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UNDERSTANDING EMOTIONAL AVATARS: A SYSTEMATIC REVIEW ACROSS THEORY, CONTEXT, CHARACTERISTICS, AND METHODS

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ABSTRACT

This systematic literature review provides an overview of avatar-mediated emotional processes via the TCCM (Theory-Context-Characteristics-Methodology) approach, presenting findings from an analysis of 32 peer-reviewed studies retrieved through Scopus database. The findings show that the literature is mainly empirical and segregated across virtual experiential domains including marketing, health, and immersive environments, it also exceeds established theoretical frameworks focusing primarily on technology acceptance models, social cognition theories, or emotionally based approaches. In terms of characteristics perspective, the results show that avatar's design features, emotional cues and user-related factors have a significant effect on behavioural, psychological and relational outcomes through key mediating mechanisms such as emotions, trust, engagement and cognitive appraisals, with the role of moderators to include individual variation, technology settings and external environmental conditions. It further highlights the contemporary fissures, such as limited theoretical synergies, neglected real-world and cross-cultural milieu, and methodological uniformity, thus providing ample opportunity for more holistic and multidisciplinary lenses to be integrated. Based on such insights acquired from texts, the study puts forth an integrated conceptual framework for understanding avatar and emotion interactions, and outlines a future research agenda that focuses on integrative theorization, richer construct development, and the use of advanced methodological techniques. This not only pushes forward the theoretical understanding of avatar dynamics in virtual environments but also provides practical insights into crafting imbued systems that are user-sensitive, emotionally responsive, and adaptable for future digital landscapes.

KEYWORDS: virtual avatars, emotions, SLR, TCCM.

1.INTRODUCTION

Contemporary advancements in voice recognition, natural language processing, human-machine interaction, and artificial intelligence have facilitated virtual agents to replicate human conversations through text or speech (Van Pinxteren *et al.*, 2020). One such virtual agent is called an Avatar, which has become a notable tool in organizations to enhance consumer engagement (Chae *et al.*, 2016). Avatars are computer characters that resemble human appearance and behavior and are controlled by an AI-based software or human programmers, enabling them to communicate with the users (Miao *et al.*, 2022). They are characterized by their ability to visually and behaviorally adapt, maintain consistency throughout interactions, and engage synchronously with other agents or users (Lee H *et al.*, 2026). These characteristics enhance feelings of embodiment and presence, establishing avatars as key components of the social structure within metaverse environments. Human-technology interactions involve deep emotional connections. People's thoughts, decisions, and actions are influenced not only by practical features but also by their feelings. Studies show that emotions play a crucial role in how humans think (Monika Schwarz-Friese, 2012). The prominent investment and growth in this field is an indication that several companies are embracing the concept of avatars to consolidate their customer relationship management. This change is evident with the popularity of virtual influencers like Lil Miquela, who works with global fashion houses, as well as brand owned avatars like Imma and Noonouri, who has worked with luxury brands including Dior and Balenciaga. Companies, especially e-commerce, travel and hospitality, banking, and educational ones, are placing big bets on AI-driven avatar marketing so that they find easy ways of interacting and assisting consumers (Song and Shin, 2022). Spurred by the fast technological progress and the increased use of digital anthropomorphic avatars in advertising, the market of the global digital anthropomorphic avatar market is expected to grow to USD 270.61 billion by 2030, up to USD 29.51 billion in 2022 (Grand View Research, 2023).

Avatar marketing is the strategic utilization of virtual identities, CGI characters and personas used for using avatars in marketing to represent and promote brands. Yet, today, avatars are not mere visual aids, they can be present and engage with consumers to develop emotional bonds (Silva and Bonetti, 2021). As digital technologies and artificial intelligence have been rapidly embedded into our lives, avatars have become social agents inside brand ecosystems, drastically changing how consumers perceive and act towards brands (Wang *et al.*, 2026).

Avatars that resemble humans can activate social norms within individuals, such as reciprocity, forming parasocial relationships, being polite, and sparking curiosity. This, in turn, leads to emotional, behavioral, social, and cognitive reactions during these interactions (Yuan & Gao, 2023). They exhibit human-like behaviors such as speech or gestures, but also other human characteristics such as emotions, empathy or memory (Burden & Savin-Baden, 2019). Despite this growth, much of the existing literature has been centred on technology capabilities and adoption trends, affording little perspective in terms of the psychological and relational aspects of human-avatar interactions. To fill this gap, the current research examines the effect of avatars on consumer perceptions, emotional atonement, and behavioural patterns. Specifically, this presents new lines of academic inquiry regarding the ways in which avatars might be, not just tools for transmitting communication but how consumers confer authenticity and trust upon non-human agents and what this means for the further evolution of marketing frameworks in digitally mediated audiences.

Given the increasing popularity of avatar marketing, it is crucial to comprehend present research patterns and prospective possibilities in avatar-human interaction. While scholarly interest in avatar-based interactions is on the rise, current research exhibits a disjointed and inconsistent knowledge base (Yue Peng *et al.*, 2024). Even though prior review articles have served to examine avatars, virtual agents, and AI-mediated interfaces in the field of marketing, such analyses have been conducted in a rather fragmented and limited manner (Husain R *et al.*, 2025; Kumar P *et al.*, 2025; Rahman MS *et al.*, 2024; Qu Y *et al.*, 2025). With an emotive touch, Avatars are increasingly woven into the marketing fabric influencing consumer engagement and experience with a brand. Enabled by artificial intelligence, anthropomorphism, and social presence their capability to elicit and modulate consumer emotion has yet to be studied. Current studies are piecemeal, examining independent attributes or environments only, and do not make cumulative sense of avatar-related emotional and social behaviours. As a result, the field lacks a nested approach that relates its theoretical underpinnings to usage contexts and strong empirical paradigms. Therefore, to streamline future research there is a need for a systematic review to consolidate existing findings, delineate the field's scope, and suggest future research directions.

Elaborating on this combined synthesis and addressing the necessity of conducting an extensive synthesis of the previous knowledge about avatars

and emotional aspects (Paul and Menzies 2023), this study states the following research questions:

RQ1. What are the theoretical foundations and the main conceptual perspectives which are currently prevalent in the literature in relation to avatars and emotional processes during interactions?

RQ2. Which characteristics of avatars and emotional cues have been explored in previous studies, and under what contexts and interaction settings?

RQ3. What methods are used in studies investigating avatar-induced emotional responses?

RQ4. What theoretical, background and methodological gaps still lie in the current literature around avatars and emotional appropriation and how can future research be shaped to this end?

By utilizing the SPAR-4-SLR protocol (Paul *et al.* 2021) alongside the Theory-Context-Characteristics-Method (TCCM) framework (Paul and Rosado-Serrano, 2019) we conduct a systematic review of the literature (SLR) to address the research questions at hand. As per the framework as discussed by Paul and Menzies (2023), this research will have a considerable impact on the theoretical knowledge and practical application of avatars in interactions. Through the investigation of RQ1, the review uncovers the foundational theories that form the basis of current avatar research and emotional processes, consolidating key theoretical perspectives and recurring concepts found in the literature. To answer RQ2, the study logically analyses the features of avatars and emotional indications in different situations, offering a clear outline of the scope of the research, limitations, and major focus points of the research in past studies. RQ3 examines the prevalent methodological strategies used to pursue the study of the avatar-induced emotional reactions, prioritizing the popular research designs, data collection methods and techniques of the analysis.

Ultimately, by integrating insights from the preceding research inquiries, RQ4 pinpoints significant conceptual, contextual, and methodological deficiencies in the existing literature, proposing a structured plan for future research to enhance scholarly comprehension of avatars and emotional encounters (Paul 2024).

The rest of the paper is built in the following way. The methodological approach is presented in Section 2, which specifies the SPAR-4 SLR protocol used for systematic data collection as well as the TCCM framework used for analysis. This section outlines the assembly and arrangement as well as assessment stages that informed article

identification, screening, coding and appraisal. Section 3 describes and discusses the main findings, one at a time per research question. Concretely, it maps the progress of thinking about the deployment of avatars and emotional experiences; identifies key constructs and relational patterns that have been tested previously (antecedents, mediating emotional mechanisms, contextual boundary conditions, related to avatar-induced emotions); and discusses all contributions generated by applying TCCM model such as theoretical adequacy and methodological implications. This section also discusses an overall future research agenda and provides strategic recommendations for practitioners in technology contexts. Section 4 concludes the paper by presenting a summary of the main findings and indicating limitations of the study.

2. METHODOLOGY

To gain a thorough insight into avatars and emotional processes, this study employs a systematic literature review methodology based on the TCCM framework and adheres to the SPAR-4 SLR guidelines. The SPAR-4 SLR protocol is a systematic and formal review model consisting of three major stages, namely assembling (selecting and retrieving pertinent studies), arranging (organizing, screening and narrowing literature), and assessing (evaluating, synthesizing and presenting outcomes). The protocol guarantees a clear, informative, and uniform approach to the review that will enable us to identify, examine, and analyse studies of high-quality and relevance in a systematic manner. The review has methodological strength following the sequential steps of SPAR-4 SLR and we provide a grounded synthesis of existing work on avatars and emotion through a structured process.

2.1 Assembling

Following the SPAR protocol, this study systematically assembled the corpus of articles examining avatars and emotions in digital environments. It was searched only in the Scopus database, where only peer reviewed journal articles that have been published in English were included in order to achieve methodological rigor and conceptual consistency, and exclude conference proceedings, books, book chapters, and reports. The choice of Scopus can be explained by its large interdisciplinary scope, improved search functions, and high indexing standards, which is why it is suitable for the review of the research on the border between marketing, psychology, human-computer interaction, and immersive technologies.

Furthermore, the shortlisting of search keywords was based on identifying keywords associated with Avatars and emotions from existing literature. Subsequently, the search query was finalized with the following selected keywords:

(TITLE-ABS-KEY ("Virtual Avatar") AND TITLE-ABS-KEY (" Emotion"))).

The preliminary search in the stage of assembling provided 679 documents.

2.2. Arranging

Scopus filters were used to sort, organize, and refine the dataset in the study. It focused on articles written in subject areas of social sciences (95) , Psychology (88), Business, Management and accounting (20), Economics, Econometrics and Finance (3) and multidisciplinary (25) area, which resulted in 195 documents. The search was further narrowed down to articles which are not conference papers, books, or reports but only articles. The search showed 148 documents. Afterwards only English language papers were considered, leaving 147 abstracts for assessment. Screening the abstracts resulted in 41 papers for a comprehensive review. After reading the full-text of 41 papers, 9 irrelevant research papers were excluded. Ultimately, 32 research papers were included in the TCCM

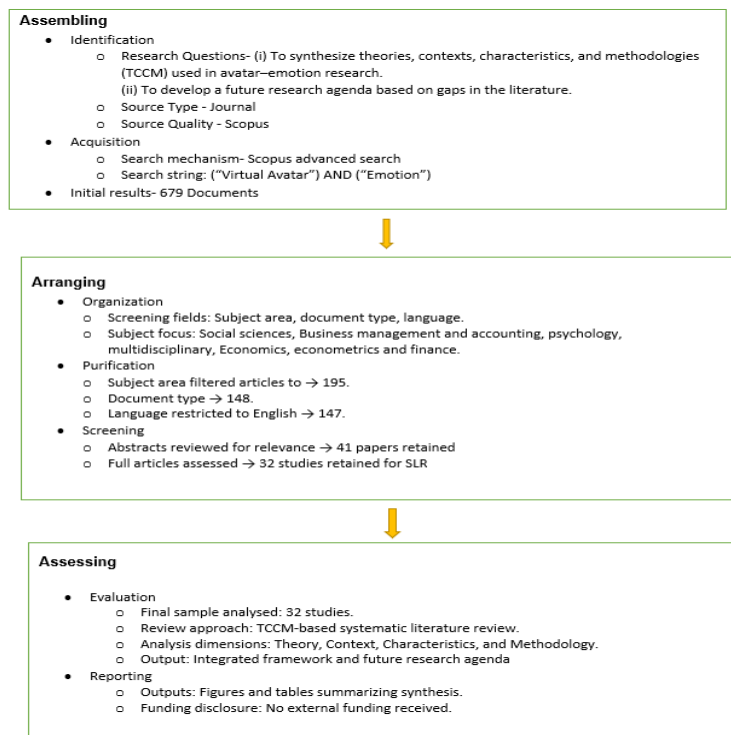
framework-based analysis.

2.3. Assessing

For evaluation, we utilize the TCCM framework, which offers a clear, comprehensive, and structured approach to literature analysis by incorporating theoretical foundations, contextual factors, study characteristics, and research methodologies. This framework facilitates a more nuanced and detailed analysis of the literature. The TCCM framework is also used to outline future research agendas. Section 4 provides a detailed discussion of the future research agenda.

We should note that the current review is not without limitations which may hinder one's understanding of the Avatar framework. A conversation of these limitations is given in section 6 of the paper. Further, the study was not funded and no ethical approval was necessary as there were no direct data collections. However, the present study followed ethical norms of systematic review and maintained transparency, impartial nature as well as rigor throughout the conduct of research. The sources of the information were well cited and the analysis was conducted in an

unbiased manner to protect both the integrity and ethical value of this study



3. FINDINGS AND DISCUSSION

This paper introduces a short summary of the literature on avatars and emotions, in terms of (I)

theoretical, (C) contextual, (C) characteristics and (M) methodological approaches. The structure of the review is in line with TCCM and groups previous

research based on theoretic foundations informing the investigation of avatars and emotions, contexts in which emotional experience involving an avatar are possible, non-trivial issues related to avatars and emotions, and empirical evidence to rule on various methodological questions. The emergent systematic synthesis facilitates to integrate the literature on how emotions processes have been conceptualized, studied and operationalized in open non-directive interactions with avatars together as well as to outline commonalities across studies and research gaps.

3.1. Theoretical perspective

The theoretical basis behind avatar-based research is drawn from a cross disciplinary synthesis of technology adoption, social interaction, and psychological theories. A large body of research is based on concepts derived from technology acceptance theories, namely the Technology Acceptance Model (TAM) (Blut et al., 2024) and the Unified Theory of Acceptance and Use of Technology (UTAUT/UTAUT2) (Kondrateva et al.,2025) and Behavioural Reasoning Theory (BRT), from which perceived usefulness and ease of use as well as behavioural intentions describe how users engage with avatars. These models, however, focus mostly on functional adoption and offer little understanding of the emotional dynamics within avatar interactions. This limitation is addressed in multiple studies, using theories related to social and self related behaviour like Social-Cognitive Theory and Self-Expansion Theory (Huang YT et al.,2026), Sociometer Theory and Social Self-Preservation theory (Pauw LS et al.,2022) and Temporal-Need Threat Model of Ostracism, that support the idea that avatars facilitate identity expression and projection of oneself but also enable self reflection and evaluation and emotional validation processes within digital environments. Additionally, Uses and Gratifications Theory (UGT) (Wang Y et al.,2025) emphasizes user's motivations for avatar engagement as well as depersonalization (Gall D et al.,2022) and socioemotional selectivity (Hao F et al.,2025) theories that offer insight into changes in self-perception and emotional priorities in digital contexts.

Simultaneously, a wealth of literature studies emotion and cognition based processing mechanisms triggered by avatars. It is well established that how users appraise and interpret avatar related stimuli informs discrete emotional response such as Cognitive Appraisal Theory (Suh, A (2024)), Affective Events Theory (Angerbaur K et al.,2025), Beck's Cognitive Theory of emotion (Monferrer et

al.,2023), Ekman's theory of Basic Emotions (Rbeiz et al.,2025). More relevantly, persuasion based approaches like Elaboration Likelihood Model (ELM) (and Cognitive Tuning Theory (Duan M et al.,2025) explain how the dimensions of avatars alter attitudes along central as well as peripheral routes. Moreover, Parasocial Interaction (PSI) (Dondapati, A 2025), Media Equation Theory and Expectancy Violations Theory (Sylaiou et al.,2020) and Theory of Mind (Pino et al.,2021) indicate that users often view avatars as social beings resulting in emotional attachment and relational intimacy.

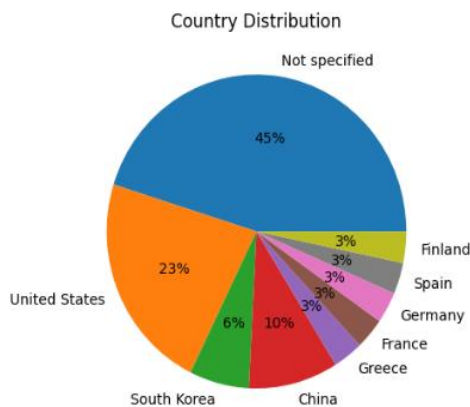
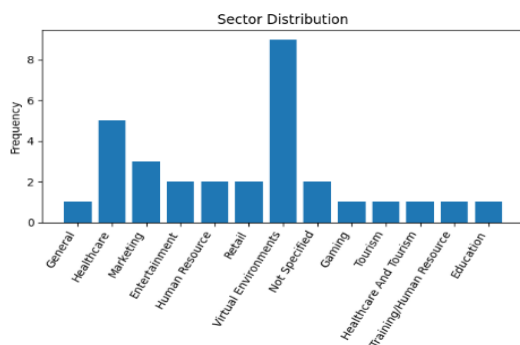
In addition, design and perception-oriented theories like Anthropomorphism Theory (Wang Y et al.,2026), Uncanny Valley Theory (Stamos A et al.,2025), Face Space Theory (Miller E.J et al.,2023), and Enclothed Cognition Theory (Huang Y et al.,2025) investigate how avatar appearance and human likeness impact biased emotional responses from trust to affinity to discomfort to eeriness. Signalling Theory (Huang Y et al.,2025) and Source Credibility Theory (Dondapati A, 2025) are used to further explain how avatars act as communicative cues, especially in marketing and virtual influencer settings. In theory, however, there is great diversity but in practice the literature is fragmented as most studies apply different standalone frameworks and there remains little integration across the technological, social and emotional triad. Moreover, with such fragmentation, there is potential for improved unity in the theoretical domain to provide a more holistic account of these emotive processes that occur through avatar experiences.

3.2. Context

In this systematic review, we include in our review a total of 32 studies. The latter context regarding sector and country is treated as follows:

(i) Sector: Avatar-driven investigation retains a full prevalence in both virtual environments and appears as mass literature about presence, embodiment and social interaction. In parallel to this, healthcare applications are a major area of use, with avatars being deployed for therapy sessions, clinical trials and emotion skill training. A significant amount of this work is framed in relation to marketing and consumer behaviour contexts including those engaged with virtual influencers and digital advertising, where avatars influence trust, engagement, and purchase intentions. Entertainment and gaming contexts, furthermore, emphasize avatar's ability to impact emotional and behavioural responses of users in organizational and human resource settings, meanwhile, illustrate

their increasing usage in work environments or as tools for employee training. Newer areas like retail, education, tourism and training further suggest the increasing relevance of avatars across different experience oriented and service-based industries. A few studies do not have clearly defined contexts, implying inconsistency in reporting. In summary, the evidence reveals that avatar research is mainly focused within immersive digital environments but continues to cross over into diverse areas of inquiry where avatars are used as flexible tools to influence emotional and behavioural responses.



(ii) Country: This review finds that research on avatar use is largely confined to developed economies, far less representation in the US dominates across the studies examined, attesting to its mature technology infrastructure, early adoption of immersive technologies and influential body of research around digital interaction and innovation. Furthermore, the increasing number of studies that came from Asian nations like China and South Korea leave their mark as they are the pioneers in these developments relating to virtual platforms and metaverse ecosystems, and digital consumers engagement. Several European nations including France, Germany, Spain, Finland and Greece also have literature related to the fields analysed which

appear moderately represented yet consistently so particularly in areas using experimental, psychological and immersive technologies. But many studies fail to clearly indicate the geographic context in which they are based, limiting opportunities for cross-cultural comparison and reducing the contextual clarity of findings.

3.3 Characteristics

Based on the existing literature concerning avatars and emotions, we synthesize empirical evidence to develop an integrated conceptual framework. The framework differentiates among central predictors, affective centric mediating processes, contextual and individual factors. In the sections that follow, we illuminate each of these components, and explain their interactions in light of the wider literature on digital avatars:

3.3.1 Independent Variables

Across the studies reviewed, independent variables generally fall into four categories: design factors, social behaviours and perceptions, psychological constructs, and context types that impact user interaction with avatars and virtual environments. A major stream of research focuses on avatar design properties like realism (Kim I et al.,2024) like form and behavioural realism, anthropomorphism (Blut M et al.,2024), geometric properties (spherical vs. cubic shapes) (Huang Y et al.,2025), attractiveness (Huang Y T et al.,2026), and visual cues such as gender, ethnicity or clothing (Rbeiz K S et al.,2025). Apart from appearance, research shows that factors related to communication, including valence (Wu J et al.,2017) of spoken language, vocal tone, and cross-modal alignment (Duan M et al.,2025) between the text and voice for emotion significantly matter. Social and relational factors such as intergroup interaction, experiences of inclusion vs. exclusion (Angerbauer K et al.,2025), parasocial interaction with avatars or virtual influencers are other key classes. In addition, we identity congruity (Cheng X et al.,2025), related constructs, such as self-image congruence (Huang Y T et al.,2026), perceived self-presentation, and privacy concerns among the primary antecedents that impact user responses. A series of studies also introduces constructs relating to motivation (Wang Y et al.,2026) and adoption like hedonic motivation (Kondrateva G et al.,2025), innovation and technological barrier and technical, social, and financial barriers, following the line of thought released by a technology acceptance research perspective. Finally, contextual and environmental

factors such as crowd behaviour (Bendiksen B *et al.*,2024), avatar roles such as expert vs non-expert (Sylaiou S *et al.*,2020), immersive conditions such as embodiment (Gall D *et al.*,2021) and presence modify user perceptions and behaviours even further. Collectively, these findings signal that avatar-related outcomes are influenced by a complex set of antecedents like design, social context, individual differences and technological conditions.

3.3.2 Dependent Variables

Overall, the dependent measures in the studies measured behavioural, psychological and perceptual outcomes of avatar interaction. The most common studies are in this cluster which broadly comprises intention to use (Stamos A *et al.*,2025), purchase intention (Kim I *et al.*,2024), on-going intention and metaverse actual usage or resistance (Wang Y *et al.*,2026). In marketing and social applications, outcomes include consumer behaviour such as intention to follow someone, purchase decisions, number of favourable reviews, and whether to befriend someone (Shin M *et al.*,2019). Additional studies focus on psychological and relational outcomes, including engagement, avatar connection (Angerbauer K *et al.*,2025), satisfaction, inclusion climate, and social self-efficacy (Suh A ,2024). A second major class of response is emotional (Sylaiou S *et al.*,2020), like Sadness, Disappointment, Shame, Anger, Relief, Admiration, Persuasiveness, Acceptance, Arousal, Valence, Dominance (Gall D *et al.*,2021) and perceptual in nature, including emotion recognition (Monferrer M *et al.*,2023), emotion acceptance or rejection, perceived social characteristics such as trustworthiness and friendliness (Rbeiz K S *et al.*,2025), etc.. In general, this body of research shows that avatar studies address more than just simple intentions to use the avatar, their results cover a rich variety of short and long-term outcomes from temporary affective reactions over behaviour to social decision making.

3.3.3 Mediators

Mediating mechanisms are of central importance as they explain the processes that translate avatar-related stimuli into behavioural and psychological outcomes. The most common mediators pointed out by various studies are: emotional engagement, including positive and negative affectivity (Angerbauer K *et al.*,2025), eeriness and coolness (Kim I *et al.*,2024), Emotional pleasure (Huang Y T *et al.*,2026), Emotional Information Synchronization (EIS) (Duan M *et al.*,2025) and Emotional

Attachment (Cheng X *et al.*,2025). The results demonstrate that affective processes are primarily underlying user reactions towards avatars. In addition to emotions, cognitive mediators like perceived credibility (Dondapati, A 2025), are also key factors in shaping the response especially in technology acceptance and marketing contexts. Another major category comprises social and relational mediators like parasocial interaction (Dondapati, A 2025), trust (Stamos A *et al.*,2025), avatar identification, which clarifies how users develop meaningful relationships with avatars. Additionally, a handful of studies present engagement related mediators that capture virtual engagement, travel confidence, and stress reduction (Hao F *et al.*,2025), suggesting that the extent to which individuals are experientially immersed impacts behavioural outcomes. It should be noted that many of the studies conceptualized intention as a mediator through which emotional or cognitive responses become behaviours. Overall, the findings across studies reinforce a process-based perspective wherein avatar related stimuli affect outcomes through embodiments that are emotional, cognitive, and relational in nature.

3.3.4 Moderators

Moderating variables in the studies reveal when avatar effects are more and less pronounced. One important set of moderators pertains to individual differences such as anthropomorphism tendencies (Stamos A *et al.*,2025), disability identity (Angerbauer K *et al.*,2025), other aspects of participant like experience, cultural background and psychological variables like mental health (Monferrer M *et al.*,2023). These elements play a role in how users perceive and engage with avatars. A second major category includes design and technological moderators, including behavioural realism (Kim I *et al.*,2024), virtual assistant type (intelligent vs. simple), communication mode (voice vs text) and avatar representation (avatar vs non-avatar) (Blut M *et al.*,2024). Some studies also uncover contextual moderators like resistance to change (Hao F *et al.*,2025), and emotional characteristics of content, as well as environmental conditions such as immersive settings or group dynamics. Moreover, presence related variables such as co-presence and embodiment act as moderators that enhance emotional and behavioural responses to virtual environments. Other studies demonstrate boundary conditions, like the uncanny valley effect (Wang Y *et al.*,2026), which modifies how realism affects user perceptions. Taken together, these

findings imply that avatar effects are on a very tight leash and may be quite fastened to the specifics of

both the stimuli, but also the user characteristics, technological configurations and situational context.



3.4 Methodologies

The variety of methods applied in the studies analysed shows notable heterogeneity, with a clear predominance for quantitative (mainly experimental) approaches, attesting to the relevance given by this field to establish causal relations between avatar features and user reactions. A large number of studies used controlled laboratory, virtual

reality (VR) and online experiments in productiveness, with between subjects, within subjects and mixed experimental designs to manipulate various features of avatars including their realism, animacy and emotional expression. These psychology studies were held on a variety of contexts from marketing, healthcare, gaming, education to immersive virtual environments.

Numerous studies also increased methodological robustness by adopting multi-study designs and complex statistical methods. Also, survey based methodologies such as cross-sectional, as well as longitudinal (panel data), were commonly employed to obtain user perceptions, attitudes and behavioral intentions with the use of validated scales across a broad range of diverse samples recruited through outlets such as Amazon Mechanical Turk and Prolific. In addition to these, meta-analytic and systematic review methods were ascertained with aggregated insights from numerous studies affirming the robustness of results.

The field also shows increasing use of qualitative, computational, and mixed method approaches beyond traditional quantitative methods. Qualitative designs (interviews, observations, think aloud protocols) were used to understand nuanced user experiences and to contextualize emotive and behavioural responses in immersive spaces. At the same time, computational approaches employing natural language processing (NLP), machine learning (ML) and deep learning techniques (e.g., BERT, CNN) were applied to process large scale user generated data and identify emotional trends. Importantly, multiple experimental studies included physiological and neuroscience-based assessments for example EEG, eye-tracking, and skin conductance which could provide objectivity measuring user's emotional or cognitive status. Additionally, mixed-method designs, in particular sequential multi-phase approaches were adopted to triangulate theory building with empirical validation. Despite this methodological diversity, some limitations remain including over reliance on student and online convenience samples, limited cross-cultural validation and relatively few longitudinal or real world field studies. This composite overview of methodological trends points toward a maturing research domain that increasingly mixes experimental rigor with technological advancements and methodological pluralism to gain insights into the multifaceted interplay of avatars, affects, and user behaviour.

4. FUTURE DIRECTIONS

Based on previous systematic reviews of (Paul et al.,2021) i, we apply the TCCM model to provide a structured future research agenda aimed at advancing the literature on avatars and emotions.

4.1 Theory (T)

The majority of research on avatars, influencers, and metaverse interaction is cushioned in established

frameworks like the Technology Acceptance Model and Proteus Effect. Although some of these theories have facilitated an understanding of user uptake and behavioural change, they predominantly focus on cognitive mechanics. Future work should strive toward integrative theoretical frameworks that engender simultaneous consideration of cognitive, emotional, and social processes. More specifically, emotion motives deserve to be embodied within a framing context, as previous literature demonstrates the impact of discrete emotions like empathy, fear, guilt, eeriness and coolness on user impressions. Scholars should also investigate the interplay between cognition and emotion by looking at how constructs from tradition, such as perceived usefulness or ease of use, interact with emotional responses to shape behavioral intentions

An additional concern regarding theory is this mystery around constructs like presence, embodiment, and realism. Studies often treat these constructs interchangeably or investigate them in isolation, restricting an understanding about their functioning within virtual experiences. Future research should seek to clarify these constructs both conceptually and empirically, on the presumption they can have unique but intertwined influences on emotional involvement and behavioural responses. Additionally, the body of literature highlights those theories based on identity and congruency (such as self-congruity, functional congruency and avatar identification) should be included in order to have a deeper understanding about user's perceptions and evaluations towards avatars.

Finally, future research should expand theoretical development to include social and moral aspects along with a more substantive temporal dimension. Studies have shown that interactions with avatars can shape moral judgments, empathy and social dynamics in ways resonant with theories from social cognition and moral psychology. Moreover, factors like nonverbal cues (e.g., eye contact, gestures) and verbal cues (e.g., emotional language) need further theoretical underpinning to elucidate their contributions towards perceived realism and relational outcomes. Recent studies have focused primarily on short-term reactions, neglecting how perceptions and behaviour may change over time. As a result, future research can benefit from applying longitudinal theoretical perspectives to differentiate between the instant affective responses and enduring attitudinal or behavioural shifts, ultimately providing a more thorough insight into the complex interplay between humans and avatars.

4.2 Context (C)

Most studies investigating avatars and virtual environments of up until now remain conducted in controlled, laboratory settings on student populations and within a single-platform context with low ecological validity and generalizability. Future research should venture into real-world and naturalistic environments, particularly across social media platforms and immersive metaverse ecosystems. Instagram, Youtube and future metaverse (virtual worlds) are dynamic user-generated platforms where avatar characters can interact intuitively. Studying avatar-based marketing, communication and engagement in such environments can give us deeper insight into how users respond in typical everyday exposure conditions. Exploring beyond the limitations of temporary experimental exposure and towards continuous and embedded engagement will improve the relevance and applicability of both future results.

Another contextual stretch involves diversifying domains of application and user segments. We encourage future research to explore avatars beyond gaming and, across multiple industries such as retail, tourism, healthcare, education and workplace collaboration. Avatars, for example, are utilized in virtual tourism experiences, online learning environments and professional metaverse platforms but their deployment across these sectors is not well researched. In addition, diverse participant groups (for example older adults, children, clinical populations and people with disabilities) are crucial to include because most findings are drawn from homogeneous samples. To make research results more inclusive and generalizable, individual differences between user groups in their perception and interaction with avatars need to be explored.

Lastly, future research should focus on cross-cultural and multi-platform contexts, as cultural and technological environments may significantly influence avatar perception and interpretation. The way avatar design elements are interpreted, emotional expressions recognized and interaction styles understood varies so much based on cultural norms that cross-cultural comparisons of these aspects are essential to making globally relevant inferences. Moreover, comparative studies across various virtual platforms such as social VR applications, gaming environments, or professional metaverse systems can show how platform affordances shape user behaviour and experience. New contexts, however, such as human-AI hybrid model interactions and multi-user virtual environments deserve some attention given their

introduction of novel dynamics around presence, collaboration and identity construction. The aim is to expand research across these diverse contexts to give a fuller and realistic portrait of avatar-mediated interactions.

4.3 Characteristics (C)

Future work should explore a wider and more nuanced range of avatar-related characteristics, as previous research has tended to focus on specific avatar features in isolation. Avatar realism is one of the most important dimensionalities, which can come in a wide range from over-the-top cartoonish representations to hyperrealistic ones. Beyond realism, specific design attributes including shape, gender, ethnicity, and visual appearance need more in-depth exploration because these attributes inform emotional responses, trust, and social judgments. Additionally, the influence of expressive and behavioural cues (face, gesture, eye contact, voice) which are important for conveying emotions and enhancing perceived presence is under-researched. Future research should also include verbal attributes, such as emotion and the way a person talks, which can heavily determine likeability and interaction outcomes regardless of visual appearance.

At the user level, future research needs to integrate a variety of individual differences that might moderate behavioural responses toward avatars. Previous studies show the significance of characteristics like personality traits, prior exposure to virtual worlds, demographics (e.g., age, gender and cultural background) and digital competence. User's psychological states, like anxiety, empathy and self-awareness, also influence how they perceive and interact with avatars. Of this, avatar identification, self-congruity, and identity alignment are most relevant to examining deeper psychosocial links between users and their avatars. But these influences are often ignored, at best treated as control variables rather than core constructs.

Finally, interaction-level characteristics, describing the interrelationship dynamics between avatars and users, also need to be studied further. Presence, embodiment, emotional contagion and social interaction dynamics are key constructs that inform and shape user experience but have been largely studied in isolation. Future investigations are needed to study the way in which these interactional factors co-evolve and influence the others over time, especially within immersive environments. Research must also examine interaction effects involving multiple avatars such as avatar design and user characteristics or emotional expressions and

contexts. A second important avenue is temporal dynamics including learning effects, habituation, and perception evolution across repeated interactions. Future work that considers attributes in a more holistic and integrative manner better actualizes current research, providing important insights into the underlying mechanisms of avatar-mediated experiences.

4.4 Methodologies (M)

Previous studies that investigate avatars and virtual environments are largely cross-sectional in design using self-report-based measures restricting causal inference and fearing common methods bias and external validity. Longitudinal studies, controlled experiments, and real-world field studies with a more dynamic lens can be conducted to capture this more evolving relational aspect of user-avatar interactions. Longitudinal methods are particularly pertinent to exploring the time-varying nature of perceptions, emotions, and behaviour in persistent metaverse environments. Furthermore, experimental designs that include well-described control conditions (e.g., human versus avatar comparisons and varying degrees of realism or interactivity) would promote evaluation of causal mechanisms and underlying processes.

A key methodological development has been the blending of objective and multimodal measures with conventional self-report tools. Future studies must include measures that capture physiological and behavioural dimensions like eye-tracking, EEG, or interaction logs, enabling access to deeper cognitive and emotional processes that may not be fully covered by reported data. For example, physiological signals can measure emotional responses (arousal, attention, engagement) more accurately than the most comprehensive self-report instruments while behavioural data (clicks, time spent, purchase behaviour) adds parallel validity to outcome variables. In addition, multimodal approaches that combine different types of data can offer a more nuanced understanding of user experiences and mitigate the risk of relying solely on subjective perceptions.

Third, future studies should use sophisticated analytics and mixed-methods to increase rigor and depth. Machine learning and natural language processing models can enhance the accuracy of emotional analysis, behavioural assessment, and Bayesian methods can provide increased flexibility to model complex relationships. Mixed-method designs that combine the quantitative with qualitative approaches may also shine a light on mechanisms and contextual factors more fully. It is also important

for researchers to employ diverse and non-convenience sampling strategies that capture a broad range of demographic and cultural groups. By embracing these methodological approaches, future work towards avatar and metaverse research can enhance how reliable, valid, and practical the findings will be.

5. IMPLICATIONS

This research has important implications for scholars and practitioners who wish to learn about emotions in avatar mediated interactions. Through the means of a framework-based systematic literature review following TCCM approach, the study consolidates current knowledge on avatars and emotions and paves the way for future research in theoretical, contextual, characteristics, and methodological axes.

5.1 Theoretical Implications

First, this review contributes to the theoretical understanding of avatar-mediated environments, by showcasing that user responses are grounded in a complex interplay between cognitive appraisals, emotional processes and design characteristics. Based on conceptual frameworks like cognitive appraisal theory, congruity theory, and socioemotional selectivity theory, the synthesis points out that avatars may provoke multi-dimensional emotional responses which encompass also positive such as involvement and attachment but also negative emotions like eeriness, distrust, paradox. Importantly, results refute the traditional belief that positive feelings solely drive technology usage; instead, negative and paradoxical emotions equally determine user perception, resistance and continuance behaviour.

Second, this review builds on prior literature by highlighting the contextual and user-dependent aspects of avatar effects. Avatars with positive outcome might not be universally applicable but are context and user characteristics specific. The synthesis shows that SST and anthropomorphism theories should be complemented with situational and demographic variables for a more thorough explanation of user behavior in virtual environments. In addition, the review notes that aspects like non-verbal cues, embodiment and realism impact social presence and emotions significantly despite current technologies not being able to reproduce real-life interactions fully which translates into a theoretical gap between virtual and physical social cognition.

Third, by reconceptualizing avatar design as a non-neutral psychologically loaded construct that shapes perception, attribution and behaviour, this review

adds to existing knowledge. The findings show that even subtle design elements like the geometry, realism and emotional expression, can influence trust, social judgments and decision-making. Furthermore, the review identifies key theoretical contradictions, for example, the uncanny valley effect, emotional misalignment and paradox of technological affordances in which features designed to enhance immersion may also expose participants to risks such as privacy concerns, discomfort and social threat. By incorporating these insights, the review offers a more integrated and dynamic lens through which to view avatars as socio-technical agents situated in complex emotional and behavioural ecologies.

5.2 Practical Implications

From the practical point of view, the findings imply organizations and designers should consider a context-sensitive and user-centred approach when it comes to designing and implementing avatars. Rather than expecting greater realism or emotional expressiveness to improve user experience across the board, practitioners should be working towards a fit between avatar characteristics, task context and user expectations. Emotional avatars, for example, may appear to be effective in relational contexts (healthcare or education), but reduce trust in transactional or utilitarian use cases. Also, too realistic may cause discomfort (the uncanny valley), which means that we should develop a balanced and calibrated design perspective.

Second, the review emphasizes emotional design, personalization and adaptability in avatar systems. Customized avatars, empathetic responses, and congruency between design elements can help increase user engagement, satisfaction with experience and behavioural outcomes. Furthermore, utilizing effective computing and real-time emotional monitoring might allow organizations to more effectively understand and address user's emotional states. But practitioners must also actively mitigate the negative experiences such as frustration, distrust and emotional discomfort with investment in safeguards, feedback mechanisms and supportive interaction designs.

Finally, the results highlight important organizational, ethical and social implications regarding implementation of avatar-based technologies. Organizations must develop governance

frameworks that spell out behavioural norms, privacy protections, and data security measures in order to ensure avatars are deployed safely and responsibly. This inclusivity and accessibility in the digital economy and access to this transformation are available for diverse user groups like older adults or people with disabilities and has no less significance for equitable adoption. This review also balances hedonic value (immersion or enjoyment) with functional value (effectiveness, efficiency and utility) to promote sustainable uptake. In summary, avatars can be successfully implemented when considering all these aspects as a whole.

6. LIMITATIONS AND CONCLUSION

Despite the application of a thorough and systematic technique guided by the SPAR-4 SLR protocol, as well as the TCCM framework, it needs to be highlighted that some limitations exist within this study. This review is limited to the Scopus database and uses. This review uses information only from English-language, peer-reviewed journals, which may create publication and language bias by excluding articles that are relevant but published in non-peer-reviewed or foreign-language sources. In addition, the specific key words ("virtual avatar" and "emotion") may result in overlooked relevant literature, and some subjective judgment is exercised when conducting screening. Generalizability may also be limited by the relatively small sample of 32 studies. However, the paper offers a well-organized and substantive synthesis of work on avatars and emphasizes the interaction between design as well as emotional, cognitive, and social factors in impacting user behaviour. Through the application of the TCCM framework, it contributes rich theoretical insights and meaningful groundwork for future studies in this fledgling area.

In conclusion, these findings and limitations highlight both the evolution of avatar emotion research and a call for studies with better coverage of databases, an integration of multiple disciplines, longitudinal designs, and cross-cultural validations in forthcoming reviews. These efforts are crucial to ensure the development of cumulative theory on emotional digital embodiment and enabling responsible deployment of emotionally expressive avatars within marketing, service, education, healthcare and metaverse ecosystems.

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