balanced group sizes: (1) VI + hedonic product: $n = 420$ (24.98%); (2) VI + utilitarian product: $n = 420$ (24.98%); (3) HI + hedonic product: $n = 422$ (25.10%); and (4) HI + utilitarian product: $n = 419$ (24.92%). Participants completed the questionnaire after exposure to the assigned stimulus (see Appendix B in Supporting Information).

The measurement instrument was structured in three sections: first, the informed consent along with screening and qualifying questions; second, the measurement scales for the latent variables in the conceptual model; and finally, questions related to sociodemographic characteristics. All variables were measured using a seven-point Likert-type item scale, ranging from 1 (strongly disagree) to 7 (strongly agree). The scales were adapted from previously validated research in scientific literature to ensure content validity and methodological rigor. Specifically, consumer identification with the influencer was measured using the scale from Abell and Biswas (2023) and Belanche et al. (2024). Parasocial relationship and purchase intention were measured using scales from Chung and Cho (2017). Brand credibility was measured using a scale adapted from Erdem and Swait (2004). The scale for intention to follow the influencer's advice was based on Casaló et al. (2011). The scale to classify products as utilitarian or hedonic was based on Moon et al. (2010).

3.3 | Manipulations Check

Several checks were conducted to verify the effectiveness of the experimental design. First, participants were asked to identify the type of scenario to which they had been exposed. Second, to assess the manipulation of influencer type, the level of perceived anthropomorphism was measured using the scale adapted from Kim and Park (2024). The results confirmed a successful manipulation of influencer type. Specifically, HIs received a significantly higher score for perceived anthropomorphism ($M_{HIs} = 5.28$, $SD = 1.57$) compared to VIs ($M_{VIs} = 3.49$, $SD = 1.59$; $t(1679) = -23.311$, $p < 0.001$, $d = -1.797$). Third, the manipulation of product type was assessed. For this purpose, a pretest was conducted in which one hundred university students were provided with definitions and examples of utilitarian and hedonic products and asked to rate the two proposed products on a scale from 1: purely utilitarian product to 7: purely hedonic product (Moon et al. 2010). The results confirmed that the cosmetic product was perceived as highly hedonic ($M = 6.2$, $SD = 1.1$), while the nutritional supplement was perceived as highly utilitarian ($M = 2.0$, $SD = 1.3$).

TABLE 1 | Construct reliability, convergent validity, and discriminant validity.

Construct	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Alpha	CR	AVE
Type of product (1)	N.A.	0.002	0.322	0.375	0.127	0.296	0.182	N.A.	N.A.	N.A.
Type of influencer (2)	0.002	N.A.	0.016	0.024	0.016	0.012	0.016	N.A.	N.A.	N.A.
Identification (3)	0.323	0.016	0.800	0.790	0.541	0.730	0.737	0.899	0.900	0.640
Parasocial relationship (4)	0.375	0.024	0.790	0.856	0.526	0.705	0.671	0.892	0.890	0.733
Brand credibility (5)	0.127	0.006	0.541	0.526	0.819	0.566	0.648	0.910	0.910	0.670
Intention to follow advice (6)	0.296	0.009	0.729	0.704	0.566	0.857	0.737	0.916	0.920	0.735
Purchase intention (7)	0.181	0.003	0.697	0.669	0.648	0.729	0.844	0.830	0.830	0.712

Note: The bold numbers on the diagonal show the square root of the average variance extracted (AVE). The numbers below the diagonal represent the correlations between constructs; the italicized numbers above the diagonal represent the HTMT ratio values. Abbreviations: CR, composite reliability; NA, not applicable.

3.4 | Assessment of Normality and Common Method Bias

Normality conditions and the possible presence of common method bias (CMB) were verified. First, univariate normality was examined by inspecting the skewness and kurtosis of the variables; values were within the acceptable range (George and Mallery 2021), confirming a reasonable data distribution. Moreover, no extreme outliers or systematic patterns indicative of artificial or inconsistent responses were detected. Since the data were collected using a single self-administered questionnaire, it was deemed appropriate to control for CMB. Several strategies recommended by Podsakoff et al. (2003) were implemented. First, the order of item presentation was randomized to reduce the possibility of automated or sequential responses (Galbreath and Shum 2012). Second, the questionnaire separated independent and dependent variables into distinct blocks (Jordan and Troth 2020). Subsequently, Harman's single-factor test was performed, in which a single-factor accounted for less than 47.6% of the total variance, indicating a minimal presence of CMB.

The common latent factor criterion was also employed, and variance inflation factors (VIFs) were calculated among the model constructs. No value exceeded the threshold of 3.4, thereby ruling out problematic collinearity and suggesting that no CMB distorts the results, assuming the data does not exhibit significant methodological biases that compromise the internal validity of the model. Therefore, it was deemed appropriate to proceed with evaluating the quality of the measurement model and estimating the proposed structural relationships.

3.5 | Estimation Procedure

The nature of the research question must guide the selection of the appropriate research method, the context of the inquiry, the units of analysis, and the available resources (Paul and Kaurav 2025). In this study, we used partial least squares structural equation modeling (PLS-SEM) to evaluate the proposed model. The model includes 11 confirmatory hypotheses and was chosen primarily for its effectiveness in analyzing

complex models that involve multiple mediators (identification, parasocial relationship, and credibility) and a moderator (product type). Additionally, PLS-SEM is particularly useful for prediction-oriented research (Hair et al. 2019). This technique is advantageous when examining causal relationships under conditions of non-normal distribution or with large, heterogeneous samples. In line with current methodological recommendations, we conducted the analysis using SmartPLS software version 4.1.1.2. The PLS-SEM method was applied to obtain reliable estimates for reflective constructs and to reduce potential bias in loadings and structural paths (Dijkstra and Henseler 2015). The model evaluation followed a two-stage approach: first, we examined the measurement model to verify the reliability and validity of the scales; second, we analyzed the structural model. To estimate the stability of the coefficients and assess the significance of the hypothesized relationships, we performed bootstrapping with 10,000 subsamples at a 95% confidence level using two-tailed tests.

4 | Results

4.1 | Measurement Validation

Internal reliability of the scales was examined using Cronbach's alpha and composite reliability (CR) coefficients. All constructs reached values above the acceptable thresholds of 0.70 for Cronbach's alpha and 0.83 for CR, confirming adequate internal consistency. The CR of the constructs ranged from 0.83 to 0.91, and Dijkstra–Henseler's ρA also remained within expected limits, further reinforcing the robustness of the measures (see Table 1). For convergent validity, it was verified that all standardized factor loadings exceeded the recommended value of 0.70 and were statistically significant. The average variance extracted (AVE) values for all constructs were also above the threshold of 0.50, providing empirical evidence of convergent validity (see Table 1). Discriminant validity was assessed using the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio. In the first case, it was confirmed that the square root of the AVE for each construct was greater than its correlations with other constructs, thus meeting the criterion. In the second case, all HTMT coefficients remained below the conservative threshold of 0.8,

TABLE 2 | Descriptive statistics, factor loadings, and outer weights of measurement model indicators.

Construct	Item	Mean (<i>M</i>)	SD	FL	W	<i>t</i>
Type of product (utilitarian–hedonic)	ProductType	0.499	0.500	1.000	1.000	N.A.
Type of influencer (virtual–human)	InfluencerType	0.500	0.500	1.000	1.000	N.A.
Identification	IDENTIF1	3.468	1.694	0.779	0.231	52.561
	IDENTIF2	3.447	1.760	0.823	0.244	60.967
	IDENTIF3	3.384	1.675	0.778	0.231	53.761
	IDENTIF4	2.667	1.648	0.792	0.235	61.320
	IDENTIF5	2.845	1.705	0.826	0.245	62.601
Parasocial relationship	PARASOC1	3.171	1.768	0.854	0.367	84.473
	PARASOC2	3.352	1.948	0.860	0.369	90.038
	PARASOC3	3.092	1.756	0.854	0.367	86.235
Brand credibility	CRED1	3.942	1.431	0.809	0.231	43.898
	CRED2	3.959	1.428	0.841	0.240	44.782
	CRED3	4.047	1.426	0.752	0.214	33.875
Intention to follow advice	INTADVICE1	4.030	1.717	0.795	0.259	58.409
	INTADVICE2	3.437	1.676	0.873	0.284	74.500
	INTADVICE3	3.311	1.646	0.877	0.286	86.976
Purchase intention	PINT1	3.205	1.747	0.881	0.565	33.585
	PINT2	2.978	1.762	0.805	0.516	59.688

Note: FL = Factor Loading; W = Outer Weight; *t*-value = *t*-statistic of the outer weight from bootstrapping. For categorical variables (type of product, type of influencer), FL, W, and *t* are not applicable (N.A.); these are dummy-coded (0/1) as exogenous variables. All *t*-values are significant at $p < 0.001$.

confirming discriminant validity between conceptually related construct pairs (see Table 2). These results confirm the psychometric adequacy of the proposed model and support the validity of the hypothesized structural relationships.

4.2 | Structural Model Assessment

Once the measurement model was validated, the structural relationships were examined. The global indices indicated adequate model fit. The standardized root mean square residual (SRMR) was 0.028, below the recommended threshold of 0.08 (Hu and Bentler 1998). The normalized fit index (NFI) reached 0.929, exceeding the reference value of 0.90. The chi-square statistic ($\chi^2 = 1835.611$) further suggests that the model provides an acceptable approximation of the empirical data.

Validation of the structural model was carried out by analyzing the standardized path coefficients, coefficients of determination (R^2), effect sizes (f^2), and predictive relevance (Q^2), following the guidelines of Hair et al. (2017) for PLS-SEM. The R^2 values of the dependent variables ranged from 0.104 to 0.785, which is considered a moderate to high explanatory capacity in the context of the social sciences (Cohen 1988). In addition, Q^2 values, obtained through the blindfolding technique, were greater than zero for all dependent latent variables, confirming the model's predictive relevance (Chin 1998). The results indicate a good model fit and robust empirical support for 10 of the 11 hypotheses tested (see Table 3).

A significant effect of influencer type on consumer identification with the influencer is confirmed ($\beta_1 = 0.652$; $p < 0.001$), which supports H1 (Figure 2). In line with theoretical expectations, consumers identify more with HIs than VIs. Influencer type exerts a positive, robust, and statistically significant influence on consumer identification with the influencer. Similarly, a positive and significant effect of influencer type on parasocial relationship is observed ($\beta_2 = 0.286$; $p < 0.001$), supporting H2. The nature of the influencer also has a positive and significant effect on the development of a parasocial relationship, confirming that HIs foster stronger emotional relationships with consumers than VIs.

Product type exerted a significant moderating effect on the relationship between influencer type and parasocial relationship ($\beta_3b = 0.166$; $p < 0.01$), supporting H3b. Figure 3 shows that the difference in parasocial relationship between HIs and VIs is substantially larger for hedonic products than for utilitarian products. While HIs consistently generate higher parasocial relationship levels in both conditions, the gap widens clearly in the hedonic setting, demonstrating that product type intensifies the emotional advantage of HIs. By contrast, product type did not moderate the relationship between influencer type and identification ($\beta_3a = 0.014$; $p = n.s.$), so H3a was not supported. This indicates that identification operates as a more stable, cognition-based process that remains relatively unaffected by product category.

The mediating relationships in the model were also supported. Identification positively and significantly influenced

TABLE 3 | Results of hypothesis testing.

Hypothesis	Relationship	β	f^2	t	Result
H1	Type of influencer → Identification	0.652	0.059	9.539 ***	Supported
H2	Type of influencer → Parasocial relationship	0.286	0.045	6.237 ***	Supported
H3a	Influencer × product → Identification	0.014	0.000	0.361 ns	Not supported
H3b	Influencer × product → Parasocial relationship	0.166	0.002	2.655 **	Supported
H4	Identification → Parasocial relationship	0.847	2.995	62.083 ***	Supported
H5	Identification → Brand credibility	0.343	0.038	5.028 ***	Supported
H6	Identification → Intention to follow the advice	0.598	0.592	25.298 ***	Supported
H7	Parasocial relationship → Brand credibility	0.225	0.016	3.256 ***	Supported
H8	Parasocial relationship → Purchase intention	0.224	0.068	6.471 ***	Supported
H9	Brand credibility → Intention to follow the advice	0.243	0.098	9.490 **	Supported
H10	Brand credibility → Purchase intention	0.298	0.162	11.188 ***	Supported
H11	Intention to follow the advice → Purchase intention	0.409	0.192	6.621 ***	Supported

Construct	R^2	Q^2
Identification	0.104	0.005
Parasocial relationship	0.785	0.014
Brand credibility	0.304	0.020
Intention to follow the advice	0.573	0.033
Purchase intention	0.644	0.015
Model fit indicators	SRMR	0.028
	NFI	0.929

Note: β = standardized path coefficient; f^2 = effect size; R^2 = coefficient of determination; Q^2 = predictive relevance (PLSpredict). *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. Abbreviation: ns, not significant.

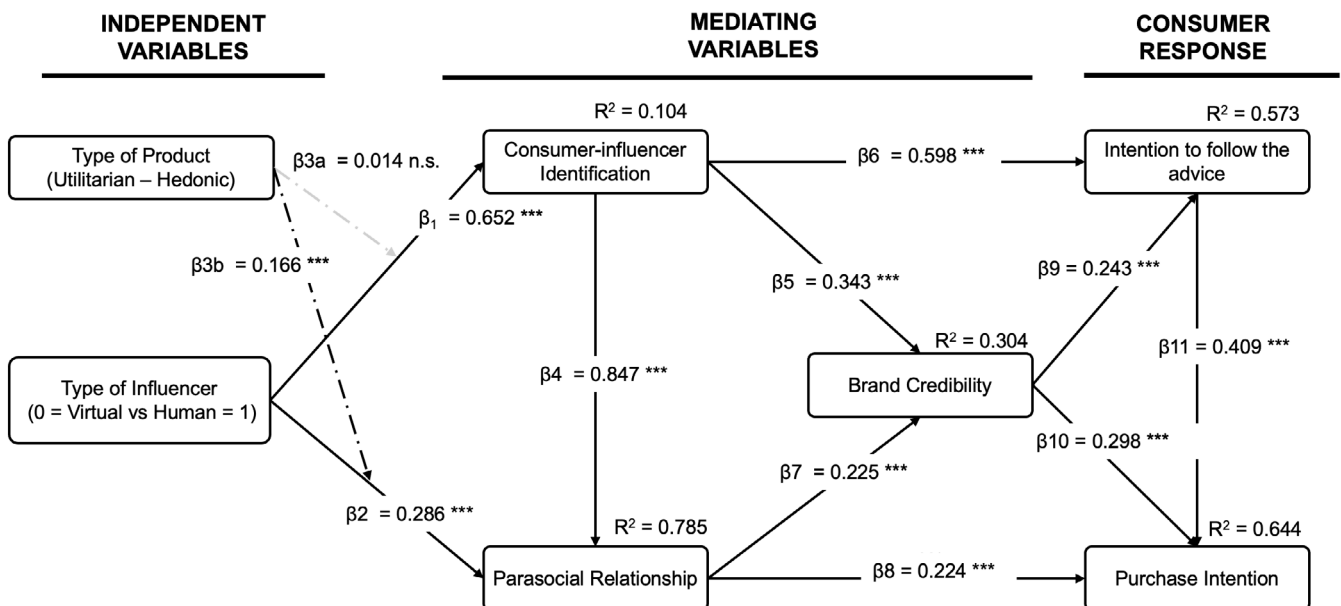


FIGURE 2 | Estimated relationship model. **Significant at the 0.05 level, ***significant at the 0.01 level, n.s. = not significant. Solid lines represent direct effects; dashed lines represent moderating effects; light gray lines represent nonsignificant relationships.

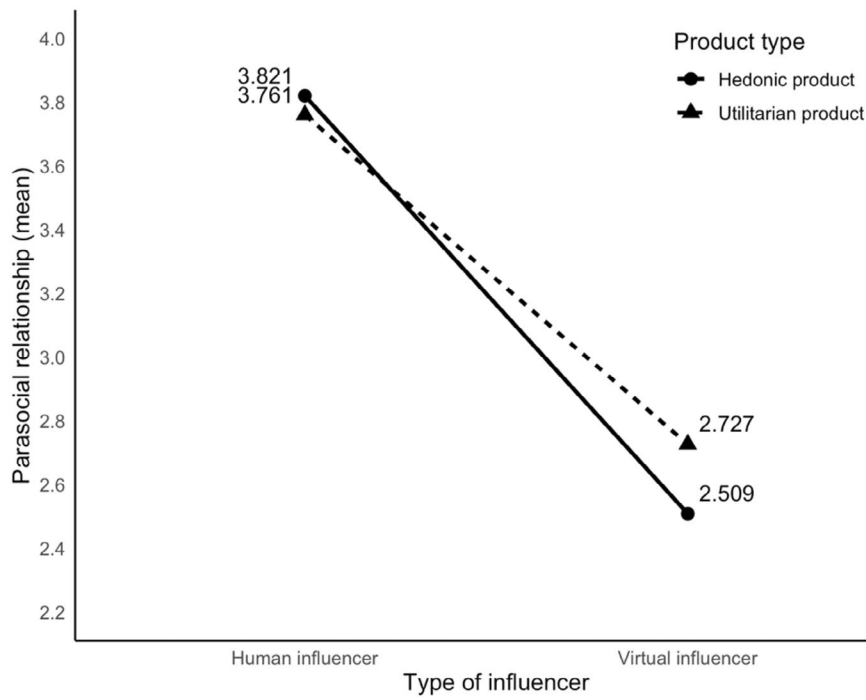


FIGURE 3 | Interaction effect of product type (hedonic vs. utilitarian) and influencer type (human vs. virtual) on parasocial relationship.

parasocial relationship ($\beta_4=0.847$; $p<0.001$), brand credibility ($\beta_5=0.343$; $p<0.001$), and intention to follow advice ($\beta_6=0.598$; $p<0.001$), supporting H4–H6. These findings highlight that the greater the consumer's identification with the influencer, the more likely they are to develop an intense parasocial relationship, and that identification has a positive and significant impact on the intention to follow the influencer's advice.

Parasocial relationship exerted a significant positive effect on brand credibility ($\beta_7=0.225$; $p<0.001$) and purchase intention ($\beta_7=0.224$; $p<0.001$), supporting H7 and H8. This confirms that emotional closeness toward the influencer enhances both brand judgments and behavioral intentions. Brand credibility had a direct and significant influence on intention to follow advice ($\beta_9=0.243$; $p<0.001$) and purchase intention ($\beta_{10}=0.298$; $p<0.001$), supporting H9 and H10. Finally, intention to follow advice positively and significantly predicted purchase intention ($\beta_{11}=0.409$; $p<0.001$), supporting H11. These results align with the theoretical expectations derived from internalization mechanisms and the Theory of Reasoned Action.

Based on the estimated model, the proportion of explained variance (R^2) is particularly high for the mediating variables related to the consumer's perception of the influencer and behavioral response variables. Specifically, the model explains 78.5% of the variance in parasocial relationship ($R^2=0.785$), 64.4% in purchase intention ($R^2=0.644$), 57.3% in the intention to follow the influencer's advice ($R^2=0.573$), 30.4% in brand credibility ($R^2=0.304$), and 10.4% in identification with the influencer ($R^2=0.104$). These values indicate that the model exhibits moderate to high explanatory power for the outcome variables, particularly those more closely related to consumer action.

The analysis of effect sizes (f^2) reveals that identification has the strongest influence on parasocial relationships ($f^2=2.995$), far exceeding the conventional threshold for a large effect (Cohen 1988). Identification also shows a strong effect on intention to follow advice ($f^2=0.592$). Brand credibility has a moderate effect on purchase intention ($f^2=0.162$) and intention to follow advice ($f^2=0.098$). Remaining effects were minor ($f^2<0.10$), indicating more limited but still meaningful contributions. Overall, the mediation chain through identification and parasocial relationship represents the model's principal explanatory strength.

Regarding predictive relevance, PLSpredict results show positive Q^2 values only for intention to follow advice ($Q^2=0.033$). The remaining values, brand credibility ($Q^2=0.020$), purchase intention ($Q^2=0.015$), parasocial relationship ($Q^2=0.014$), and identification ($Q^2=0.005$), are small, indicating limited out-of-sample predictive power.

5 | Discussion and Conclusion

5.1 | Theoretical Implications

The study confirms that both HIs and VIs can influence consumer behavior but that they do so through different psychological mechanisms and that these mechanisms depend on product type. The findings deepen understanding of how influencer type, product type, and relational processes interact in influencer marketing. First, the results reinforce the central role of influencer type in activating identification and parasocial relationships (Franke et al. 2023; Koles et al. 2024; Stein et al. 2024). Consumers tend to identify more with HIs, who disclose personal aspects and convey authenticity and closeness, regardless of whether they promote hedonic or utilitarian products

(Schouten et al. 2020; Belanche et al. 2024). This positions HIs as privileged agents in generating parasocial relationships (Dondapati and Dehury 2024; Zhou, Li, et al. 2024) and transferring positive attributes to brands.

Second, the introduction of product type reveals important nuances in these processes. While HIs generally elicit more intense parasocial relationships than VIs, the difference is especially pronounced for hedonic products. VIs reduce the parasocial relationship gap in utilitarian contexts but remain at a relational disadvantage in hedonic categories. This pattern supports the relevance of source–product congruence (Venciute et al. 2023; Meng et al. 2025; Yao et al. 2025) and shows that the impact of VIs is not uniform but contingent on product characteristics.

Third, the divergence in moderating effects between identification and parasocial relationships is theoretically significant. The absence of a significant moderating effect of product type on identification suggests that this factor is a more fundamental and stable process anchored in the nature of the endorser (human vs. virtual). By contrast, the parasocial relationship is more dynamic and context-responsive. The widening gap between HIs and VIs for hedonic products indicates that experiential, symbolic, and emotional product attributes magnify the relational advantage of HIs. This is consistent with the conceptual distinction proposed in the hypotheses section, where identification was treated as a cognitively grounded mechanism and the parasocial relationship as a more experiential process.

Fourth, the structural model confirms and extends prior work by validating a full process architecture from influencer type through identification and parasocial relationship, to brand credibility and behavioral outcomes (Pan et al. 2025). Identification emerges as the main driver, triggering a sequence of effects on parasocial relationship, brand credibility, and intention to follow advice. This reinforces the importance of symbolic alignment between influencers and audiences (Janssen et al. 2022; Spörl-Wang et al. 2025) and highlights the need to select endorsers who accurately represent target audiences' values. The direct effects of parasocial relationship and brand credibility on purchase intention further underline the importance of emotional bonds and perceived truthfulness in influencer effectiveness (Lee and Kim 2025; Lou and Yuan 2019).

The study contributes to theories of influencer marketing and human–technology interaction by demonstrating that effectiveness cannot be analyzed in isolation from product type and relational mechanisms. HIs excel in activating processes of symbolic identification, empathy, and deep parasocial relationship, whereas VIs stand out in utilitarian contexts due to their ability to project objectivity and standardization (Belanche et al. 2024; Liu et al. 2025). The “match-up hypothesis” is thereby refined: product–influencer fit primarily enhances the relational stage of the process, rather than simply improving overall evaluation.

The findings extend Social Identity Theory and Source Credibility Theory by showing that social categorization of the endorser activates distinct persuasive routes that impact brand perceptions and behavioral intentions (Tajfel and Turner 1986; Ohanian 1990). They also provide evidence of the current limitations of VIs in generating identification and parasocial

relationships comparable to those of HIs, contributing to the literature on parasocial relationships and digital influencers (Stein et al. 2024). More broadly, the results invite a reconsideration of existing theoretical models to better capture persuasive interactions in hybrid human–virtual contexts and to reassess the legitimacy and role of VIs as a distinct category in digital communication (Kapitan et al. 2022).

A further theoretical contribution lies in clarifying the differential sensitivity of identification and parasocial relationship to product type. Identification behaves as a relatively stable, cognition-based assessment that is only modestly affected by whether the endorsed product is hedonic or utilitarian. Parasocial relationships, in contrast, are strongly amplified or attenuated by product type. This contrast refines expectations about when and how influencer-based persuasion is most effective and emphasizes that not all relational mechanisms respond equally to contextual cues.

Finally, the choice of stimuli is relevant for interpreting the relational findings. The HIs in this study are well-known music celebrities (@Rosalia.vt and @AitanaX), while the VIs (@Lilmiquela and @Bermudaisbae) have lower celebrity status. This difference may enhance familiarity-based responses and strengthen the relational advantage of HIs. However, the observed patterns across influencer types and product categories align with Social Identity Theory, the parasocial interaction paradigm, and Source Credibility Theory, suggesting that celebrity status amplifies rather than replaces the underlying psychological processes differentiating HIs and VIs.

5.2 | Managerial Implications

The results of this study offer strategic guidelines for professionals, agencies, and brands aiming to enhance the effectiveness of their influencer marketing campaigns. The findings confirm that HIs retain a significant relational advantage over VIs, consistently fostering stronger parasocial relationships and higher identification in all product contexts. This advantage is most pronounced for hedonic products, or those with high symbolic value, where HIs excel due to their ability to generate genuine emotional bonds and perceived authenticity. Therefore, collaborating with an HI remains the best option for maximizing emotional connection, and campaigns featuring HIs should highlight authenticity, interpersonal connection, and everyday experiences.

In contrast, VIs are particularly suited for promoting utilitarian or functional products (such as technology, digital services, or nutrition products), where attributes like objectivity, consistency, and technical sophistication are highly valued. However, managers must recognize that the additional operational control and flexibility afforded by a VI may not compensate for the inherent deficit in emotional connection and identification, especially for hedonic brands. To capitalize on the benefits of VIs in the utilitarian space, communication should focus on objective information and functional comparisons, avoiding overly emotional narratives. If VIs are used, it is recommended to invest in enhancing their appearance, warmth, and perceived naturalness by incorporating human traits and personalized narratives.

Therefore, alignment between product type, campaign objective, and influencer type is crucial to achieve a persuasive impact.

5.3 | Limitations and Future Research

This study presents several limitations that should be acknowledged, which also offer opportunities for future research. First, the use of a non-probability sample collected in public spaces limits external validity. It constrains the generalizability of the findings to broader populations. The sample consists of young adult social media users, which limits extrapolation to other demographic or cultural groups. Second, the experimental manipulation relied on well-known HIs, who are established music artists, and VIs, who are globally recognized avatars. Differences in celebrity status, domain expertise, and prior familiarity may therefore introduce a contextual constraint. Although this confound does not undermine the central theoretical insight of the study, namely the differential sensitivity of identification and parasocial relationship to product type, it suggests the value of future studies using human and VIs who are matched in visibility, follower base, or niche, or by explicitly modelling influencer status as a separate factor. Third, focusing exclusively on Instagram limits the applicability of the results to other platforms where interaction dynamics, affordances, and consumption patterns differ. Extending the model to short-form video platforms, live-streaming contexts, and mixed reality environments would enable a more comprehensive assessment of influencer persuasion processes. Moreover, the limited predictive relevance of several endogenous variables suggests that the model may overlook external factors that shape influencer effectiveness. Future extensions could incorporate additional antecedents such as perceived authenticity, value congruence, and content esthetics, which may enhance explanatory and predictive performance. Further research should also broaden the variety of influencer profiles examined, including micro-influencers, and account for heterogeneity across consumer segments. Expanding the analysis to alternative digital platforms such as TikTok or Twitch, as well as emerging immersive environments, would strengthen the generalizability of the findings. It is also important to integrate product-related variables (e.g., involvement, social visibility, perceived risk) and consumer-related variables (e.g., psychographic traits, fundamental needs) to capture better the alignment between message, endorser, and context. Finally, longitudinal designs and additional mediation pathways, including perceived authenticity and content usefulness, should be explored to improve the model's external validity and refine its ability to explain persuasion dynamics across evolving digital ecosystems.

5.4 | Conclusion

The VIs vs. HIs duality can be understood as a relational continuum rather than a functional dichotomy. Effectiveness depends on the fit between the nature of the influencer, the product type, and the psychological processes activated. The main theoretical contribution of this study lies in highlighting the differential sensitivity of identification and parasocial relationships to product type, thereby clarifying that identification operates as a comparatively stable, cognitively grounded mechanism. In contrast, parasocial relationships are more context-dependent

and responsive to hedonic versus utilitarian cues. In this sense, the validated sequential model refines existing understandings of human–technology interaction and provides practical guidelines for influencer marketing planning that combine operational efficiency with affective relationships in an increasingly hybrid social ecosystem.

Author Contributions

Francisco Rejón-Guardia: conceptualization, methodology, resources, writing – original draft, supervision, funding acquisition. **Virginia Palomas-Gómez:** conceptualization, methodology, formal analysis, investigation, writing – original draft. **Sebastian Molinillo:** conceptualization, methodology, investigation, resources, writing – original draft.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. Appendix **A**. Appendix **B**.