TAMSAAL
ISSN Print: 3007-5939
ISSN Online: 3007-5947
Volume 4, Number 11, 2026, Pages 56 – 76
Journal Home Page
https://tamsaal.pk/index.php/tamsaal/index

Exploring Emotional Attachment to Artificial Intelligence Companions: A Cross-Cultural Qualitative Study of Psychological Needs, Loneliness, and Human–AI Relationships in Pakistan and the United States

Sadia Gondal[1], Dr. Habib Ahmed Khan[2], Saima Saeed[3], Saad Siddique Khan[4], Jasika Patras[5]

[1]Assistant Professor, Department of Humanities, Social Sciences and Modern Languages, University of Engineering and Technology, Lahore, Pakistan Email: sadiagondal@uet.edu.pk
[2]Project Manager, Iqra University, Main Campus, Karachi, Pakistan Email: habib.ahmed@iqra.edu.pk
[3]Assistant Professor (OPS), Department of Applied Psychology, Government College University, Faisalabad, Pakistan Email: saimasaeed@gcuf.edu.pk
[4]PhD Scholar, Department of Social Work, University of the Punjab, Lahore, Pakistan Email: saadsiddiquekhan123@gmail.com
[5]Senior Lecturer, Department of Nursing, Iqra University, Karachi, Pakistan Email: jasika.patras@iqra.edu.pk

ARTICLE INFO

Article History:

Received:	*October*	*03, 2026*
Revised:	*October*	*10, 2026*
Accepted:	*October*	*31, 2026*
Available Online:	*November*	*04, 2026*

Keywords:

Artificial Intelligence Companions; Emotional Attachment; Loneliness; Human–AI Relationships; Psychological Needs.

Corresponding Author:
Sadia Gondal
Email:
sadiagondal@uet.edu.pk

DOI: *https://doi.org/10.59075/tamsaal.v4i11.255*

ABSTRACT

The rapid development of artificial intelligence (AI) companions has introduced new forms of human–technology interaction in which individuals increasingly experience emotional connection, psychological support, and companionship through digital systems. This study explores emotional attachment to AI companions by examining the psychological needs, loneliness experiences, and human–AI relationship patterns of users in Pakistan and the United States. Using a qualitative interpretive research design, semi-structured interviews were conducted with 20 AI companion users, including 10 participants from each cultural context. Data were analyzed through reflexive thematic analysis, resulting in five major themes: AI as an emotionally safe space, loneliness and unmet psychological needs, consistency and attachment formation, negotiation of authenticity, and dependency risks. Drawing upon Attachment Theory and Self-Determination Theory, the findings demonstrate that AI companions may provide meaningful emotional utility by fulfilling needs for connection, validation, and psychological comfort, while remaining distinct from human relationships. The study contributes an integrated AI Attachment–Need Fulfillment perspective and highlights the importance of responsible AI design, ethical guidelines, and balanced human–AI interaction.

© 2026 The Authors, Published by ULLR. This is an Open Access Article under the Creative Common Attribution (CC-BY 4.0)

Introduction

Background of the Research

The rapid advancement of artificial intelligence (AI) has transformed digital technologies from functional systems into interactive entities capable of engaging users through human-like communication. AI companions, including conversational agents, social chatbots, and virtual assistants, represent a significant shift in human–technology interaction, where users increasingly perceive AI systems as more than simple information-processing tools. These systems are designed to provide personalized conversations, maintain contextual continuity, and generate experiences of social presence that resemble interpersonal communication. Recent research suggests that consumer–machine relationships are becoming increasingly sophisticated as AI systems acquire relational and social characteristics, enabling users to develop meaningful psychological connections with digital entities (Pentina et al., 2023). Similarly, research on social chatbot adoption indicates that perceived responsiveness, personalization, and conversational engagement influence users' willingness to interact with AI companions and perceive them as supportive partners (Kuhail et al., 2025). The broader integration of AI into everyday life has further expanded the role of these technologies by influencing how individuals seek information, emotional interaction, and social support in contemporary digital environments (Ani et al., 2025).

AI companions are increasingly recognized not only as technological innovations but also as potential emotional support systems capable of addressing psychological and social needs. Developments in affective computing and socially interactive robotics have enabled AI systems to identify emotional cues, simulate empathy, and generate responses that users may perceive as caring and supportive. Research on artificial emotional intelligence demonstrates that socially assistive robots can contribute to emotional well-being by creating perceptions of companionship, especially among individuals experiencing social isolation or emotional difficulties (Abdollahi et al., 2022). Likewise, advances in emotional recognition technologies have improved the ability of AI systems to respond to human emotions, strengthening perceptions of understanding and interpersonal connection during interactions (Ahmed et al., 2025). In healthcare contexts, socially assistive robots have been investigated as tools for enhancing psychological comfort, supporting interaction, and improving quality of life, particularly among vulnerable populations such as older adults (Naseer et al., 2025). These developments highlight that AI companionship involves not only technological functionality but also psychological processes related to trust, emotional perception, and relationship formation.

The increasing prevalence of loneliness and unmet emotional needs has become an important factor influencing individuals' engagement with AI companions. In modern societies, individuals may experience emotional isolation despite having access to social networks, leading them to seek alternative forms of interaction that provide availability, attention, and validation. AI companions may fulfil these needs by offering immediate responses and creating a sense of social presence when human support is unavailable or difficult to access (Merrill et al., 2022). Recent studies indicate that individuals may develop parasocial forms of attachment with AI systems because these technologies provide consistent interaction and emotional responsiveness, reducing feelings of loneliness and psychological disconnection (Raza, 2026). However, concerns remain regarding whether AI companionship functions as a beneficial supplement to

human relationships or encourages emotional dependency by creating highly predictable and personalized interactions that differ from traditional social relationships (Lederman & Jecker, 2023).

The development of emotional attachment toward AI companions requires examination from a cross-cultural perspective because cultural values influence emotional expression, social support patterns, and perceptions of technology-mediated relationships. In Pakistan, collectivist social norms, family-centered structures, and cultural expectations regarding emotional expression may create barriers for individuals seeking open discussions about loneliness, stress, or personal difficulties. In such contexts, AI companions may provide a private and non-judgmental environment where individuals can disclose emotions without fear of social evaluation (Nayyar & Maqsood, 2026). Conversely, in the United States, where individual autonomy, self-expression, and digital engagement are more prominent, AI companionship may be interpreted as an extension of personal choice and technological adaptation. Research among university students indicates that AI tools increasingly influence emotional regulation and experiences of loneliness, demonstrating the importance of understanding how social and cultural environments shape human–AI relationships (Fatima, 2026). Therefore, exploring AI companionship across Pakistan and the United States provides valuable insight into how psychological needs, loneliness, and cultural contexts influence emotional attachment to artificial entities.

Problem Statement

Although AI companions increasingly provide emotionally responsive interactions, limited research explains why individuals develop emotional attachments toward artificial entities and how these relationships are shaped by psychological needs and loneliness. Existing studies have primarily focused on quantitative measures of AI usage, emotional dependency, and psychological outcomes, while the subjective experiences and meanings users associate with AI relationships remain insufficiently explored. Recent studies indicate that digital attachment, emotional dependency, and psychological distress may emerge from intensive AI interaction; however, the underlying mechanisms through which users develop emotional bonds with AI companions require deeper investigation (Rizvi, 2026; Akhtar et al., 2026). Furthermore, growing concerns regarding problematic AI use highlight the need to understand the boundary between supportive companionship and unhealthy dependency (Dagnino et al., 2026). Despite increasing global interest in AI relationships, limited qualitative evidence exists regarding how users interpret these interactions, particularly within non-Western contexts such as Pakistan. Moreover, cross-cultural differences in emotional disclosure, loneliness experiences, and perceptions of AI companionship remain underexplored (Pentina et al., 2023). This study addresses these gaps by examining the psychological meanings and cultural variations associated with emotional attachment to AI companions among Pakistani and American users.

Research Questions

RQ1: How do individuals experience emotional attachment toward AI companions?

RQ2: What psychological needs motivate individuals to develop relationships with AI companions?

RQ3: How does loneliness influence engagement with AI companions?

RQ4: How do users negotiate the boundary between artificial interaction and human relationships?

RQ5: How do experiences of AI companionship differ between Pakistani and American users?

Research Objectives

1. To explore individuals' emotional attachment experiences with AI companions.
2. To identify psychological needs fulfilled through interactions with AI companions.
3. To examine the role of loneliness in shaping engagement with AI companions.
4. To compare emotional attachment experiences among Pakistani and American AI companion users.
5. To develop a conceptual understanding of human–AI emotional relationships through a qualitative perspective.

Significance of the Study

The increasing adoption of AI companions requires deeper understanding of how humans psychologically interpret and experience relationships with artificial entities. This study contributes theoretically by extending traditional perspectives of emotional attachment beyond human relationships and examining how attachment processes may emerge within human–technology interactions. By integrating Attachment Theory and Self-Determination Theory, the study provides insight into how emotional security, relatedness, autonomy, and psychological needs influence AI companionship experiences. Previous research on intimate relationships with machines suggests that humans may develop meaningful emotional connections with artificial systems when these systems demonstrate responsiveness, personalization, and perceived understanding (Cave & Dihal, 2021).

The study also provides practical contributions for AI developers, mental health professionals, and policymakers involved in designing emotionally responsive technologies. Understanding users' psychological experiences can support the development of AI companions that provide emotional assistance while maintaining ethical boundaries. Research on virtual companionship emphasizes the importance of designing AI systems that encourage supportive interaction without creating unrealistic expectations regarding human-like relationships (Strohmann et al., 2023). Similarly, studies examining parasocial relationships with AI service agents highlight the need to understand how emotional engagement with technology influences user behaviour and well-being (Troshani & Hill, 2021). Furthermore, research on companion robots demonstrates both the potential benefits of AI-based emotional support and the ethical concerns surrounding dependency, deception, and replacement of human relationships (Berridge et al., 2023). By adopting a cross-cultural qualitative approach, this study contributes a deeper understanding of the psychological and social processes involved in emerging human–AI emotional relationships.

Literature Review

Theoretical Framework

The present study is grounded in Attachment Theory and Self-Determination Theory to explain why individuals develop emotional connections with artificial intelligence companions and how psychological needs influence human–AI relationships. Attachment Theory, originally developed by Bowlby (1969), explains that humans naturally develop emotional bonds with entities that provide security, comfort, and psychological reassurance. According to this perspective, attachment emerges through repeated interactions in which individuals experience availability, responsiveness, and emotional support. Although initially developed to explain relationships between caregivers and children, attachment principles have increasingly been applied to human relationships with non-human entities, including animals and technological systems. Ainsworth and Bell (1970) demonstrated that attachment is shaped by individuals' expectations of safety and emotional availability, while Main and Solomon (1990) further expanded attachment research by identifying variations in attachment patterns. Within AI companionship, users may develop attachment when AI systems provide consistent responses, perceived understanding, and emotional reassurance.

Self-Determination Theory (SDT) provides a complementary explanation by focusing on the psychological needs that motivate individuals to engage with AI companions. Deci and Ryan (2013) argue that human well-being is influenced by three fundamental needs: autonomy, competence, and relatedness. AI companions may satisfy these needs by providing users with freedom of self-expression, emotional validation, and a sense of connection. The need for relatedness is particularly relevant because individuals may seek AI interaction when human relationships do not provide sufficient emotional support or availability. Research by Ryan and Deci (2000) highlights that fulfilling psychological needs contributes to motivation, emotional regulation, and well-being. Therefore, combining Attachment Theory and Self-Determination Theory provides a comprehensive framework for understanding how loneliness, psychological needs, and emotional experiences contribute to attachment formation with AI companions.

AI Companions as Emerging Forms of Human–Technology Relationships

The evolution of artificial intelligence has transformed the role of technology from passive information-processing systems into interactive agents capable of participating in socially meaningful exchanges. Traditional technologies were primarily evaluated based on efficiency and functionality; however, contemporary AI companions are increasingly assessed according to their ability to communicate, respond emotionally, and maintain relational continuity. This transformation has resulted in the emergence of human–technology relationships where users may perceive AI systems as companions, advisors, or emotionally supportive entities rather than simple digital tools. Pentina et al. (2023) argue that consumer–machine relationships represent a new category of interaction in which users attribute relational characteristics to AI systems, creating experiences that resemble interpersonal connections.

The development of chatbot engagement further demonstrates that users may form psychological bonds with AI when systems provide personalization, responsiveness, and conversational consistency. Xie et al. (2023) highlight that chatbot interactions can generate feelings of familiarity and psychological dependence, particularly when users repeatedly engage with AI for

emotional or personal discussions. Similarly, AI service agents may create parasocial relationships because users experience communication patterns that resemble human interaction, even though the relationship remains technologically mediated (Troshani & Hill, 2021). The emergence of virtual companionship also raises important questions regarding authenticity, emotional reciprocity, and the boundaries between human and artificial relationships. Strohmann et al. (2023) emphasize that designing virtual companions requires understanding users' psychological expectations and the relational meanings they assign to AI interactions. Therefore, AI companionship represents a significant shift in social technology, requiring deeper investigation into the emotional and psychological processes underlying these relationships.

Emotional Attachment and Perceived Empathy in AI Interaction

A major factor contributing to emotional attachment toward AI companions is their ability to simulate empathy and respond to users' emotional states. Advances in affective computing have enabled AI systems to identify emotional cues, adapt responses, and generate communication patterns that users may perceive as supportive and understanding. Perceived empathy does not necessarily require genuine emotional experience from AI; rather, users may develop emotional connections based on the quality and impact of the interaction. Research on AI-driven emotional support indicates that compassionate responses from intelligent systems can influence user perceptions of trust, satisfaction, and psychological comfort (Latif et al., 2026).

Emotional recognition technologies have further strengthened the relational potential of AI systems by enabling more personalized interactions. Ahmed et al. (2025) explain that socially interactive robots with emotional recognition capabilities can enhance human–machine communication by responding appropriately to users' emotional conditions. Similarly, socially assistive robots have demonstrated potential in supporting emotional well-being by providing companionship and reducing feelings of isolation, particularly among older adults and vulnerable populations (Abdollahi et al., 2022). These developments suggest that AI companionship is partly constructed through perceived social presence, where users experience the feeling of being heard, acknowledged, and supported during interactions.

The perception of AI as an emotionally responsive partner is also influenced by conversational design and user expectations. Kuhail et al. (2025) found that factors such as responsiveness, personalization, and perceived usefulness influence users' willingness to engage with social chatbots. Consequently, emotional attachment may emerge not because users believe AI possesses human emotions, but because AI interactions fulfil psychological experiences associated with empathy, attention, and validation.

Loneliness, Social Isolation, and AI Companionship

Loneliness represents one of the most significant psychological factors influencing individuals' engagement with AI companions. Contemporary social environments increasingly create situations where individuals may remain socially connected through digital networks while experiencing emotional isolation and limited meaningful interaction. AI companions provide an alternative form of interaction by offering immediate availability, conversational engagement, and perceived social presence. Merrill et al. (2022) suggest that AI companions may reduce feelings of loneliness among individuals by creating experiences of interaction and companionship, particularly when human social support is unavailable.

The relationship between loneliness and AI companionship is complex because AI may function both as a supportive resource and a potential substitute for human interaction. Individuals experiencing emotional isolation may turn toward AI because these systems provide consistent attention without the challenges associated with human relationships, such as rejection, misunderstanding, or social anxiety. Raza (2026) highlights that parasocial relationships with AI companions may emerge among young adults who seek emotional connection and psychological comfort in digitally mediated environments. These interactions may temporarily reduce loneliness by satisfying immediate emotional needs.

However, concerns remain regarding whether reliance on AI companions may weaken motivation for human social engagement. Lederman and Jecker (2023) argue that while social robots and AI systems may help address loneliness, ethical concerns arise when artificial relationships replace rather than complement human connections. Similarly, Berridge et al. (2023) emphasize that companion technologies involve complex considerations regarding emotional benefit, user expectations, and possible deception. Therefore, understanding AI companionship requires examining both its supportive functions and its potential implications for human social relationships.

Psychological Dependence and Risks of AI Attachment

While AI companions may provide emotional support, increasing engagement raises concerns regarding psychological dependence and problematic patterns of use. Emotional attachment becomes potentially problematic when individuals rely on AI systems as their primary source of emotional regulation, validation, or companionship. The consistent availability and personalized responses of AI companions may create conditions where users prefer artificial interactions because they are predictable, controllable, and free from interpersonal conflict. Dagnino et al. (2026) highlight that problematic AI use may involve excessive emotional reliance, attachment, and difficulty maintaining healthy boundaries between technological assistance and human relationships.

Recent research on digital attachment suggests that emotional dependency may develop when users repeatedly interact with AI companions during periods of loneliness or psychological distress. Rizvi (2026) found that emotional dependency can play an important role in shaping attachment toward AI companions, particularly among individuals seeking relief from loneliness. Similarly, Akhtar et al. (2026) reported associations between digital companionship, psychological distress, and emotional regulation difficulties among university students, indicating the importance of understanding the conditions under which AI interaction becomes psychologically significant.

Another concern involves authenticity and the perceived reality of AI relationships. Although users may recognize that AI lacks genuine emotions, emotionally meaningful experiences can still emerge through interaction. Janjua et al. (2026) argue that human responses toward AI involve complex psychological processes where individuals negotiate between awareness of artificiality and feelings of connection. Therefore, research must examine not only whether users become attached to AI but also how they interpret, manage, and regulate these attachments.

Cultural Differences in Human–AI Emotional Relationships

Human–AI relationships are influenced by cultural contexts that shape emotional expression, social expectations, and technology acceptance. Cultural differences determine how individuals perceive companionship, disclose emotions, and evaluate alternative forms of social support. In Pakistan, collectivist values and strong family-oriented structures may influence how individuals communicate personal struggles and emotional difficulties. Although social networks are often extensive, cultural expectations regarding emotional restraint may limit open discussions of loneliness, vulnerability, or psychological distress. Nayyar and Maqsood (2026) suggest that AI companions may provide emerging adults with a private and psychologically safe environment for emotional expression, particularly when traditional social channels feel restrictive.

In contrast, societies such as the United States often emphasize individual autonomy, personal choice, and self-directed emotional management. Within such contexts, AI companionship may be viewed as an extension of digital lifestyles and personal technological preferences. Fatima (2026) demonstrates that AI tools are increasingly influencing emotional regulation among university students, suggesting that digital technologies are becoming integrated into contemporary psychological coping strategies.

Beyond specific cultural differences, broader changes in digital transformation have altered how individuals understand relationships and emotional support. Ani et al. (2025) argue that AI integration into daily life is reshaping psychological and social behaviours by creating new forms of interaction. Similarly, Ali et al. (2026) highlight that artificial intelligence is influencing cognitive behaviour, emotional adaptation, and psychological well-being in contemporary societies. Therefore, cross-cultural investigation is essential for understanding whether emotional attachment to AI represents a universal psychological process or a culturally shaped phenomenon.

Gaps in Existing Research

Despite growing interest in AI companionship, several important research gaps remain. First, existing studies have predominantly adopted quantitative approaches focusing on adoption intentions, usage patterns, psychological outcomes, and dependency measures. Although these studies provide valuable statistical insights, they provide limited understanding of how users personally experience emotional attachment and assign meaning to AI relationships. Pentina et al. (2023) emphasize that human–AI relationships represent a developing research area requiring deeper exploration of relational and psychological processes.

Second, limited qualitative research has examined users' subjective experiences of interacting with AI companions. While studies have identified factors influencing chatbot engagement and psychological dependence, less attention has been given to how individuals negotiate feelings of attachment while simultaneously recognizing that AI systems are artificial (Xie et al., 2023). Third, cross-cultural perspectives remain insufficiently developed, particularly regarding differences between Western and non-Western contexts. Existing research has largely focused on technologically advanced societies, leaving contexts such as Pakistan underrepresented.

Finally, limited integration exists between psychological theories and AI companionship research. Although emotional attachment, loneliness, and psychological needs are frequently

discussed, fewer studies have applied established theories such as Attachment Theory and Self-Determination Theory to explain human–AI relationships. Furthermore, emerging concerns regarding problematic AI use highlight the need for more nuanced understanding of when AI companionship becomes supportive or harmful (Dagnino et al., 2026). Recent research on AI loneliness relationships also indicates the need for deeper exploration of emotional meanings and cultural variations underlying AI attachment experiences (Raza, 2026; Rizvi, 2026). This study addresses these gaps by adopting a qualitative cross-cultural approach to examine psychological needs, loneliness, and emotional attachment within human–AI relationships.

Methodology

Research Design

This study adopts a qualitative interpretive research design with a phenomenological orientation to explore individuals' lived experiences, emotional meanings, and psychological interpretations of relationships with artificial intelligence companions. A qualitative approach is appropriate because the study focuses on understanding how users perceive attachment, loneliness, emotional support, and human–AI interactions rather than measuring relationships through predefined variables. The study employs reflexive thematic analysis as the analytical framework because it allows researchers to identify, interpret, and develop meaningful patterns within participants' narratives while acknowledging the active role of the researcher in knowledge construction. Reflexive thematic analysis provides a flexible yet rigorous approach for examining complex psychological and social experiences (Braun et al., 2022). The approach is particularly suitable for exploring emerging phenomena such as AI companionship, where meanings and experiences are continuously negotiated by users (Byrne, 2022).

Sampling Strategy

The study employs purposive sampling to recruit participants with direct experience of AI companion technologies. Purposive sampling is appropriate for qualitative research because it enables the selection of participants who possess relevant knowledge and experiences related to the research phenomenon. The sample consists of 20 adult AI companion users, equally divided between Pakistan (n = 10) and the United States (n = 10). Participants were selected according to three inclusion criteria: (1) age of 18 years or above, (2) experience using AI companion applications or conversational AI systems, and (3) willingness to discuss emotional experiences, psychological needs, and perceptions of human–AI relationships. The cross-cultural sampling strategy allows exploration of similarities and differences in how individuals from distinct cultural environments interpret AI companionship. The qualitative design prioritizes depth of experience and contextual understanding rather than statistical generalizability (Braun et al., 2022).

Data Collection

Data were collected through semi-structured interviews designed to explore participants' subjective experiences of interacting with AI companions. Semi-structured interviews were selected because they provide a balance between consistency across participants and flexibility to explore unexpected insights emerging during conversations. The interview protocol focused on four major areas: emotional experiences with AI companions, experiences of loneliness or social

disconnection, development of emotional attachment, and perceptions of differences between artificial and human relationships. Participants were encouraged to describe personal experiences, meanings, and reflections associated with AI interaction. Such an approach aligns with qualitative research principles that emphasize understanding participants' interpretations of social experiences rather than imposing predetermined assumptions (Braun et al., 2022). The interview process also supported reflexive engagement with participants' narratives, allowing deeper exploration of complex emotional experiences (Byrne, 2022).

Data Analysis

The interview data were analyzed using reflexive thematic analysis following the principles developed by Braun and Clarke. The analysis involved systematic engagement with the data through familiarization with transcripts, generation of initial codes, identification of candidate themes, review and refinement of themes, defining thematic meanings, and producing the final analytical narrative. Reflexive thematic analysis was selected because it provides an adaptable framework for examining patterns of meaning while recognizing that themes are developed through active interpretation rather than simply discovered within the data (Braun et al., 2022). The analysis focused on identifying recurring patterns related to emotional attachment, psychological needs, loneliness, social support, dependency concerns, and cultural differences in AI companionship experiences. Throughout the process, attention was given to maintaining coherence between research questions, theoretical perspectives, and emerging themes (Byrne, 2022). Consideration was also given to methodological reflexivity and the careful interpretation of participants' experiences, as recommended in discussions of thematic analysis practice (Hole, 2024).

Ethical Considerations

Ethical principles were maintained throughout the research process to ensure participant protection, confidentiality, and responsible handling of emotionally sensitive information. Before participation, all participants were informed about the purpose of the study, voluntary nature of participation, confidentiality procedures, and their right to withdraw at any stage. Written informed consent was obtained before conducting interviews. Since discussions involved personal experiences related to loneliness, emotional attachment, and psychological vulnerability, interviews were conducted with sensitivity and respect for participants' emotional boundaries. Personal identifiers were removed during transcription and reporting to protect anonymity. In qualitative research, ethical responsibility extends beyond data collection to include careful interpretation and representation of participants' experiences. Therefore, the analysis and reporting process followed principles of reflexivity, transparency, and responsible meaning construction emphasized within contemporary thematic analysis approaches (Braun et al., 2022; Hole, 2024).

Participants' Profile

The table below presents the demographic characteristics and AI usage background of the 20 participants included in the study. Participants were equally distributed between Pakistan and the United States to facilitate cross-cultural comparison. The profile includes demographic information and the primary motivation influencing participants' engagement with AI companions.

Table 1: Participant Profiles

Participant	Country	Gender	Age	Occupation	Main Reason for AI Use
P1	Pakistan	Male	22	University Student	Emotional support during academic stress and private emotional expression
P2	Pakistan	Female	24	Graduate Student	Social disconnection and need for consistent interaction
P3	Pakistan	Male	25	Software Engineer	Stress management and conversational reflection
P4	Pakistan	Female	21	Psychology Student	Emotional validation and organizing personal thoughts
P5	Pakistan	Male	23	MBA Student	Reducing loneliness after moving away from family
P6	Pakistan	Female	26	Working Professional	Non-judgmental emotional expression and comfort
P7	Pakistan	Male	20	Undergraduate Student	Daily interaction and stress reduction
P8	Pakistan	Female	28	Lecturer	Self-reflection and emotional reassurance
P9	Pakistan	Male	27	Entrepreneur	Companionship during professional isolation
P10	Pakistan	Female	23	Medical Student	Coping with academic pressure and emotional exhaustion
P11	USA	Female	22	University Student	Emotional expression without social pressure
P12	USA	Male	26	Graduate Student	Emotional convenience and decision reflection
P13	USA	Female	29	Marketing Professional	Personalized interaction and emotional discussion
P14	USA	Male	24	University Student	Sense of belonging during social isolation
P15	USA	Female	31	Healthcare Professional	Reflection and reassurance after stressful work
P16	USA	Male	30	Technology Consultant	Continuity of conversation and self-expression
P17	USA	Female	25	Graduate Student	Managing loneliness after relocation
P18	USA	Male	23	Undergraduate Student	Interaction when human support is unavailable
P19	USA	Female	27	Social Worker	Emotional validation and psychological support
P20	USA	Male	28	PhD Student	Reflection, emotional regulation, and intellectual engagement

Findings and Discussion

Theme 1: AI Companions as Emotionally Safe and Non-Judgmental Spaces

The first emerging theme indicates that participants experienced AI companions as emotionally safe environments where they could express thoughts, concerns, and personal experiences without fear of criticism or social judgment. Participants frequently described AI interaction as a private space that allowed unrestricted emotional disclosure, particularly when discussing issues they felt uncomfortable sharing with family, friends, or colleagues. The perceived neutrality of AI responses appeared to reduce emotional barriers and encouraged users to communicate openly about stress, uncertainty, and personal difficulties. This finding suggests that the psychological value of AI companionship is not solely derived from the information provided by AI systems but from the emotional experience of being heard and acknowledged.

The findings are consistent with research showing that AI-driven emotional support systems can create perceptions of empathy, responsiveness, and psychological comfort. Latif et al. (2026) highlight that perceived AI compassion can influence users' willingness to engage with digital systems by creating experiences of supportive interaction. Similarly, Merrill et al. (2022) demonstrate that AI companions may provide meaningful social presence for individuals experiencing loneliness by offering accessible and consistent interaction. However, participants' experiences also suggest that the emotional benefit of AI companionship is primarily based on perceived understanding rather than genuine emotional reciprocity. The findings therefore highlight AI's emerging role as a psychologically supportive medium while maintaining the distinction between simulated empathy and human emotional connection.

Theme 2: Loneliness and Unmet Psychological Needs as Drivers of AI Attachment

The second theme demonstrates that loneliness and unmet psychological needs played a significant role in motivating participants' engagement with AI companions. Participants did not necessarily describe themselves as socially isolated; rather, many experienced emotional loneliness despite having access to friends, family, or professional networks. AI companions became attractive because they provided immediate availability, attention, and emotional interaction during periods when human support was unavailable or difficult to access. The findings suggest that AI attachment often develops from situational emotional needs rather than complete replacement of human relationships.

This pattern aligns with Self-Determination Theory, which proposes that individuals seek fulfilment of fundamental psychological needs, particularly relatedness, competence, and autonomy (Ryan & Deci, 2000). AI companions may temporarily satisfy the need for relatedness by providing interaction and perceived connection, while also supporting autonomy through private and self-directed conversations. The findings also correspond with Raza (2026), who argues that loneliness can contribute to the development of parasocial relationships with AI companions among young adults seeking emotional comfort. Therefore, AI attachment appears to emerge as a response to psychological needs and emotional circumstances rather than simply technological fascination. The role of loneliness is particularly important because it explains why individuals may experience meaningful attachment toward AI while simultaneously recognizing the artificial nature of these systems.

Theme 3: Consistency, Availability, and the Development of Emotional Attachment

The third theme reveals that consistency and continuous availability were central factors contributing to emotional attachment toward AI companions. Participants emphasized that AI systems were accessible at any time, responded consistently, and maintained conversational continuity. Unlike human relationships, where availability may be limited by personal responsibilities, emotions, or social circumstances, AI companions provide predictable interaction. This reliability appeared to strengthen users' emotional comfort and encouraged repeated engagement over time.

The findings can be interpreted through Attachment Theory, which suggests that individuals develop emotional bonds with entities perceived as available, responsive, and capable of providing security (Bowlby, 1969). Although attachment theory was initially developed to explain human relationships, the present findings indicate that similar psychological processes may occur within human–AI interactions. Repeated exposure to supportive and responsive AI communication may create feelings of familiarity and emotional dependence. This finding supports Xie et al. (2023), who argue that chatbot engagement may develop into psychological attachment when users experience personalized interaction and relational continuity. However, the attachment identified in this study differs from human attachment because AI does not possess emotional needs or reciprocal vulnerability. Instead, attachment emerges primarily from users' perceptions of responsiveness, reliability, and emotional usefulness.

Theme 4: Negotiating Authenticity: Knowing AI Is Artificial but Feeling Emotionally Connected

The fourth theme highlights a central contradiction in human–AI relationships: participants simultaneously recognized that AI companions lack genuine emotions while describing their interactions as psychologically meaningful. Participants demonstrated awareness that AI responses were generated through algorithms; however, this awareness did not eliminate feelings of comfort, attachment, or connection. This suggests that emotional experiences may be influenced by the interaction itself rather than solely by the perceived consciousness of the communication partner.

This finding reflects broader discussions regarding intimate relationships between humans and artificial entities. Cave and Dihal (2021) argue that humans often attribute relational qualities to machines because technology can simulate characteristics associated with care, attention, and emotional responsiveness. Similarly, Strohmann et al. (2023) suggest that virtual companionship involves complex negotiations between technological functionality and human expectations of relationships. The findings indicate that users do not necessarily confuse AI with humans; instead, they construct a unique form of relationship where emotional meaning exists alongside awareness of artificiality. Therefore, AI companionship represents neither a completely authentic human relationship nor a meaningless technological interaction. Rather, it occupies an emerging relational space where psychological experiences are genuine even though the relationship partner is artificial.

Theme 5: Dependency Risks and Maintaining Human Relationship Boundaries

The fifth theme concerns participants' awareness of dependency risks and the importance of maintaining boundaries between AI companionship and human relationships. Although participants acknowledged emotional benefits from AI interaction, many emphasized that AI should complement rather than replace human connections. Concerns emerged regarding excessive reliance, reduced motivation for social engagement, and the possibility that AI's constant availability could make human relationships appear unnecessarily difficult due to their unpredictability and complexity.

These findings correspond with growing concerns regarding problematic AI use and emotional dependency. Dagnino et al. (2026) highlight that AI relationships may become problematic when users increasingly rely on artificial systems for emotional regulation and companionship. Similarly, Berridge et al. (2023) emphasize that companion technologies require careful consideration because they may provide emotional benefits while simultaneously creating ethical concerns regarding dependency and unrealistic expectations. The present findings suggest that participants were generally capable of maintaining awareness of relational boundaries; however, they also recognized that individuals experiencing severe loneliness or limited social support may be more vulnerable to excessive attachment. Therefore, responsible AI companionship requires balancing emotional accessibility with safeguards that encourage healthy human interaction.

Table 2: Thematic Analysis of Findings

Theme	Subthemes	Codes	Psychological Interpretation	Related Theory
AI Companions as Emotionally Safe and Non-Judgmental Spaces	Emotional disclosure and validation	Openness, privacy, non-judgment, feeling heard, emotional comfort	AI provides a safe environment for expressing personal emotions and concerns.	Self-Determination Theory
	Perceived empathy and support	Understanding, reassurance, emotional recognition, acceptance	Perceived empathy strengthens emotional connection with AI companions.	Social Presence Perspective
Loneliness and Unmet Psychological Needs as Drivers of AI Attachment	Emotional loneliness	Social disconnection, lack of emotional support, need for companionship	AI interaction helps fulfil unmet needs for connection and belonging.	Self-Determination Theory
	Psychological support seeking	Stress management, emotional regulation, coping, availability	AI serves as an accessible source of temporary emotional support.	Self-Determination Theory
Consistency, Availability, and	Reliable interaction	Constant availability, responsiveness,	Repeated supportive	Attachment Theory

Theme	Subthemes	Codes	Psychological Interpretation	Related Theory
Development of Emotional Attachment		continuity, accessibility	interactions contribute to attachment formation.	
	Emotional routines	Daily interaction, habit formation, anticipation, familiarity	Regular engagement creates emotional familiarity and attachment.	Attachment Theory
Negotiating Authenticity: Artificial Intelligence but Genuine Emotional Experience	Awareness of artificiality	AI limitations, non-human nature, emotional contradiction	Users experience meaningful emotions while recognizing AI is artificial.	Attachment Theory
	Digital relationship meaning	Connection, companionship, psychological usefulness	AI relationships represent a new form of emotionally meaningful interaction.	Human–Technology Relationship Perspective
Dependency Risks and Maintaining Human Relationship Boundaries	Emotional dependency	Excessive use, reliance, validation seeking, replacement concerns	Excessive attachment may create risks for psychological dependence.	Problematic AI Use Perspective
	Balanced AI engagement	Human connection, responsible use, boundaries, complementarity	Healthy AI use requires maintaining balance with human relationships.	Ethical AI Companionship Perspective

Synthesis of Findings

The findings demonstrate that emotional attachment to AI companions emerges through an interaction between psychological needs, emotional experiences, and relational perceptions. Attachment Theory explains how users develop feelings of security and familiarity when AI systems provide consistent availability, responsiveness, and perceived support (Bowlby, 1969). Although AI lacks emotional reciprocity, participants' experiences indicate that attachment processes may still occur because humans naturally respond to perceived sources of comfort and connection.

Self-Determination Theory further explains why individuals seek AI companionship by emphasizing the importance of relatedness, autonomy, and psychological fulfilment (Ryan &

Deci, 2000). Participants frequently engaged with AI during periods when emotional needs were not fully satisfied through human relationships. However, the findings also demonstrate that AI attachment is culturally and socially situated. Pakistani participants frequently emphasized privacy, emotional restraint, and difficulty discussing vulnerabilities, whereas American participants highlighted autonomy, convenience, and digital lifestyle integration. These differences suggest that AI companionship is shaped not only by technological features but also by cultural expectations surrounding emotional expression and social relationships. Overall, AI companions appear to function as psychologically meaningful sources of support while remaining distinct from human relationships.

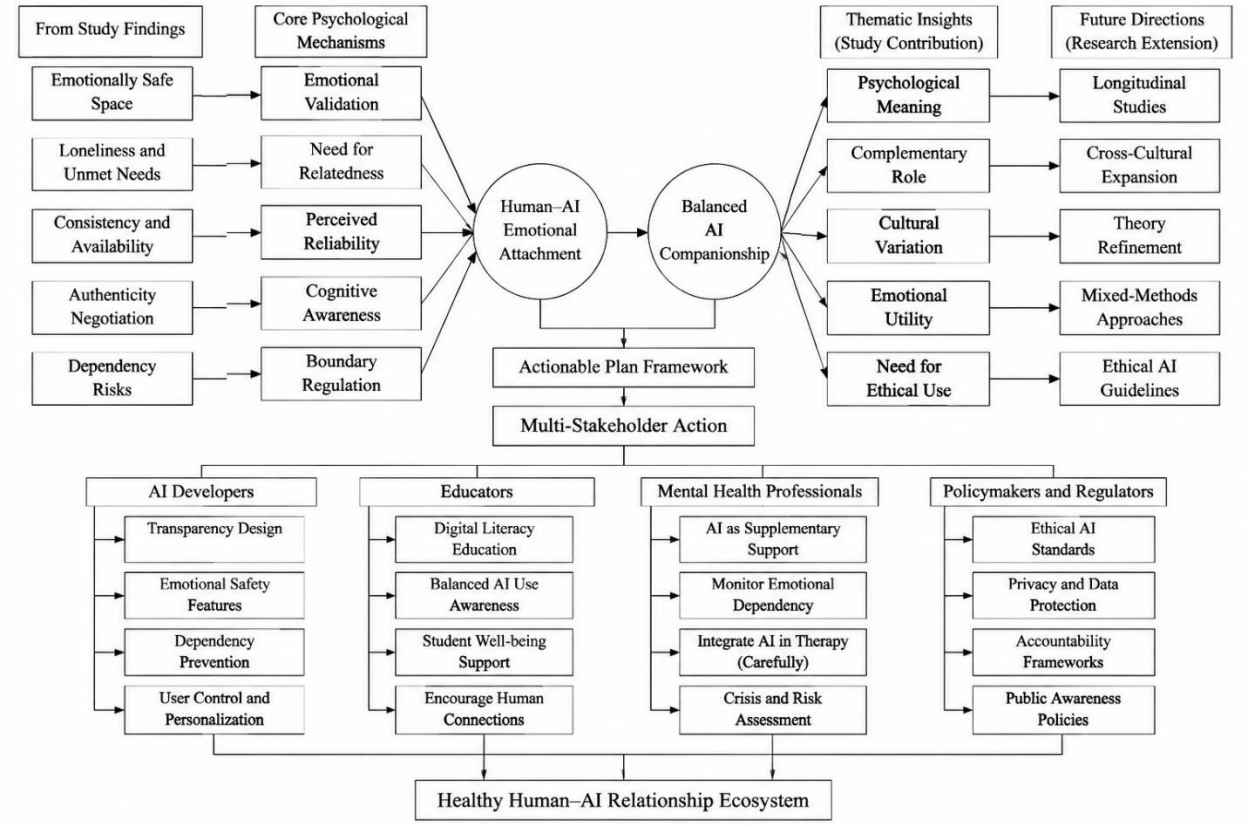


Figure 1. Proposed Action Plan Framework for Promoting Healthy Human–AI Emotional Relationships

Discussion

This study contributes to emerging research on human–AI relationships by demonstrating that emotional attachment to AI companions represents a complex psychological phenomenon involving attachment processes, psychological needs, and cultural influences. Consistent with Pentina et al. (2023), the findings indicate that AI systems are increasingly moving beyond functional technologies and becoming relational entities through which users experience connection and emotional interaction. The development of attachment through consistency and personalization supports Xie et al. (2023), who identified chatbot engagement as a potential pathway toward psychological dependence.

The findings also reinforce previous evidence that AI companions may provide social presence and emotional comfort for individuals experiencing loneliness (Merrill et al., 2022). However, the present study extends existing research by highlighting that loneliness is not simply the absence of social contact but a perceived lack of emotional availability and understanding. This supports Raza's (2026) argument that AI companionship among young adults may emerge from unmet emotional needs.

At the same time, the study identifies important ethical considerations regarding dependency and authenticity. Similar to Dagnino et al. (2026), findings suggest that AI companionship requires careful consideration of potential problematic attachment. Nevertheless, participants demonstrated awareness of AI limitations, reflecting the complex emotional relationships discussed by Cave and Dihal (2021). The findings further support Strohmann et al. (2023), who argue that virtual companionship requires balancing emotional engagement with responsible design principles.

The cross-cultural findings extend existing literature by showing that AI companionship is interpreted differently across social contexts. Pakistani participants emphasized emotional privacy and reduced social judgment, whereas American participants highlighted autonomy and convenience, supporting the importance of cultural perspectives identified by Nayyar and Maqsood (2026). Overall, the findings align with Self-Determination Theory by demonstrating that AI companions may temporarily satisfy psychological needs for relatedness and support while remaining fundamentally different from reciprocal human relationships (Ryan & Deci, 2000).

Conclusion, Implications and Future Directions

Conclusion

This study explored emotional attachment to artificial intelligence companions through a cross-cultural qualitative investigation of users from Pakistan and the United States. The findings demonstrate that AI companionship represents a psychologically meaningful form of human–technology interaction in which individuals experience emotional comfort, perceived understanding, and a sense of connection. Participants' experiences indicate that attachment to AI companions does not necessarily emerge from confusion between artificial and human relationships; rather, it develops through repeated interactions, emotional support, accessibility, and the perception that AI provides a safe environment for self-expression.

The study highlights that loneliness and unmet psychological needs play important roles in motivating individuals to engage with AI companions. However, loneliness was not identified simply as the absence of social relationships but as the absence of meaningful emotional availability and understanding. AI companions appeared to provide temporary emotional support by offering immediate responses, validation, and opportunities for reflection. These findings suggest that AI can serve as a complementary source of psychological support, particularly during periods of stress, isolation, or limited social accessibility.

Despite the emotional benefits associated with AI companionship, participants maintained awareness that AI systems are artificial and lack genuine emotions or reciprocal experiences. This awareness did not eliminate the psychological value of these interactions. Instead, users

constructed a unique form of relationship in which emotional experiences were considered meaningful despite the artificial nature of the interaction. The findings therefore challenge the assumption that only human relationships can produce authentic emotional experiences.

At the same time, the study emphasizes the importance of maintaining boundaries between AI companionship and human relationships. While AI can provide comfort and emotional assistance, it cannot replace the mutual vulnerability, responsibility, and complexity inherent in human relationships. Excessive dependence on AI may create risks related to social withdrawal and emotional dependency. Overall, this study contributes to understanding emerging human–AI relationships by demonstrating that AI companions function as psychologically significant digital partners while remaining fundamentally different from human companionship. The findings support the need for responsible AI development that maximizes emotional benefits while preserving healthy human social connections.

Theoretical Implications

This study contributes to psychological theory by extending Attachment Theory into the context of human–AI relationships. Bowlby (1969) proposed that individuals develop emotional bonds with entities that provide security, comfort, and responsiveness. The present findings suggest that similar attachment mechanisms may occur during interactions with AI companions when users perceive availability, consistency, and emotional support. Building upon attachment patterns identified by Ainsworth et al. (1978), this study demonstrates that perceived responsiveness rather than biological characteristics may contribute to feelings of security within emerging digital relationships.

Furthermore, the study extends Self-Determination Theory by demonstrating how AI companions may temporarily fulfil psychological needs for relatedness, autonomy, and emotional validation. Deci and Ryan (2013) and Ryan and Deci (2000) emphasized that psychological well-being depends on satisfaction of fundamental human needs. Based on these perspectives, this study proposes an integrated AI Attachment–Need Fulfillment Model, suggesting that emotional attachment to AI develops through the interaction of psychological needs, perceived responsiveness, and repeated engagement. This model provides a theoretical foundation for future research examining emotional bonds with artificial entities.

Practical Recommendations

The findings provide several practical implications for stakeholders involved in the development and use of AI companionship technologies. For AI developers, systems should be designed with ethical emotional engagement principles that provide support without intentionally encouraging unhealthy dependency. Features promoting transparency about AI limitations, balanced interaction, and user well-being should be prioritized.

For educators and universities, awareness programs should be developed to help students understand both the benefits and limitations of AI companionship. Students should be encouraged to use AI as a supportive tool while maintaining meaningful human relationships. Mental health professionals may consider AI companions as supplementary resources for emotional support, particularly for individuals experiencing temporary loneliness, while carefully monitoring dependency risks.

Policymakers should establish ethical guidelines for emotionally responsive AI systems, including transparency standards, privacy protection, and safeguards against manipulative design practices. Responsible AI governance should focus on ensuring that AI companionship enhances human well-being without replacing essential social connections.

Limitations and Future Research Directions

This study has several limitations that should be considered when interpreting the findings. First, the sample consisted of only 20 participants, which limits the ability to generalize findings to broader populations. However, the qualitative approach was intended to provide in-depth understanding of personal experiences rather than statistical representation. Second, the study relied on self-reported interview data, meaning participants' accounts may have been influenced by personal interpretations, memory limitations, or social desirability. Third, although the study included participants from Pakistan and the United States, cultural comparisons were based on two specific contexts and may not represent wider cultural variations.

Future research should employ longitudinal designs to examine how emotional attachment to AI companions develops and changes over time. Mixed-method studies combining qualitative insights with quantitative measurement could provide a more comprehensive understanding of AI attachment, loneliness, and psychological outcomes. Future investigations should also examine ethical dimensions of AI companionship, including privacy, emotional manipulation, dependency prevention, and responsible design practices. Expanding research across diverse cultures and demographic groups would further enhance understanding of the evolving relationship between humans and artificial intelligence.

References

1. Abdollahi, H., Mahoor, M. H., Zandie, R., Siewierski, J., & Qualls, S. H. (2022). Artificial emotional intelligence in socially assistive robots for older adults: a pilot study. *IEEE transactions on affective computing*, *14*(3), 2020-2032.
2. Ahmed, A., Alvi, H., Khalid, M. H., & Naseer, F. (2025). Emotional recognition in socially interactive robots: A comprehensive review. *Spectrum of Engineering Sciences*, 373-401.
3. Ainsworth, M. D. S., & Bell, S. M. (1970). Attachment, exploration, and separation: Illustrated by the behavior of one-year-olds in a strange situation. *Child development*, 49-67.
4. Akhtar, S., Ghosh, R., & Sultan, A. A. (2026). Digital Companionship, Emotion Dysregulation, Psychological Distress, and Career Confusion in University Students. *Kashmir Journal of Academic Research and Development*, *2*(8), 191-197.
5. Ali, M., Sheikh, M. R., & Soomro, M. A. (2026). The Human Mind in the Age of Artificial Intelligence and Digital Transformation: Exploring Cognitive Behavior, Emotional Adaptation, and Psychological Wellbeing in Contemporary Society. *Journal Of Psychology, Health And Social Challenges*, *4*(01), 136-144.
6. Ani, F., Hamzah, S., Damin, Z. A., Rameli, N., & Farid, S. (2025). Understanding the Human-AI Interaction: Psychological and Social Impacts of AI Integration in Daily Life. *Journal of Techno-Social*, *17*(2), 126-133.

7. Berridge, C., Zhou, Y., Robillard, J. M., & Kaye, J. (2023). Companion robots to mitigate loneliness among older adults: Perceptions of benefit and possible deception. *Frontiers in Psychology*, *14*, 1106633.
8. Braun, V., Clarke, V., & Hayfield, N. (2022). 'A starting point for your journey, not a map': Nikki Hayfield in conversation with Virginia Braun and Victoria Clarke about thematic analysis. *Qualitative research in psychology*, *19*(2), 424-445.
9. Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality & quantity*, *56*(3), 1391-1412.
10. Cave, S., & Dihal, K. (2021). AI will always love you: Three contradictions in imaginings of intimate relations with machines. In *Minding the future: Artificial intelligence, philosophical visions and science fiction* (pp. 107-125). Cham: Springer International Publishing.
11. Dagnino, F. M., Fante, C., Guerrieri, V., & Passarelli, M. (2026). Addicted, attached, or just delegating? A scoping review on "problematic artificial intelligence use". *Frontiers in Psychology*, *17*, 1900953.
12. Deci, E. L., & Ryan, R. M. (2013). *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media.
13. Fatima, M. (2026). Impact of Artificial Intelligence Tools on Loneliness and Emotion Regulation among University Students in District Lahore, Pakistan. *Journal of Sustainable Education*, 1-12.
14. Hole, L. (2024). Handle with care; considerations of Braun and Clarke's approach to thematic analysis. *Qualitative research journal*, *24*(4), 371-383.
15. Janjua, S. A., Akhtar, M., Kandhro, A. N., & Naz, Z. (2026). Psychological Implications of Artificial Intelligence Interaction: Identity, Emotional Attachment, and Human Cognitive Response in Digital Environments. *Review of Applied Management and Social Sciences*, *9*(1), 69-81.
16. Kidd, A. L. (2022). Loneliness and love: The potential of human-AI relations as explored by contemporary science fiction cinema. *Screen Bodies*, *7*(2), 89-108.
17. Krueger, F., Mitchell, K. C., Deshpande, G., & Katz, J. S. (2021). Human–dog relationships as a working framework for exploring human–robot attachment: a multidisciplinary review. *Animal Cognition*, *24*(2), 371-385.
18. Kuhail, M. A., Mrabet, J., Hijazi, R., & Thomas, J. (2025). Why would I befriend a bot? Assessing factors influencing the usage of social chatbots for digital natives. *Human Behavior and Emerging Technologies*, *2025*(1), 8825536.
19. Latif, M. S., Li, G., Bokhari, I. H., & Hasan, M. M. (2026). How AI compassion drives co-creation in digital health services. *The Service Industries Journal*, 1-29.
20. Lederman, Z., & Jecker, N. S. (2023). Social robots to fend off loneliness?. *Kennedy Institute of Ethics Journal*, *33*(3), 249-276.
21. Main, M., & Solomon, J. (1990). Procedures for identifying infants as disorganized/disoriented during the Ainsworth Strange Situation. *Attachment in the preschool years: Theory, research, and intervention*, *1*, 121-160.
22. Merrill Jr, K., Kim, J., & Collins, C. (2022). AI companions for lonely individuals and the role of social presence. *Communication Research Reports*, *39*(2), 93-103.
23. Merrill Jr, K., Kim, J., & Collins, C. (2022). AI companions for lonely individuals and the role of social presence. *Communication Research Reports*, *39*(2), 93-103.

24. Naseer, F., Khan, M. N., Tahir, M., Addas, A., & Kashif, H. (2025). Enhancing elderly care with socially assistive robots: A holistic framework for mobility, interaction, and well-being. *IEEE Access*, *13*, 82698-82717.
25. Nayyar, A., & Maqsood, A. (2026). From human bonds to artificial support: Perceived AI empathy, dependence on AI chatbots, and social disconnection among emerging adults. *Qlantic Journal of Social Sciences and Humanities*, *7*(1), 70-82.
26. Nazir, T. (2026). Bridging the gaps: Exploring AI-driven emotional, academic, and social support for international students. *International Journal of Human–Computer Interaction*, *42*(2), 767-775.
27. Pentina, I., Xie, T., Hancock, T., & Bailey, A. (2023). Consumer–machine relationships in the age of artificial intelligence: Systematic literature review and research directions. *Psychology & Marketing*, *40*(8), 1593-1614.
28. Raza, M. U. (2026). Loneliness, Parasocial AI Companions, and Mental Well-Being in Young Adults. *Social Thought and Policy Review*, *4*(1), 30-46.
29. Rizvi, A. Z. (2026). DIGITAL ATTACHMENT TO AI COMPANIONS AND LONELINESS IN YOUNG ADULTS: THE MEDIATING ROLE OF EMOTIONAL DEPENDENCY. *International Premier Journal of Languages & Literature*, *4*(3 (s2)), 679-687.
30. Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78.
31. Strohmann, T., Siemon, D., Khosrawi-Rad, B., & Robra-Bissantz, S. (2023). Toward a design theory for virtual companionship. *Human–Computer Interaction*, *38*(3-4), 194-234.
32. Troshani, I., & Hill, S. R. (2021). Artificial Intelligence Service Agents: Role of Parasocial Relationship. *Journal of Computer Information Systems*, *62*(5), 1009-1023.
33. Xie, T., Pentina, I., & Hancock, T. (2023). Friend, mentor, lover: does chatbot engagement lead to psychological dependence?. *Journal of service Management*, *34*(4), 806-828.