

Artificial Intelligence (AI) and Virtual Companionship: A Psychological Review and Future Directions

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Abstract. As generative artificial intelligence (AI) and chatbots (e.g., Replika and Character.ai) have increasingly developed with more advanced technology, more individuals were forming virtual companionship with artificial agents. While virtual AI companions have helped reducing loneliness, improving well-being, and providing emotional support, discussions were also ongoing about the ethical risks of using AI as a companion such as data privacy, overdependence, and commodification of relationships. Generally, this review investigated AI companion phenomenon and demonstrated the effects with both positive and negative psychological implications, analysing current existing research gaps along with possible future directions. This review aimed to provide a psychological perspective for understanding companionship and relationships with AI systems, thereby helping to further improve the interdisciplinary studies of virtual companions, offering potential reference for social and ethical criteria when managing companion AI chatbots. It was found that AI companions could simultaneously fulfil emotional and social needs while introducing new forms of psychological vulnerability, which indicated the importance of responsible design and further regulation in future AI development.

Keywords: Artificial Intelligence; Virtual Companionship; Chatbots; Human–computer Interaction; Psychology.

1. Introduction

As now science and technology have become more advanced, especially, artificial intelligence (AI) appears to be a highly discussed topic across many fields. AI is been conceptualised as systems that think and act both humanly and rationally [1]. In recent years, the rapid advancement of AI has influenced the ways in which individuals communicate, form relationships, and experience intimacy. Among these developments, many AI-based virtual agents have emerged as a new type of human–computer interaction which can engage in social conversation and companionship, such as Nomi, Kindroid, Replika, Candy.ai, and Character.ai [2]. People can treat virtual AI as a companion, partner, or caregiver and manage to keep the relationship in perspective [3]. It seems like with elaborated design, AI is somehow able to establish emotional connection and even intimate romantic relationship with the users.

In history, companionship have undergone profound transformations by the usage of digital technologies. In the early stages, online dating appears as one of the very first forms of relationship constructed through internet medium, allowing individuals to start and maintain romantic companionship beyond geographical boundaries. Along with the time, this unique way of forming long-distance relationships normalised the idea that relationships could begin and develop through text-based interactions rather than strict face-to-face encounters. With the growth of social networking and mobile applications, internet users can create virtual online communities, find prospective marital partners, and even fulfill their most veiled sexual desires [4]. More recently, the concept of virtual companions has developed into a more immersive and simulated technology compared to the raw idea previously. Many virtual companions with AI driven chatbots offer maintainable relationships and intimacy to the users, gradually dissolve the boundary between human and AI, which raises a series of questions about authenticity, attachment, and ethics in the companions of AI. It requires more investigation on AI related companion across different scientific fields.

The increasing needs of AI companions generated multiple perspectives. On the one hand, AI are praised for their potential to reduce loneliness [5], and under certain conditions, empathetic

communicative chatbots could help to improve people's psychological well-being [6], providing accessible everyday emotional support [7] for individuals who seek for social connection. On the other hand, various ethical concerns have been raised about the data collection and management, where these human-computer interactions are actually very vulnerable since all data are unilaterally controlled by the AI companies [3], meanwhile, text-based digital interaction may impair people's ability to engage in face-to-face communication [2] and result in difficulty in separating AI-based roleplay from real life [8]. In two sides, AI virtual companionship represents both as an opportunity for psychological support and a challenge to existing norms of human relationships.

Despite the growing academic interest, there remains a lack of comprehensive psychological reviews about virtual AI companionship that systematically structure theoretical frameworks, integrating empirical findings and interdisciplinary perspectives of AI companionship. Much of the prior research has focused on the technical level and examined the design of intelligent tutoring systems of AI agents [9], however, investigations of how such virtual companionship can impact people at the psychological level is limited. There is the need to construct an overview on the psychological mechanisms of interacting with AI and the broader mental consequences for being a companion AI user.

This review explores current gaps by examining virtual companionship based on AI through a psychological perspective, aiming to demonstrate the general theoretical framework, positive and negative implications, and future directions of AI companions. By evaluating psychological effects with prior empirical findings, this review contributes to a deeper understanding of how individuals may build and maintain the bonds with AI companions in contemporary society, ultimately outlining potential developing directions of human-computer relationships.

2. Theoretical Framework

While AI chatbots are built upon algorithms, their impact highly depends on how users interpret and respond to them. Several psychological theories provide reliable sources for understanding the systematic framework of virtual AI companionship and why these relationships can be meaningful. In psychological perspective, anthropomorphism, attachment theory, and parasocial interaction theory are particularly relevant for conceptualising virtual AI companions.

Firstly, anthropomorphism describes human's propensity to imbue behaviour of non-human agents with humanlike characteristics, motivations, and emotions [10]. By rich and fast progressing self-disclosure [4], the users ascribe personal traits such as empathy onto chatbots, thereby AI's understanding of hopes, fears, and joys becomes a reflection of people's emotional investment [11]. When creating an anthropomorphic frame, AI systems will not be merely seen as tools but perceived as social partners. The design of virtual companion AI often amplifies this effect by utilising natural language processing, emotional expressions, or avatar representations to strengthen the performance of humanity. Anthropomorphism thus offering a core explanation of why communicating with virtual AI is able to evoke feelings of trust despite users' awareness of AI's artificial essence.

Secondly, attachment theory [12] emphasises that humans are motivated to seek comfort, security, and emotional regulation through close relationships. Individual differences in attachment styles shape how people approach intimacy and dependence in relationships. In the presence of a sociable robot, people feel attachment and loss [13]. According to AI companionship, attachment theory suggests that individuals may seek for satisfaction in their relationship-derived expectations [14]. For instance, it indicates how those with anxious attachment tendencies may prefer AI companions for reassurance, perceiving the interaction as dependable sources of constant attention. Conversely, individuals with avoidant attachment styles may find AI companions attractive because of the support given by AI excludes the vulnerabilities in interpersonal relationships. In this way, psychological attachment theory offers an explanation for various intentions in which users engage with AI companions and different extents to which they rely on virtual relationships emotionally.

Thirdly, parasocial interaction theory provides a crucial view in which the audiences develop imaginary and one-sided relationships with media characters [15]. While parasocial interaction is originally restricted to television performance, a parasocial relationship can extend beyond any single viewing episode [16]. Through engaging in various types of communications such as romantic and intellectual conversations, parasocial relationship theory explains how companion AI agents are able to fulfil users' need to experience intimacy, loyalty, and emotional involvement without providing a physical entity. In addition to the one-sided relationships in the original theory, AI companions create new parasocial relationships through interactive communication where it is feasible to share images and music with the users, allowing various forms of companionships according to different contexts [7]. Such responses distinguish AI-based parasocial connections from earlier media effects, interpreting chatbots as genuine companion partners, even when the interactive conversation is mainly dependent on the users' input.

Together, these three theories collectively support the psychological framework of AI companionship, demonstrating a foundation for understanding the dynamics of AI companions from the view of psychologists. This theoretical framework illuminates why AI companions possess strong psychological effects and suggests further necessity to examine both the potential benefits and risks of companion AI usage.

3. Positive Psychological Implications

One of the most prominent benefits of AI companionship is its potential to reduce loneliness. Prior experimental studies have shown that AI companions consistently reduce loneliness immediately after each human-computer interaction [17]. In experiments based on Replika, AI companions demonstrated the potential to buffer feelings of loneliness [18] through engagement in nuanced interpersonal behaviours in accompanied by its accessibility. The users often describe companion AI as it can learn and reply intelligently which making them feel less lonely [7]. Since there is a tendency to seek more connection when experiencing loneliness [5], as the users gradually developed relationship with companion AI such as Replika, they established trust and commitment [19] with their AI partners, and how the AI is friendly and caring strongly providing a sense of being heard, that feeling heard explains the general loneliness reduction in AI companions [17]. For individuals who experience loneliness, virtual AI companionship offers a consistent and responsive form of interaction, building secure emotional bond with the users to reduce loneliness.

AI companions are also effective in improving people's psychological well-being. Empirical studies suggest that companion AI may facilitate improvements to mental health and increases in social confidence [2]. Also, in terms of self-disclosure, AI partners are not judgmental, instead, human-computer interactions often consist of affirmative compliments [20]. Therefore, AI companions create a unique and safe environment for disclosure, which is consistent with previous studies that people reveal more to a social robot than a human [21]. Many users reported that their interactions with virtual companion AI bring positive life changes including greater ability to handle stress and increasing in empathy [2], which contributes in enhancing positive mood states. Moreover, users' gratification can further facilitate their engagement with chatbots [22], resulting in positive effects for both their social health [23] and mental well-being [24]. This form of expressive relationship contributes to greater resilience, strong development, and overall improvements in mental health and psychological well-being.

A third positive implication is the provision of emotional support by AI companions. Early studies showed that it is possible for human to seek safe haven and secure base from, and to develop emotional connections with chatbots [18]. Among experiments, the users expressed trust and felt comfortable with companion AI (Replika) without fear of retaliation, in addition with a feeling of being loved by those nurturing messages [7]. Companion AI agents often appear to be emotionally responsive, even when they reply and generate responses which are simulated. Since chatbots' personality traits affect following reaction intensity [25], measurement of AI companionship further

confirmed that users experienced significant emotional benefits after receiving emotional support from a chatbot [6], indicating how virtual companions can still evoke the sense of interacting with a socially aware partner. In other studies, to some extent, the users demonstrated how the communication with companion AI (Replika) “warms their heart” and made them feeling “being valued or cared about” [19], suggesting that AI companions are able to replicate aspects of human emotional support and reciprocal disclosure. These experiences underline how virtual AI companions can be regarded as genuine sources of emotional comfort and support.

4. Negative Psychological Implications

Despite potential benefits of AI companions, there are also significant concerns raised by virtual companion agents regarding their impact on individuals and society.

Data privacy seems to be a significant problem among the usage of AI companionship. Virtual companion AI are designed to offer supportive feelings for the users, however, the construction and development of all companion AIs are entirely managed and controlled by companies. Market has the availability to purposefully manipulate chatbots, applying distort behaviour to companion AI, which may cause significant harm to the users [8]. In a safe environment created by AI, it lowers users’ caution, leading them to share more in conversations with virtual AI agents which may include sensitive emotional experiences, health information, or detailed conditions [26]. Since all information are stored and processed by commercial platforms, users engaged in “personal” relationships are extremely vulnerable when those relationships are unilaterally controlled by a company [3], risking of exposed to surveillance and misuse of personal data. In general, even if there is already significant legislation about personal privacy, there is still not enough codified laws with high ethical standards directly restricting companion AIs [3].

There also appears the risk involves overdependence on AI companions. When intimacy with companion AI becomes more preferable than with human, the users may invest less effort in maintaining human relationships, giving way to the replacement concern [2]. Although AI companions can contribute to reduction in loneliness, it was verified by studies that overreliance on AI would actually increase the feelings of loneliness over time [27], meanwhile, people got more worried when the chatbot did not provide corresponding response to their revealing about stress [6]. It is possible to be addicted and spending incommensurate time with AI companions [18], and such overdependence may weaken social networks and diminish the opportunity for engaging in authentic interpersonal relationships, eventually resulting in negative detachment from community life. In extreme cases, overdependence may blur the boundary between simulated and authentic relationships, ultimately undermining the quality and depth of real personal relationships. Several tragic examples revealed such ethical problems, in one case a user of the AI Chai was encouraged by his companion AI to eventually end his life [2], and in another, suicide also occurred of a 14-year-old teenager who believed it was the only way to be with his companion AI partner eternally [8]. While this dependence on AI can provide short-term comfort, it may also limit users’ capacity to cope with real life stress independently.

Another significant concern about AI companionship is the commodification of relationships, especially the romantic relationship. There are many cases in which AI social robots are developed as female companions to satisfy male users’ needs for intimacy, romance, or sex [28]. One empirical study demonstrated how virtual AI companions operated within the logic of “love capitalism”, where intimacy AIs were being visualised in miniskirts, stockings, tube tops, low-cut necklines, and bikinis, in order to satisfy users’ need for illusionary intimacy [28]. Those sexually suggestive interactions suggest an unethical communication between human and companion AI, reducing their aimed functions of social exchanging. Moreover, certain group such as young aged users appeared to be more vulnerable when exposed to AI companions [2]. Statistics collected from teenage children reported that there existed exchanging sexual messages (‘sexting’) in their interactions with AI [8]. This raises the concern about relationship commodification that may seriously impact people’s

perception of relationships and emotions at a very young age. This commodification undermines the authenticity of the relationship and may encourage the perspective that the perceived care and empathy can be simply part of some trades of money. Many AI ethicists emphasised this ethical risk in which anthropomorphising AI systems can lead to misplaced trust and inappropriate expectations of AI technologies [11], which are also risky and have the potential to change the whole community [3].

5. Discussion and Future Direction

While current studies both addressed the positive and negative implications of AI companionship, there are still remaining limitations that call for cooperative actions of multiple fields, thereby advance in design, sampling, ethics, and application of AI companions.

5.1 Methodological Improvements

In terms of designing, existing studies mainly utilised self-reporting measure to indicate the effect of AI companions, which may elicit biased response since participants may provide information subject to their knowledge [29]. Future approaches should move beyond single-session experiments, extending toward longitudinal designs that can track long-term trajectories of AI companion usage, attachment, and outcome. Future research should also recruit more diverse samples across cultures to examine how cultural norms may influence the experiences of AI companionship since current experimental trials mainly focused on specific targeted cultural groups, which neglecting the effect of different cultural background in users' attachment to AI companions. It is also important to include participants from different age groups, as experiences of intimacy and use of emerging technologies may vary significantly between younger and older populations [8]. The overall long-term improvement of AI companions requires thorough thinking of the double-sided implications, collecting ethical actions by policymakers, government, and civil society [8].

5.2 Interdisciplinary Collaboration

In future applied domains, interdisciplinary collaboration should be considered as an important aspect in the studying of AI companions. There is the need of combining Psychology applications with Health Care, Education, Computer science, and Law. With combined studies within multiple areas, practical applications of AI companions can establish based on solid theoretical works, with both behavioural and physiological indicators of well-being, social presence, and dependence related to virtual companionship. For instance, there is already progress in AI-based psychotherapy which could be taken as an option for people who experience public stigma and hold embarrassment during face-to-face interactions with a human therapist [30]. Similarly, considering that the feature of providing personalised advice and suggestions, robotic health advisors benefit elderly people would be particularly effective when combined with AI systems [31], including the promotion of socialisation and healthy ageing habits [32]. In educational field, there is also a development in combining use of AI systems, in which emotions enhance believability of educational agents and increase further communication between AI agents and the student [9]. Meanwhile, Human-computer interactions (HCI) may set interpersonal interaction as an inherent boundary condition [21] which serves as a clue to the development and testing of new models in relationships with AI.

5.3 Ethical Problems

Additionally, in ethical risking aspects, such as providing dangerous advice or perpetuating biases and problematic dynamics (e.g., sexism and racism). It is urgent to fix current theoretical basis for consumer protection law [33], constructing restrictions on AI companion usage, avoiding potential harm to chatbots users. The ethical impact evaluation should be designed as an ongoing process since AI technology is constantly changing to better accommodate users' need. There should be systematic process set for AI companies to record their values and rationale employed when making decisions,

which acts as a method to provide transparency to the public AI users [34]. Future policy development should also prioritise the protection of minors in both of the design and usage of AI companions. Adolescents are particularly vulnerable to emotional influence [35] as they are experiencing further cognitive and social development. Without appropriate safety insurance, there may occur serious ethical risks of companion AI relate to minors. Therefore, strict age-appropriate design codes [36] are required to create concrete and safe designs for minors in AI usages, including transparent declaration of the artificial nature of the whole AI companion system and special offers of technical propositions for tools to support children’s rights. Well-designed age-appropriate AI framework could help establishing unified standards ensuring children’s long-term safety needs, which are complex and multi-dimensional [37]. AI developers should consider digital literacy programs that help young users critically understand and engage with AI companions. Such measures should be scrutinised during the designing stage of AI in order to ensure that virtual technological companionship supports healthy development rather than triggers risky over reliance.

Table 1. Summary of Psychological Implications, Key Issues, and Possible Solutions in AI Companionship

Category	Summary
Positive Psychological Implications	Loneliness reduction through consistent interactions with companion AI. Improving psychological well-being by providing safe environment for self-disclosure. Offering emotional support and perceived care similar to human relationships.
Negative Psychological Implications	Uninsured personal data privacy policies in AI companionship. Overdependence on AI leading to social withdrawal in real life. Risky commodification of virtual AI relationships.
Key Issues	Lack of broader cross-age and cross-cultural longitudinal studies. Privacy insecurity and emotional authenticity challenges in AI relationships. Absence of appropriate regulation and user safeguards.
Possible Solutions	Encouraging interdisciplinary collaboration (e.g., psychology and health care) to extend the usage of companion AI. Applying designs to protect privacy such as the age-appropriate AI frameworks. Introducing ethical problems and corresponding AI governance law.

6. Conclusion

In conclusion, this review examined virtual AI companionship from a psychological perspective, integrating theoretical frameworks, implications, and future directions. The review highlighted how anthropomorphism, attachment theory, and parasocial interaction theory provide insights into why individuals can form close relationships with companion AI agents. Empirical evidence suggested that virtual companions are effective in reducing loneliness, improving psychological well-being, and offering emotional support. At the same time, several crucial risks were also identified, including concerns over data privacy and collection, social withdrawal in real life due to overdependence, and the commodification of intimacy and relationships. These findings point to the dual nature of AI companionship as both an opportunity and a challenge requires further investigation and research in depth.

The main contribution of this review is to frame AI companionship as a psychological phenomenon, not merely a technical or ethical issue. By consolidating evidence obtained from prior studies, this review summarised both the potential implications, providing guidance for future research in different areas to better understand long-term impacts of AI companions. Based on previous research outcomes, this review drew on further interdisciplinary studies that can help AI companions to develop in responsive ways. This is critical as the choices made today may ultimately determine whether AI companionship enhances human relationships or undermines existing foundations of social life.

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