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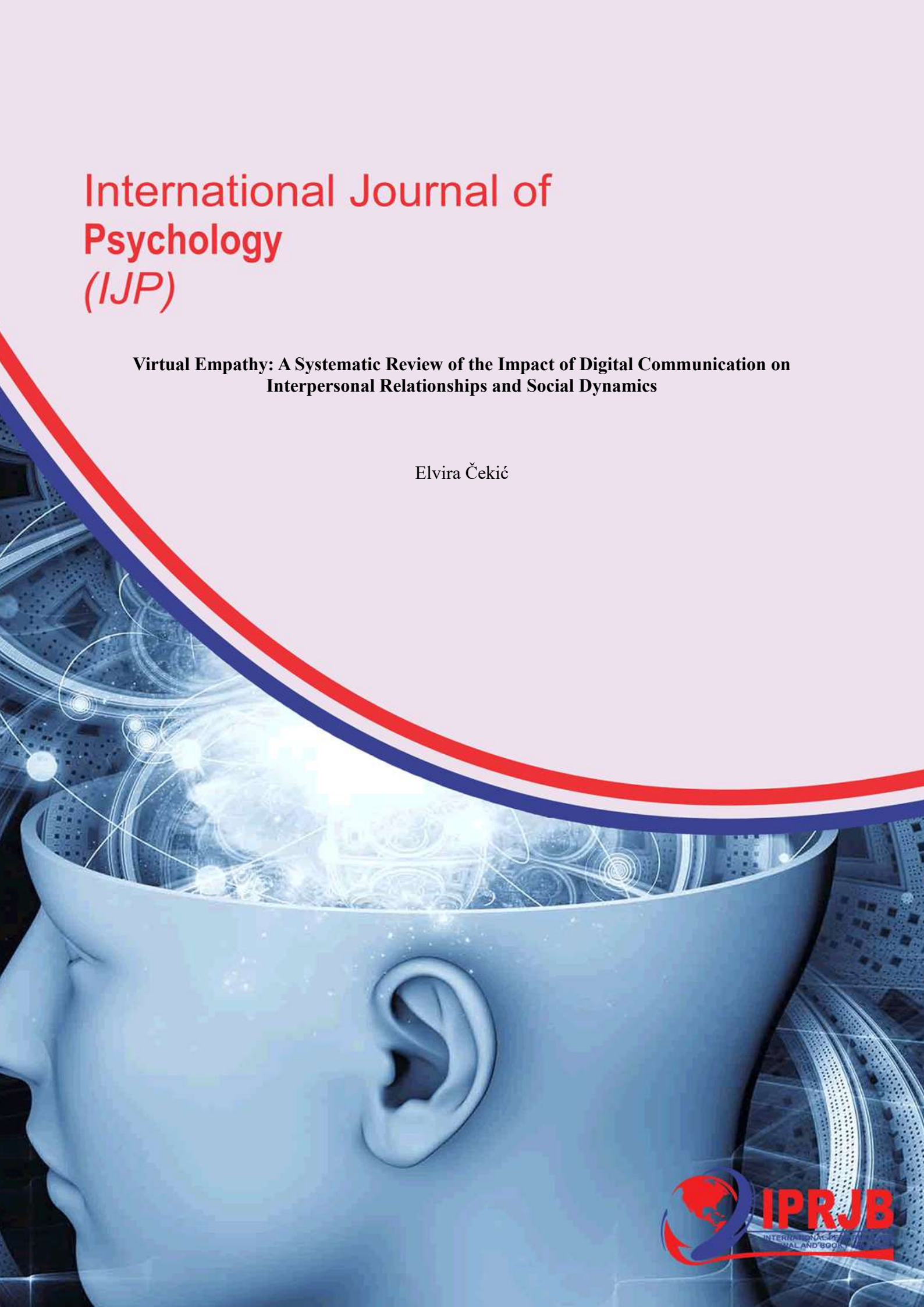

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Virtual Empathy: A Systematic Review of the Impact of Digital Communication on Interpersonal Relationships and Social Dynamics

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Abstract

Purpose: The aim of this systematic review is to determine how virtual empathy, as a multidimensional psychological construct, manifests within digitally mediated interactions and to examine its impact on emotional regulation, interpersonal relationships, and patterns of social connectedness. The analysis encompasses both cognitive and affective components of empathy, their variations depending on communication modalities, as well as empathy-related dysfunctions conditioned by technological factors. The review also includes studies that investigate the role of Artificial Intelligence (AI) and Virtual Reality (VR) in the modulation of emotional processes, moral evaluation, and neurocognitive sensitivity within digital contexts.

Methodology: This systematic review includes the analysis of 42 empirical studies published between 2013 and 2024, identified through a structured search of major scientific databases, including Scopus, Web of Science, PsycINFO, and Google Scholar. A qualitative content analysis was used to synthesize key findings, with a focus on psychological and neurocognitive mechanisms relevant to the phenomenon of virtual empathy. The selected studies span various research designs, experimental, longitudinal, survey-based, and meta-analytic, and examine digital mechanisms such as emojis, avatars, algorithmic content personalization, and interactive AI-based systems. The analytical approach is oriented toward identifying how digital environments compensate for the absence of nonverbal cues and mediate empathic processes through symbolic and immersive technologies.

Findings: The systematic review suggests that virtual empathy has a significant impact on emotional regulation and the quality of interpersonal relationships in digital contexts. Digital platforms, especially those utilizing Virtual Reality (VR), can facilitate the development of cognitive and affective empathy, particularly when the content stimulates perspective-taking and emotional resonance. However, specific limitations of digital communication, including the absence of nonverbal cues, emotional superficiality, and the dominance of algorithmically shaped "echo chambers," may substantially reduce the authenticity of empathic responses. Furthermore, chronic exposure to digitally mediated content may lead to gradual desensitization to others' emotions, potentially impairing moral sensitivity and eroding social cohesion.

Unique Contribution to Theory, Practice, and Policy: This review advances theoretical understanding through the synthesis of classical frameworks, such as Social Presence Theory and Media Richness Theory, with emerging constructs like simulated affectivity and algorithmic mediation, offering an enhanced model of digital empathy. It provides insights into how virtual environments shape moral reasoning, emotional regulation, and prosocial behavior. It provides insights into how virtual environments shape moral reasoning, emotional regulation, and prosocial behavior. At the practical level, it offers recommendations for the design of emotionally intelligent digital tools and educational programs aimed at preventing empathic desensitization. At the policy level, it highlights the need for ethical standards to regulate algorithmic content and promote inclusive, emotionally authentic communication. It also opens avenues for interdisciplinary research into the psychological implications of contemporary technologies.

Keywords: *Virtual Empathy, Digital Communication, Artificial Intelligence, Social Relationships, Cognitive and Affective Empathy.*

JEL Codes: *D91, I31, O33, Z13, L86*

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INTRODUCTION

Empathy represents a fundamental psychological capacity that enables individuals to recognize, understand, and appropriately respond to the emotional states of others. It is most commonly conceptualized through two dimensions: cognitive empathy, which refers to the ability to perceive and understand others' emotions and perspectives, and affective empathy, which involves emotional attunement and responsiveness to others' feelings (Ickes, 1997; Hatfield et al., 1993). These two components constitute the foundation for understanding virtual empathy, a contemporary form of empathic behavior emerging within digitally mediated communication environments.

In today's digital landscape where an increasing number of interpersonal interactions occur through computer-mediated communication (CMC) the notion of empathy is undergoing substantial transformation. Within this context, the concept of virtual empathy has emerged, defined as the capacity to recognize, interpret, and express emotions within digital interactions (Derks, Fischer & Bos, 2008). Since communication on digital platforms often lacks nonverbal cues such as facial expressions, eye contact, and body language, users develop alternative strategies for emotional expression and interpretation. These include the use of text, emojis, GIFs, images, voice messages, and avatars (Giles et al., 2024; Tang & Hew, 2019).

Cognitive empathy in this context is reflected in the ability to interpret written messages, tone, and communicative context, whereas affective empathy is manifested through quick emotional responses, such as supportive emojis, compassionate comments, or visual symbols (Modak & Nath, 2024). Technologies such as virtual reality (VR) and artificial intelligence (AI) are further transforming the domain of empathy by allowing users to immersively "step into" others' perspectives through simulations or interactions with emotionally intelligent chatbots (Giles et al., 2024). While these technologies may enhance emotional connectedness, they simultaneously raise concerns regarding the authenticity and ethical boundaries of such simulations.

Despite their potential to foster social support and connectedness, virtual empathy carries notable risks, including emotional superficiality, empathic desensitization, and the formation of algorithmic echo chambers that limit exposure to diverse viewpoints. This ambivalence calls for a thorough and critical examination of the ways in which digital technologies shape empathic behavior and influence the quality of human relationships.

Problem Statement

Despite growing academic interest in the concept of virtual empathy, the field remains both theoretically underdeveloped and empirically fragmented. Most existing studies focus on isolated aspects of digital communication, such as specific platforms, visual symbols, or particular technological applications, without offering an integrated understanding of the psychological and technological mechanisms that shape empathy in digital interactions (Derks, Fischer, & Bos, 2008; Tang & Hew, 2019; Giles et al., 2024).

This systematic review seeks to address the following key gaps identified in the relevant academic literature:

1. Lack of a Coherent Theoretical Framework

Although foundational models such as Social Presence Theory and Media Richness Theory have been applied to digital contexts, there is still no comprehensive model that explains how traditional dimensions of empathy (cognitive and affective) are transferred and transformed

within computer-mediated communication (Walther & D'Addario, 2001; Modak & Nath, 2024).

2. Fragmentation of Empirical Findings

Existing research is often limited in scope and focuses on individual tools (e.g., emojis, chatbots), lacking an integrative analysis of how diverse digital technologies including VR, AI, avatars, and multimodal interactions, collectively influence empathic behavior (Gitto-Kania Tami, 2023; Abd-Alrazaq et al., 2020; Canet & Sánchez-Castillo, 2024). In addition, comparative or longitudinal studies remain scarce, particularly those examining sustained empathic engagement across platforms.

3. Ethical and Emotional Implications

Issues such as the authenticity of emotional expression, emotional superficiality, and moral responsibility in digital interactions remain underexplored. For instance, Seitz (2024) notes that users often perceive simulated empathic responses from AI systems as inauthentic, which may diminish affective resonance and user trust. Similarly, Lozada & Tynes (2017) suggest that long-term digital interaction can result in empathic desensitization, though few studies investigate its broader psychosocial consequences.

Research Questions Derived from the Identified Gaps

The formulated research questions guide the analytical framework of the review and enable a focused examination of key concepts within the existing literature. They delineate the thematic domains that this systematic review seeks to address through the synthesis of relevant theoretical and empirical sources. Based on the previously identified research gaps, the following research questions are proposed:

1. How are the traditional dimensions of empathy (cognitive and affective) transformed in technologically mediated interactions?
2. Which digital elements facilitate or inhibit authentic empathic responses?
3. What are the moral and psychological implications of AI- and VR-mediated forms of empathy?

Potential Users of This Review

This review is relevant to the following groups:

- Academic researchers in psychology, communication, media, and technology studies, who require an integrated theoretical and empirical framework to guide further investigation into virtual empathy and its implications for socio-emotional functioning;
- Educational and psychological institutions, which may develop programs aimed at enhancing emotional literacy and fostering empathy in digital environments, particularly among youth and digitally native populations;
- Developers and designers of digital tools, for whom these findings may serve as a foundation for creating emotionally intelligent and ethically responsible technological systems.

Theoretical Framework

The theoretical basis of this systematic review lies in the integration of classical communication theories and contemporary psychological concepts, which together allow for a multidimensional understanding of the phenomenon of virtual empathy in digital interactions.

The framework begins with Social Presence Theory, developed by Short, Williams, and Christie (1976). This theory posits that the quality of interpersonal communication depends on the perceived presence of the interlocutor, encompassing not only physical but also emotional and psychological components. In digital interactions, which are often devoid of rich nonverbal cues such as facial expressions, body language, and tone of voice, the sense of social presence may be diminished. Thus, this theory offers valuable insight into the challenges of affective resonance, particularly in the context of attempting to establish empathy through digitally mediated communication channels.

Building on this foundation is Media Richness Theory, proposed by Daft and Lengel (1986), which classifies media based on their capacity to convey complex and emotionally charged messages. According to this theory, the richer a medium is in terms of its ability to transmit verbal, visual, and auditory information simultaneously, the better it is suited for communicating subtle emotional nuances and facilitating empathic responses. In the context of virtual empathy, this theory is especially useful for analyzing differences between "leaner" media (e.g., text messaging) and "richer" forms of communication (e.g., video calls, VR simulations, interactive AI systems).

A contemporary addition to this framework is the concept of emotional intelligence, which defines empathy as a core component of emotional and social competence. Drawing on the work of Goleman (1995), empathy is seen not only as emotional attunement to others but also as the ability to regulate one's own emotional responses, an ability particularly relevant in digital interactions that often lack immediate feedback. In digitally mediated environments, emotional intelligence enables users to more effectively shape and adapt their empathic behavior, using digital tools to preserve emotional authenticity and interpersonal connectedness.

These three theoretical foundations enable a structured analysis of the cognitive, affective, and technological dimensions of virtual empathy and provide the basis for conceptual extensions, including constructs such as algorithmic mediation and simulated affectivity.

Objectives

The aim of this systematic review is to consolidate theoretical and empirical insights into virtual empathy in digital interactions and to provide an analytical framework for assessing its implications.

Accordingly, the following research objectives have been established:

1. To systematize existing theoretical and empirical knowledge on the psychological and neurocognitive mechanisms of virtual empathy, focusing on the cognitive, affective, and behavioral dimensions of this phenomenon.
2. To analyze the impact of digital communication tools and platforms on the cognitive and affective components of empathy, identifying key factors that facilitate or hinder emotional connectedness in virtual contexts.
3. To evaluate the positive and negative implications of virtual empathy for social relationships, including risks such as emotional superficiality, empathic desensitization, and polarization, as well as its potential to enhance social cohesion and emotional support.

4. To propose guidelines for the development and optimization of digital communication technologies (e.g., AI and VR) aimed at enhancing virtual empathy, while taking into account ethical standards and practical challenges.

In order to systematically examine these dimensions, a methodological framework has been adopted to enable a comprehensive analysis of theoretical and empirical findings related to virtual empathy. The following sections outline the research approach, including search criteria, study selection, and analytical procedures.

METHODOLOGY

This systematic review adopts a multidisciplinary approach, drawing on insights from psychology, cognitive neuroscience, communication sciences, and media studies to provide a comprehensive understanding of the phenomenon of virtual empathy. The primary objective was to synthesize existing empirical and theoretical findings that address the cognitive, affective, and behavioral aspects of virtual empathy and to analyze its impact on the dynamics of social interactions in digital environments.

The search was conducted using reputable academic databases, including Scopus, Web of Science, PsycINFO, and Google Scholar, employing a pre-defined search syntax to ensure that the included sources were relevant and of high academic quality. The search included combinations of the following key terms and operators:

("virtual empathy" OR "digital empathy") AND ("online communication" OR "social media" OR "computer-mediated communication") AND ("emotional connection" OR "affective response" OR "perspective-taking").

This syntax enabled the inclusion of a broad range of studies investigating virtual empathy across various digital contexts, including social media, virtual reality, artificial intelligence, and other forms of digital interaction. Additionally, filters were applied to narrow the search to empirical studies published between 2013 and 2024, with duplicates and irrelevant sources removed.

The analysis included literature reviews, longitudinal studies, experimental and correlational research examining the cognitive, affective, and behavioral dimensions of empathy in digital interactions. The focus was placed on publications from 2013 to 2024 to ensure relevance and the inclusion of the most up-to-date research in this field.

To ensure that only methodologically valid and thematically relevant studies were included in the analysis, clearly defined inclusion and exclusion criteria were applied:

Inclusion Criteria:

- Studies that directly investigate virtual empathy and its impact on interpersonal relationships.
- Studies employing validated measures of empathy within the context of digital communication.
- Studies analyzing changes in emotional connectedness resulting from the use of digital technologies.
- Empirical studies published in peer-reviewed academic journals.

Exclusion Criteria:

- Studies that do not explore the psychological aspects of virtual empathy (e.g., technical analyses of AI systems simulating empathy).
- Papers that have not undergone a peer-review process or are published in non-indexed journals.
- Studies focusing solely on ethical, philosophical, or sociological discussions without empirical data.
- Literature reviews that do not include original empirical data.
- Studies older than 2013, unless providing a key theoretical framework relevant to the analysis.

Study Selection Process

A total of 5,462 studies were identified through searches of academic databases (Scopus, Web of Science, PsycINFO, and Google Scholar) that met the initial search criteria.

Duplicate Removal:

After removing duplicate entries from different databases, 4,102 unique records remained.

Title and Abstract Screening:

Based on the aforementioned exclusion criteria, studies that did not explicitly examine virtual empathy, focused primarily on the technical aspects of digital platforms, or did not include empirical data were eliminated, leaving 738 relevant studies.

Detailed Assessment of Methodological Validity:

From the remaining 738 studies, additional criteria were applied to ensure a high level of methodological rigor. Studies included at this stage had to:

- Use validated measures of empathy and digital interaction.
- Clearly define samples and analytical methods.
- Report results with appropriate statistical analyses.

After detailed assessment of methodological validity and theoretical relevance, 42 studies were included in the final analysis. The remaining studies were excluded due to methodological limitations (e.g., lack of clearly defined variables, weak control of research conditions, or limited generalizability of findings).

These criteria ensured that the final analysis included only studies offering insights into the psychological, cognitive, and affective dimensions of virtual empathy, while studies irrelevant to the research objectives were excluded during earlier stages.

The study selection process is illustrated in the PRISMA diagram (Figure 1), which shows the number of studies identified, the number of studies excluded after abstract and full-text screening, and the final number of studies included in the systematic review.

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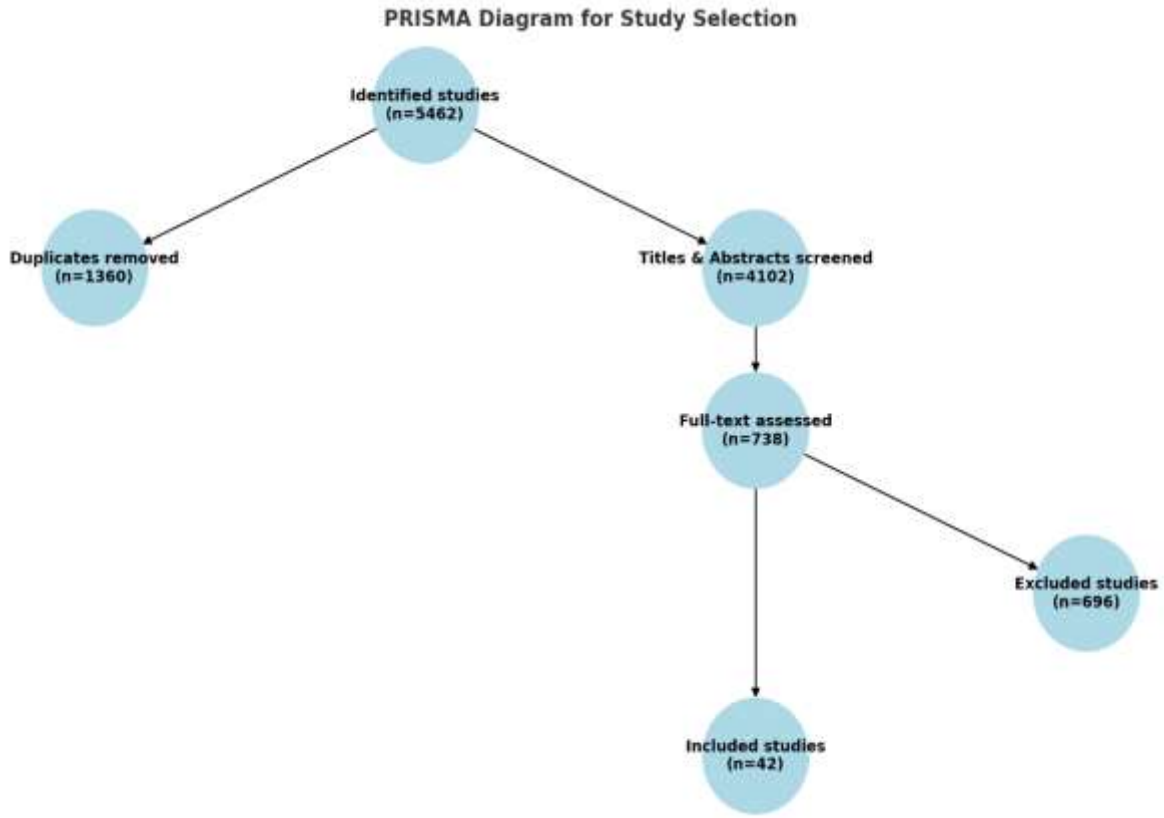

Figure 1: PRISMA Flow Diagram for the Study Selection Process

Descriptive Statistics

The temporal distribution of publications on virtual empathy from 2013 to 2024 is illustrated in Figure 2, which displays both annual and cumulative publication trends over the specified period**.**

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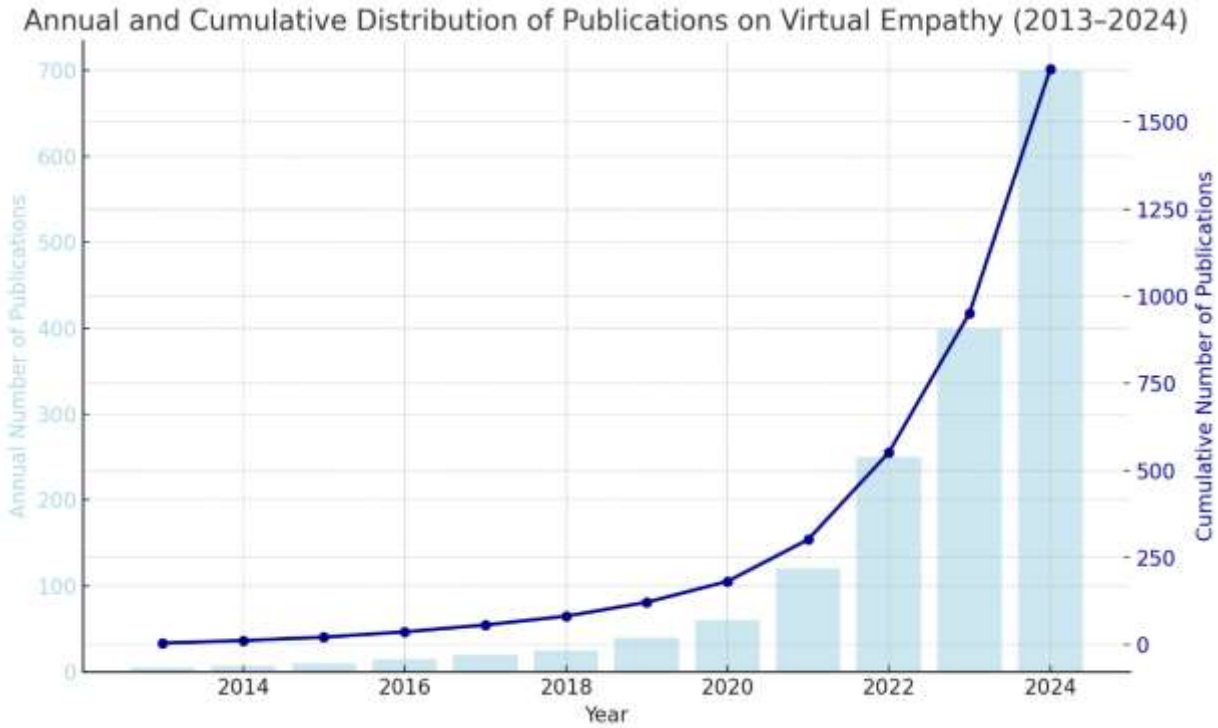

Figure 2: Annual and Cumulative Publications on Virtual Empathy (2013–2024)

Analysis of Research Trends on Virtual Empathy (2013–2024)

Based on the annual distribution of publications on virtual empathy from 2013 to 2024, key trends can be identified that indicate a growing interest in this field of research. In the initial years, from 2013 to 2017, the number of studies remained notably low and stable, with only one publication in 2013, four in 2014, and five studies each year from 2015 to 2017. This relatively modest academic interest suggests that the concept of virtual empathy was in its nascent stage of exploration during this period, while dominant research efforts remained focused on traditional forms of empathy.

From 2018 onwards, a slight increase in scholarly interest becomes evident, with 19 studies published in that year, and a similar trend continuing into 2019 with 35 studies. However, a more significant rise occurs in 2020, when the number of publications reaches 92—a development likely associated with global shifts in communication patterns caused by the COVID-19 pandemic. Given the increased reliance on digital platforms during this time, the academic community showed heightened interest in understanding how digital communication shapes emotional connectivity and interpersonal relationships.

In the following years, the growth in research became even more pronounced. In 2021, 135 studies were published, followed by a substantial rise in 2022 with 335 publications. The peak of research interest was reached in 2023, with as many as 725 papers published, confirming the status of virtual empathy as a relevant and dynamic area of inquiry. In 2024, a slight decline is observed, with a cumulative total of 878 publications at that point and 153 new studies published that year. This decrease may signal a phase of stabilization in the field, with a potential shift in focus toward more specialized topics, such as the impact of artificial intelligence (AI) and virtual reality (VR) on the development of empathic processes.

The total cumulative number of studies published between 2013 and 2024 clearly demonstrates an exponential growth of interest in virtual empathy, with the last three years contributing the most significant scholarly output in this area.

These findings underscore the exponential rise of research related to virtual empathy, particularly in the past decade. This trend may be attributed to the increasing importance of digital communication in contemporary societies and to technological advances such as virtual reality and artificial intelligence, which offer new insights into the psychological processes underlying emotional connection in digital spaces.

Identification and Selection of Studies

Table 1. presents the number of studies identified in four academic databases, along with the number of studies that passed the final selection according to predefined relevance criteria. A total of 5,462 studies were identified, but only 42 studies (0.77%) were evaluated as relevant for the final analysis.

- The Scopus database yielded the highest number of identified studies (1,890), of which 15 studies were selected (0.79%).
- Web of Science contributed 1,276 studies, with 10 assessed as relevant (0.78%).
- PsycINFO had the fewest relevant studies (8), although a total of 1,014 studies were identified (0.79%).
- Google Scholar contributed 1,282 studies, with 9 deemed relevant (0.70%).

It is noteworthy that Scopus and Web of Science collectively account for the majority of selected studies (25 out of 42, representing 59.5%). This emphasizes their importance in identifying high-quality research related to virtual empathy.

Table 1: Number of Studies Identified in Academic Databases and Selected for Analysis

Database	Number of studies found	Number of relevant studies after selection
Scopus	1890	15
Web of Science	1276	10
PsychINFO	1014	8
Google Scholar	1282	9
Total	**5462**	**42**

(Note: The number of studies selected for the final analysis represents the most relevant works that fully meet the established criteria.)

Overview of Included Studies

Table 2. provides a detailed overview of the key characteristics of the selected studies, including authorship, year of publication, methodological approach, and main findings. These studies encompass a variety of methodological designs, including experimental, longitudinal, survey-based, and meta-analytic approaches.

Experimental studies enabled the analysis of causal relationships and specific effects of digital communication on the development of virtual empathy, while longitudinal studies offered insights into changes in this phenomenon over time. Survey-based studies utilized large samples to identify behavioral patterns and user perceptions across digital platforms, whereas

meta-analyses synthesized data from multiple individual studies, allowing for broader generalization of findings.

Out of the 42 selected studies, 11 key studies were chosen for in-depth analysis based on their methodological rigor and relevance to the defined research objectives. This selection ensured high reliability of findings and a focused examination of the most pertinent aspects of virtual empathy, thus guaranteeing that the study encompasses the strongest empirical evidence available.

Studies that were not included in the final analysis failed to meet all inclusion criteria. For example, some exhibited methodological weaknesses, such as poorly defined variables, limited sample sizes, or insufficient control over experimental conditions. Additionally, certain studies were excluded due to repetitive findings or a lack of theoretical relevance to the specific research questions addressed in this review.

This selection process allowed for the analysis of studies that provide the most robust evidence regarding the impact of digital interaction on the various dimensions of empathy- cognitive, affective, and behavioral.

Table 2: Key Characteristics of Studies Included in the Systematic Review on Virtual Empathy

Author (Year)	Study Design	Sample	Digital Context	Key Findings
Powel & Roberts (2017)	Longitudinal	100 participants	Social media	Cognitive empathy increases in online interactions when emotional content is explicitly expressed.
Chen & Ibasco (2023)	Experimental	84 participants	Virtual reality (VR)	VR simulations enhance both cognitive and affective empathy, especially when users take on the perspectives of marginalized groups.
Gitto-Kania Tami (2023)	Survey-based	1060 participants	Online support groups	Digital empathy fosters social support, but emotional connection remains superficial due to the lack of nonverbal cues.
Abd-Alrazaq et al. (2020)	Meta-analysis	12 studies	Digital communication platforms	AI chatbots demonstrate cognitive empathy but lack authentic emotional responses, limiting affective connection.
Canet & Sánchez-Castillo (2024)	Meta-analysis	43 studies 5390 participants	Immersive media	Immersive media significantly enhance prosocial responses, with first-person immersive experiences (IFPEs) being more effective than witnessing experiences (IW) in fostering empathy and perspective-taking. Higher immersion levels increase the sense of presence, further amplifying prosocial effects.
López-Faican & Jaen Montaner (2024)	Experimental	34 participants	Gaming environments	Gamified interactions increase engagement and foster perspective-taking but may reinforce competitive behaviors over empathy.
Seitz (2024)	Experimental	177 participants	AI chatbots	AI tools can enhance emotion recognition in digital interactions, but challenges regarding authenticity remain.
Li & Zhang (2024)	Longitudinal	35000 posts/screenshots	Forums and discussion groups	Participants develop emotional sensitivity through repeated interactions in online forums.
Lozada & Tynes, (2017)	Longitudinal	337 participants	Interactive platforms	Long-term online interaction develops specific patterns of empathy.
Place et al. (2017)	Longitudinal	73 participians	Mobile applications	Mobile applications improve social connectedness but create a risk of emotional exhaustion.
Ellis, Campbell & Sethi (2011)	Experimental	39 participants	Online therapy programs	Online therapy programs facilitate emotional expression in individuals with anxiety and depression.

An analysis of the eleven key studies included in the systematic review reveals the complex dynamics of virtual empathy within digital interactions, with identifiable patterns across the cognitive, affective, and behavioral dimensions of this phenomenon. The application of

experimental, longitudinal, survey-based, and meta-analytic approaches enabled a comprehensive understanding of the various facets of digital empathy.

The studies consistently suggest that digital communication activates specific cognitive and affective mechanisms for recognizing and expressing empathy. The longitudinal study by Powel & Roberts (2017) demonstrates that cognitive empathy in online interactions increases when emotional content is explicitly expressed through language, whereas affective empathy remains limited due to the absence of nonverbal cues. These findings support the argument that digital empathy relies on adapted information-processing mechanisms that differ from those involved in face-to-face interactions. The experimental study by Chen & Ibasco (2023) complements these insights by showing that virtual reality (VR) allows users to engage in deeper emotional resonance when assuming others' perspectives, thereby fostering both cognitive and affective empathy.

Beyond the influence of VR, evidence suggests that different forms of digital communication have differentiated effects on users' empathic responses. The study by Gitto-Kania Tami (2023) finds that digital support groups foster cognitive empathy through the exchange of experiences and advice, but the lack of nonverbal cues reduces affective bonding among participants. This implies that digital communication may enable emotional understanding but hinder emotional immersion, which can have implications for the quality of interpersonal relationships. The meta-analysis by Abd-Alrazaq et al. (2020) confirms that AI chatbots can simulate cognitive empathy through recognition of users' emotional tone, yet they lack authentic affective responses, limiting the depth of emotional connection typically found in face-to-face interaction.

Furthermore, most of the analyzed studies confirm the dual nature of virtual empathy. The longitudinal study by Lozada & Tynes (2017) shows that long-term online interactions can develop specific empathic patterns that support the maintenance of social ties. However, the same process may also lead to empathic desensitization, where individuals become less sensitive to others' emotional expressions an effect with potential long-term consequences for social relationships, particularly in the context of frequent digital interaction. These findings underscore the need for a more nuanced understanding of the conditions under which digital empathy produces positive or negative outcomes.

Certain digital interaction formats, such as gamified environments, can significantly shape users' empathic responses. The meta-analytic study by Canet & Sánchez-Castillo (2024) found that immersive media significantly enhance prosocial responses, with first-person immersive experiences (IFPEs) proving more effective than witnessing experiences (IW) in stimulating empathy and perspective-taking. This finding highlights that direct experiential simulation of another's experience has a stronger impact on prosocial behavior than passive observation. On the other hand, the experimental study by López-Faicán & Jaén Montaner (2024) examined the role of gamification in empathy development and showed that while games can enhance perspective-taking abilities, they may simultaneously encourage competitive behaviors at the expense of emotional connectedness. The implementation of multiplayer cyber-physical gaming environments using augmented reality (AR) had a positive impact on empathy and prosocial behavior in secondary school students by allowing interaction through scenarios that stimulated affective, cognitive, reflective, and social dimensions of empathy.

Given that digital technologies can have both positive and negative effects on empathy, it is essential to develop strategies that enhance their application in ways that promote rather than hinder emotional connection. Abd-Alrazaq et al. (2020) emphasize the need for ethical

guidelines to ensure that AI tools support rather than replace authentic human interaction, by facilitating emotional expression rather than imitating it. Seitz (2024) further cautions that expressions of empathy requiring experiential capabilities or complex awareness are perceived as inauthentic by users, who do not believe that chatbots possess such capacities - potentially undermining trust and willingness to engage with these systems.

The analysis of these key studies confirms that virtual empathy is a multifaceted phenomenon that can enrich interpersonal relationships but also pose risks to their quality depending on how digital tools are implemented. Experimental and longitudinal studies indicate that certain technologies such as VR simulations and digital support platforms can foster the development of both cognitive and affective empathy through immersive and interactive experiences. Conversely, survey-based and meta-analytic research highlights challenges such as empathic desensitization, superficial emotional responses, and emotional manipulation especially in the context of AI systems that simulate empathic responses without achieving authentic emotional resonance. These findings emphasize the importance of thoughtful design of digital platforms to maximize the benefits of virtual empathy while minimizing potential risks to the quality of human relationships.

Despite the above findings, it is important to highlight certain methodological limitations of the included studies. Some studies relied on small or convenience samples, which limits the external validity of their conclusions. Moreover, there is considerable inconsistency in how empathy is operationalized and measured, making it difficult to compare findings across studies. In addition, several experimental studies demonstrated insufficient control over contextual variables, while longitudinal research often covered short time frames, which are inadequate for identifying long-term patterns. Finally, some studies exhibited weak theoretical grounding and limited integration with broader conceptual frameworks of digital empathy.

Discussion

The analysis of the results confirms the growing scientific interest in the phenomenon of virtual empathy over the past decade, which can be attributed to the rapid development of digital technologies and the transformation of interpersonal communication methods. Digital platforms and tools for online interaction have redefined the dynamics of social relationships, enabling researchers to explore more deeply how empathy manifests in virtual environments. In line with the first research question, the studies included in this review suggest that the psychological and neurocognitive mechanisms shaping empathy in digital interactions are adapted to the absence of nonverbal cues. Experimental research shows that cognitive empathy remains relatively stable in digital communication, whereas the affective component is often weakened due to limited access to emotional signals.

Analyzing the impact of digital communication on cognitive and affective aspects of empathy (the second research question), clear differences can be observed between textual and audiovisual interactions. Research based on virtual reality (VR) suggests that perspective-taking can be encouraged in simulated environments, allowing users to experience deeper emotional resonance and connection with others. However, studies conducted on social media and through chat-based communication indicate that interactions often remain superficial when not accompanied by additional nonverbal elements. The absence of facial expressions and vocal intonation may reduce the intensity of affective responses and hinder the development of deeper emotional bonds among users.

A comparative analysis of the included studies further highlights the differences in how specific technologies affect various dimensions of empathy. While Chen and Ibasco (2023) experimentally demonstrate that VR simulations foster both cognitive and affective empathy by enabling users to emotionally identify with others' perspectives, the longitudinal study by Powel and Roberts (2017) emphasizes that VR has a more pronounced effect on cognitive empathy, whereas affective responses remain limited without additional social stimulation. Similarly, although Abd-Alrazaq et al. (2020) confirm that AI chatbots effectively simulate cognitive empathy, Seitz (2024) points out that users perceive such responses as inauthentic, which diminishes affective resonance and undermines trust in digital interaction. These contrasting findings should be carefully considered in relation to technological design and the specific conditions of digital communication.

The evaluation of the positive and negative implications of virtual empathy on social relationships (the third research question) points to the ambivalent effects of digital platforms. On the one hand, they can significantly enhance the availability of social support, particularly in crisis situations such as pandemics or socioeconomic hardships. Online support groups, therapeutic communities, and digital forums enable users to share emotions and foster a sense of togetherness, thereby reducing social isolation. On the other hand, excessive digital communication may lead to digital fatigue, reducing sensitivity to the emotions of others. Furthermore, algorithm-driven "echo chambers" can foster selective empathy, wherein users develop deeper emotional bonds within their digital communities while becoming less open to diverse perspectives. This may result in polarization and a decline in universal empathy, with long-term consequences for social cohesion.

Consideration of strategies for improving digital tools in the context of empathy expression (the fourth research question) points to the necessity of technological innovations that can enhance the perceived authenticity of emotional responses in digital interactions. Advances in artificial intelligence and VR technologies could enable more faithful emotional expression, but it is crucial to establish ethical guidelines to ensure that digital tools contribute to, rather than replace, authentic human interactions. In this context, hybrid models of communication that combine textual and audiovisual elements represent a promising approach to improving the perceived authenticity of empathic responses and mitigating the limitations of digital communication.

Overall, the research findings confirm the dual nature of virtual empathy. While digital platforms offer new possibilities for developing social connection and support, they also introduce challenges that may limit the depth and quality of emotional interactions. The empirical literature clearly shows that digital technologies are not passive tools that simply facilitate empathic exchange, but rather actively shape cognitive and affective patterns of interaction. Depending on how they are used, virtual empathy can serve as a powerful tool for strengthening social connection or, conversely, result in superficial emotional reactions and reduced sensitivity to the emotions of others.

In this context, it is necessary to systematically investigate the long-term effects of digital interactions on emotional regulation and social cohesion. Further empirical analyses should focus on longitudinal approaches to precisely identify the psychological and neurocognitive mechanisms that mediate these processes, thereby enabling a theoretically grounded and empirically supported application of digital tools in fostering authentic and sustainable empathic interactions.

Ethical Challenges and Recommendations for the Sustainable Development of Virtual Empathy

Virtual empathy holds significant potential for enhancing digital interpersonal relationships, yet it simultaneously raises profound ethical challenges. For example, the findings of Gitto-Kania Tami (2023) show that digital empathy in online support groups often remains superficial due to the absence of nonverbal cues and limited personalization. This "empty" emotional connection may particularly affect vulnerable groups such as socially isolated individuals and the elderly who rely heavily on digital tools for emotional support. Similarly, Abd-Alrazaq et al. (2020) emphasize that although AI chatbots demonstrate cognitive empathy through the recognition of users' emotional tones, they lack authentic emotional resonance, thereby limiting their ability to support deeper affective empathy. Given these challenges, it becomes necessary to establish sustainable guidelines for the application of AI technology in emotional interactions.

The findings of Chen & Ibasco (2023) suggest that virtual reality (VR) simulations, which allow users to "embody" the perspectives of marginalized groups, can enhance both cognitive and affective empathy. However, these technologies require thoughtful implementation to avoid reinforcing stereotypes or inducing emotional fatigue. In a longitudinal study, Lozada & Tynes (2017) highlight that long-term digital interactions can develop specific patterns of empathy, but may also lead to empathic desensitization, raising critical questions about the sustainability of virtual relationships, especially among younger generations.

Educational programs designed to address these challenges also show promising results. Powel & Roberts (2017) advocate that the explicit expression of emotional content in digital interactions can improve cognitive empathy, but only if accompanied by mechanisms that enable affective resonance. Likewise, Seitz (2024) points out that perceptions of authenticity and credibility are key factors in developing empathic responses in interactions with chatbots.

Regulatory frameworks governing the use of AI technologies in digital interactions are equally important. Mittelstadt (2019) recognizes the significance of algorithmic transparency, clear labeling of AI-generated content, and robust user privacy protection. These measures can minimize the potential misuse of AI technologies and ensure that they support rather than exploit human emotions.

Algorithmic recommendations have a significant impact on the development of empathy, as they shape the emotional landscape of digital interaction. Mechanisms such as content personalization, user behavior tracking, and automated post ranking can lead to the creation of "echo chambers" - digital environments in which users are continuously exposed to content that reinforces their existing views, while alternative perspectives are suppressed or rendered invisible. This limitation in exposure reduces opportunities for perspective-taking and empathic understanding toward others. For example, a user who frequently engages with content related to their own social group may become less sensitive to the narratives and emotions of marginalized communities. Conversely, algorithmic systems that promote diversity and intentional exposure to different experiences, such as intercultural narratives, testimonies, or simulations, can contribute to the development of a more inclusive and emotionally enriched form of digital empathy.

Although AI and VR technologies provide significant opportunities to enhance virtual empathy, their implementation requires careful consideration of the ethical and social implications highlighted in the reviewed studies. The findings indicate the dual nature of digital empathy:

while it facilitates emotional connections and global accessibility, it also risks undermining the authenticity of those interactions. Further scientific and technological progress must prioritize maintaining a balance between these opportunities and the preservation of emotional depth and ethical integrity in human relationships.

Conclusion

The findings of this systematic review demonstrate that cognitive empathy is relatively well conveyed in digital communication, particularly when emotional content is clearly expressed through language and symbolic cues. However, affective empathy remains more sensitive to the limitations of digital media, especially the absence of nonverbal signals, which restricts emotional resonance and the depth of interpersonal connection.

These review highlight the complex dynamics between digital technologies, emotional connectedness, and social relationships, while simultaneously raising questions about the long-term impact of virtual empathy on emotional well-being and social cohesion. Digital tools such as emojis, VR simulations, and AI chatbots offer potential for facilitating social support and strengthening emotional bonds, especially in crisis situations. Yet, the results indicate that empathy in digital interactions is often reduced to superficial emotional exchanges, primarily due to the lack of nonverbal cues and algorithmically mediated connections.

A critical question remains: Can technology, which inherently limits deep emotional expression, sustainably support authentic human relationships, or are we risking a diminished sensitivity to others' emotional needs? The psychological challenges of virtual empathy are further intensified by algorithmic echo chambers, which reinforce cognitive bias and reduce users' exposure to diverse perspectives. In the long term, this phenomenon may lead to fragmentation of social relationships and a decline in universal empathy, thereby undermining the foundations of prosocial behavior in digital contexts.

Technologies such as emotionally intelligent chatbots and VR simulations demonstrate potential to enhance empathic responses, but their ethical application requires particular caution. It is essential to investigate to what extent AI tools can replicate the affective components of empathy without compromising authenticity and moral values. Algorithmic transparency, privacy protection, and clearly defined boundaries between human and AI communication are critical factors in minimizing risks of manipulation and user dehumanization.

Although digital tools offer new opportunities for emotional connection, face-to-face interactions remain irreplaceable in preserving authenticity, emotional sensitivity, and moral responsibility. Virtual empathy should not serve as a substitute but rather as a complement to traditional forms of human connection.

Future research should focus on longitudinal analyses of the psychological and social implications of virtual empathy, employing methodological approaches that incorporate experimental designs and qualitative analysis. It is essential to examine causal relationships between the use of digital tools and changes in empathic capacities, with qualitative methods mapping users' subjective perceptions and their emotional engagement. A specific emphasis on younger generations, who are most frequently exposed to digital interactions, could be addressed through comparative analyses of various digital contexts, such as social media, VR simulations, and interactions with AI chatbots. Such a research approach would enable the development of empirically grounded guidelines for applying virtual empathy within digital

ecosystems, thereby helping to mitigate potential risks to emotional well-being and social cohesion.

Theoretical Contribution

This systematic review contributes to theoretical advancement by integrating classical conceptual frameworks, specifically Social Presence Theory and Media Richness Theory, with contemporary insights into emotion-related processes mediated by digital technologies. The review offers a conceptual synthesis that explains how cognitive and affective empathy are shaped by the reduced availability of nonverbal cues and algorithmic content personalization in virtual environments. Furthermore, it introduces novel constructs such as simulated affectivity and algorithmic mediation as key components in modeling digital empathy. By linking these elements with underlying psychological and neurocognitive mechanisms, particularly moral reasoning, emotional regulation, and the formation of prosocial behavior, this review lays the foundation for a refined interdisciplinary theoretical model of empathy in technology-mediated contexts.

Implications

This systematic review offers significant implications for theory, practice, and policy in the context of digital communication and interpersonal relationships.

Theoretical Implications

The reviewed literature indicates a need to revise and expand existing theoretical models of empathy in light of digitally mediated environments. Classical frameworks such as Social Presence Theory and Media Richness Theory must be reconsidered in the context of algorithmically filtered communication and reduced nonverbal cues. The review highlights the relevance of emerging constructs such as emotional literacy, simulated affectivity, and algorithmic mediation in shaping empathic processes.

Practical Implications

Digital tools can support empathic engagement only when designed to promote emotional authenticity and interpersonal resonance. Educational programs that foster emotional literacy and ethical digital communication are crucial for cultivating virtual empathy, particularly among digital-native populations. Platform developers can integrate features such as culturally diverse narratives, emotionally responsive AI agents, and multimodal expression tools to enhance empathic interactions.

Policy and Ethical Implications

The findings underscore the urgency of implementing regulatory frameworks that ensure algorithmic transparency, robust privacy protections, and the clear labeling of AI-generated content. As technologies increasingly simulate human emotion, ethical safeguards are essential to prevent emotional manipulation and preserve trust in human communication. Digital policies should promote emotional inclusivity, social cohesion, and the ethical deployment of AI within communication ecosystems.

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