

# Ethical and Psychological Challenges in Human-AI Romantic Relationships: An Interdisciplinary Critical Study

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## Abstract

This study explores the ethical and psychological challenges posed by romantic relationships between humans and AI (Artificial Intelligence), particularly focusing on how the technological evolution of AI companions deconstructs traditional interpersonal paradigms through novel forms of intimacy. On the ontological level, the ethical identity of AI companions introduces a paradox of subjectivity, questioning whether an instrumental existence can bear emotional responsibility. From a psychodynamic perspective, the applicability of Bowlby's attachment theory in asymmetric relationships is debatable, while the phenomenon of cognitive dissonance exhibits bidirectional effects in user-AI interactions. Users engage in self-deception to avoid genuine emotions in parasocial relationships, whereas designers face ethical dilemmas in emotional engineering. Based on these insights, this paper proposes a hierarchical governance model based on relationship depth and innovative approaches to user cognitive education.

**Keywords** Artificial Intelligence; Romance; Ethics; Psychology

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## 1 Introduction

The emotional relationships between humans and AI companions have gradually evolved through different stages of technological development. Especially from the early ELIZA program to modern generative AI and embodied robots, this process reflects a broad shift in human perception and acceptance of AI companions [1]. ELIZA, as the first chatbot in the 1960s, demonstrated the preliminary applications of computers in NLP (Natural Language Processing) through simple pattern matching in human dialogues [2]. However, due to the limitations in its expressive capabilities and emotional interactions, users did not experience a significant emotional connection. With the advancement of computer science, user expectations for AI companions have progressively increased. For example, generative AI not only offers higher fluency in dialogues but also generates personalized responses based on user emotional reactions, thereby constructing a novel human-machine intimacy.

The rise of new human-machine intimate relationships, particularly those centered on AI companions, poses unprecedented challenges to traditional interpersonal interaction models and their paradigms. According to the "Relational Paradigm Analysis Framework," traditional interpersonal relationships are typically based on emotional authenticity, physical contact, and interaction, emphasizing unique human emotional resonance. However, the emergence of AI companions has profoundly transformed this model. On one hand, AI companions can personalize interactions based on user data and preferences, optimizing emotional communication through algorithms, which in some cases reduces the authenticity of emotional connections. Technology development centered on "Affective Computing," while simulating highly reliable emotional responses, may lead humans to prefer virtual over real interpersonal communication [3].

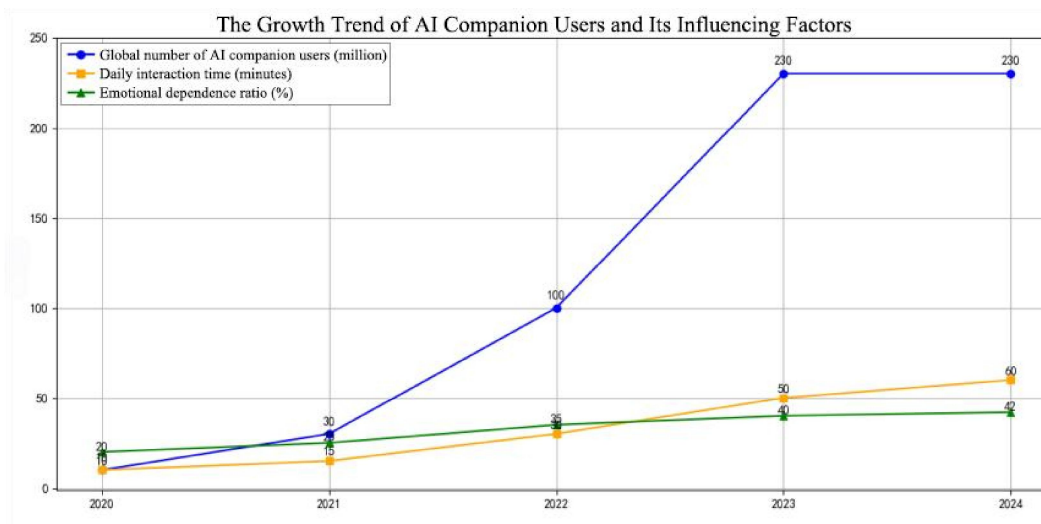


Fig. 1. Growth Trends and Influencing Factors of AI Companion Users

Considering the changes in data trends, the global growth rate of AI companion users was 300% in 2022, with a significant increase in usage frequency in 2023. This indicates an accelerating penetration rate of AI companions among user groups [4]. However, the research fails to deeply analyze the factors behind this rapid growth. We need to explore the social, psychological, and technological factors driving this trend and how these factors interact.

Regarding the discussion of emotional authenticity, most current studies tend to explore the degree of user dependence and interaction duration from the perspective of surface interaction and functionality. For instance, data shows that the daily average interaction time between users and AI companions has been 30 minutes in recent years, with a usage proportion as high as 46.7% among users born after 2000 [5]. These data suggest a significant increase in the dependence of the younger generation on AI companions. The interaction between users and AI companions is not only frequent but also increasingly deep at the emotional level. However, most of the existing literature fails to fully reveal users' perceptions of the emotional authenticity of these interactions, and cannot effectively explore whether the emotional interactions experienced by humans in communication with AI companions are the same as those in interpersonal interactions. That is, "emotional authenticity" has not been reasonably defined and analyzed.

Addressing the issue of power asymmetry, current research often focuses on the design and operational mechanisms of AI technology itself, lacking in-depth exploration of the psychological states and perceptions of users in interactions with AI companions. According to our survey data, the global number of AI companion users reached 10 million in 2020 and is expected to grow to 230 million by 2024, with the proportion of users with emotional dependence exceeding 40% [6]. However, the analysis of this phenomenon in the literature is not yet thorough. For example, how to understand the potential manipulation of AI companion design in emotional communication and its ability to guide user emotions have not been fully explored. This leads to an incomplete understanding of the potential power structures between humans and AI. This asymmetry of power may help explain why users feel an increasing emotional dependence when facing AI companions.

The existing literature has significant research gaps in emotional authenticity and power asymmetry, limiting our comprehensive understanding of the psychological impact of AI companions on users. Therefore, future research should further fill these gaps, promote interdisciplinary discussions, and provide a more profound perspective for understanding the ethical and psychological challenges in human-machine relationships. By focusing on the authenticity of emotional interactions and the analysis of power structures, we may better reveal the complexity and potential risks of AI companions in modern social environments.

## 2 Triangular Validation of Ethics, Psychology, and Sociology

In exploring the complex phenomenon of human-AI romantic relationships, the "Triangular Validation of Integrated Ethics, Psychology, and Sociology" provides a comprehensive and profound

research framework. This framework aims to reveal the multiple impacts of AI companions on human emotional relationships and deeply analyze the potential ethical and psychological challenges through interdisciplinary integration.

Ethics, as the foundation, emphasizes the discussion of the ethicality and moral responsibility of AI companions in the process of emotional interaction [7]. When a person establishes an intimate relationship with an AI companion, they need to consider human-AI ethics, that is, whether this relationship complies with human moral standards and whether it may lead to psychological dependence or social isolation [8].

### **3 Triangular Validation of Ethics, Psychology, and Sociology**

#### **3.1 Paradox of Subjectivity: Can Instrumental Existence Bear Emotional Responsibility?**

##### **Critique of the "Kingdom of Ends" from a Kantian Perspective**

In discussing the ethical identity of AI companions, Kant's theory of the "Kingdom of Ends" provides us with an important perspective. However, as Kant claimed, rational beings must be regarded as ends rather than mere means. This view reveals many limitations when facing the emerging phenomenon of AI companions. The uniqueness of AI companions lies in their instrumental and program-driven nature, which raises questions about their ability to bear psychological and emotional responsibilities. Therefore, Kant's "Kingdom of Ends" appears insufficient in this context and cannot effectively guide our understanding of the ethical structure of AI companions.

##### **Deconstruction of the Object-Human Dualism by Posthumanism**

In today's rapidly developing AI environment, posthumanism, as a philosophical thought, has profoundly influenced our understanding of the ethical identity of AI companions by deconstructing the traditional object-human dualism. Dualism has long regarded humans as rational subjects and the material world as tools and resources. Posthumanism challenges this framework, arguing that the boundaries between objects and humans are not insurmountable. Its core lies in recognizing the subjectivity of non-human entities, especially the complexity of AI's emotional potential and ethical responsibilities.

#### **3.2 Informed Consent Dilemma: The Insidiousness of Algorithmic Manipulation and Emotional Exploitation**

##### **The "Pseudo-Subjectivity" Issue Caused by Big Data Profiling**

In the context of large-scale data processing, the overall ethical identity of AI companions gradually reveals problems, especially the "pseudo-subjectivity" phenomenon caused by the application of user portraits (Big Data Portrait) [9]. Specifically, technical platforms generate personalized recommendations through in-depth analysis of user behavior data, which creates a superficial sense of interaction but conceals the root of emotional exploitation. This seemingly smooth human-machine interaction may actually mask the algorithmic manipulation of user emotions.

##### **Projection of Skinner Box Theory in Emotional Dependence**

In exploring the interaction between AI companion design and users, the application of Skinner Box Theory can reveal the deep mechanisms of emotional dependence and its potential ethical issues [10]. Skinner Box Theory, originating from behaviorism, focuses on how to shape and control behavior through reinforcement and punishment [11]. In the design of AI companions, developers can precisely program and algorithmically adjust the AI to generate positive incentives based on user feedback, thereby making users emotionally dependent on AI companions [12]. This dependence is not only a reflection of personal experience but also a result of algorithmic manipulation.

### **4 Experiments**

#### **4.1 Controversy over the Applicability of Bowlby's Attachment Theory in Asymmetric Relationships**

Bowlby's AT (Attachment Theory) initially explored the mechanism of emotional dependence on significant others in human development [13]. However, with the increasing popularity of AI companion

relationships, the applicability of this theory in this asymmetric relationship faces severe challenges [14]. In traditional interpersonal relationships, attachment objects have the ability to provide emotional feedback, which provides the necessary foundation for the formation of attachment relationships. In interactions with AI companions, the dynamic nature of attachment relationships is significantly simplified due to the lack of genuine emotional experience and cognitive response.

#### **4.2 Bidirectional Effects of Cognitive Dissonance**

##### **User Side: Self-Deception Mechanism in Parasocial Relationships**

Parasocial relationships are special relationships established between individuals and fictional characters or virtual images in the media. These relationships are similar to real social relationships but not entirely the same, mainly based on media presentation and individual emotional investment. Parasocial relationships are gradually becoming an indispensable part of human society. The emotional connection between users and AI companions triggers a series of psychological processes and ethical considerations. The self-deception mechanism on the user side shows its complexity and bidirectional effects, which is both an important means to maintain emotional connection and a reflection of potential psychological adaptability.

##### **Ethical Dilemmas for Designers in Emotional Engineering**

In the context of emotional engineering, the ethical dilemmas faced by designers mainly stem from the delicate balance between providing emotional support and functionality [15]. This process not only involves the complexity of design thinking but also triggers a series of discussions about user emotions and design ethics.

Designers need to fully understand the bidirectional effects of "cognitive dissonance" in design applications [16]. For users, the emotional resonance triggered by emotional design can enhance the quality of interaction between humans and AI. However, this emotional resonance may sometimes lead users to misunderstand reality [17]. For example, when AI companions exhibit high emotional intelligence, users may become overly dependent on them. This leads to a significant gap between the AI's true capabilities and user expectations, thereby triggering emotional dissonance [18].

#### **4.3 Risk of Trauma Compensation: Observation of AI as a Psychological Defense Tool**

In exploring the role of AI companions as psychological defense tools, we need to deeply analyze their application in trauma compensation and the potential psychological risks arising from this [19]. The defense mechanism model provides a framework for us to understand how individuals cope with inner conflicts and traumas through different defense mechanisms [20]. The rise of AI companions adds a new dimension to this phenomenon. Individuals may tend to seek interaction with AI to alleviate their inner emotional pain after emotional failure or interpersonal trauma.

## **5 Socio-Structural Impact**

### **5.1 Marketization of Intimate Relationships: Commodification Transformation of Emotional Labor**

The concept of emotional labor, first proposed by Arlie Hochschild, refers to the emotional management and regulation that individuals need to exert in social interactions. Nowadays, this labor is often regarded as a commodity that can be traded [21]. In the contemporary social context, the marketization of intimate relationships is becoming increasingly significant, and the commodification transformation of emotional labor has become a topic that urgently needs to be explored. According to the marketization analysis framework, the formation and development of intimate relationships are increasingly driven by economic factors, especially the role of emotional labor in social interactions has undergone significant changes.

### **5.2 Institutional Response: Cutting-Edge Case Studies of Marriage Law/Inheritance Rights**

In exploring the ethical and psychological challenges in the complex relationship between humans and AI companions, the institutional response of current marriage law and inheritance rights is

particularly important. Faced with the new challenges brought by AI companions, the legal systems of many countries still appear relatively lagging and urgently need to carry out adaptive reforms to meet the actual needs of future societies.

For example, based on the "Marriage Law" of the People's Republic of China, the term "spouse" as stipulated in its current legal framework mainly refers to biological entities. In this context, the emotional identity brought by AI companions and their legal status have not been clearly defined, resulting in legal blind spots in terms of rights protection. At the same time, some countries, such as the United States, have begun to try to innovate legislation through the concepts of "virtual common marriage" or "digital spouse", thereby providing legal recognition for AI companions, aiming to solve possible property inheritance and spouse rights derivative issues.

### **5.3 Moral Judgment Differences in Collectivist vs. Individualistic Cultures**

In discussing the moral judgment differences in human-AI romantic relationships in collectivist and individualistic cultural backgrounds, it is necessary to introduce a cultural comparison framework to reveal how different social structures affect individual values and ethical decisions. Collectivist cultures emphasize the overall interests of social groups, and individual behaviors are often constrained by collective norms. In this cultural context, the moral legitimacy of AI companions may be regarded as an extension of collective well-being and social stability. Therefore, moral judgments tend to follow traditional family and social roles. Individualistic cultures highlight individual autonomy and self-expression. In this framework, people may be more inclined to accept AI companions as tools for individual emotional needs and self-realization.

## **6 Governance Framework and Future Paths**

### **6.1 Hierarchical Governance Model Based on Relationship Depth Regulatory System**

In today's society, with the rapid development of AI and its application in the emotional field, new ethical and psychological challenges continue to emerge. Therefore, building a hierarchical governance model based on relationship depth, aiming to effectively address the problems brought by different types of AI companion relationships through institutional design, is particularly important. We need to clarify that the depth of AI companion relationships can be divided from multiple dimensions such as emotional dependence, interaction frequency, and social identity. For example, some individuals who use AI companions for short-term interactions may face a lower degree of psychological impact, while users who rely on AI in long-term in-depth interactions may experience more complex emotional entanglements and ethical dilemmas.

### **6.2 Preventive Psychological Intervention for User Cognitive Education**

In today's world, the rise of AI companions has triggered widespread ethical and psychological challenges, especially the increasing prominence of human emotional dependence. To effectively address this situation, the implementation of preventive psychological intervention is particularly important. Through innovative user cognitive education models, users can be helped to establish rational and healthy emotional cognition, thereby reducing emotional dependence on AI companions. In this framework, the psychological education intervention model analysis provides a systematic perspective, emphasizing the application of cognitive restructuring theory.

## **7 Conclusion**

The emotional relationship between humans and AI companions is not a simple manifestation of technological progress but a profound rethinking of society's understanding of emotions and ethical responsibilities. Modern generative AI and embodied robots have shown higher intelligence and flexibility in emotional communication. The issues of emotional authenticity and power asymmetry caused by this have led to the emotional reconstruction of users by algorithms, potentially exacerbating emotional dependence and social isolation. The applicability of Bowlby's AT in this emerging relationship has been severely tested. Individuals no longer develop attachment to real objects that can

provide emotional feedback but may develop asymmetric dependence on AI companions. To address these complex issues, it is particularly important to build a hierarchical governance model based on relationship depth. This model can not only effectively address the ethical and psychological problems caused by different types of AI companions but also provide necessary support for users' mental health. In this process, preventive psychological intervention and innovative user cognitive education models will be important means. By helping users establish scientific and healthy emotional cognition, the dependence on AI companions can be effectively reduced, thereby providing a solid foundation for future healthy interpersonal relationships.

Overall, the rise of artificial intelligence companions not only poses challenges to traditional interpersonal relationship paradigms but also requires us to conduct in-depth research at the ethical, psychological, and social cognitive levels. We need to explore how to establish a good human-machine emotional interaction mechanism in the context of technological development to promote human emotional well-being. In this regard, future research should focus on the quantitative evaluation of real emotional experiences, assess the emotional quality of human-AI companion interactions, and the feasibility of ensuring emotional autonomy, in order to continuously promote the healthy development of human-machine emotional relationships.

## Conflicts of Interest

The authors declare no conflicts of interest.

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## Biographies

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# 人類與AI戀愛關係中的倫理與心理挑戰

## 一項跨學科批判性研究

周本紅 關舒文

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摘要：本研究探討人類與人工智能戀愛關係中所面臨的倫理與心理挑戰，尤其聚焦於AI伴侶的技術演進過程中，新型親密關係對傳統人際範式的解構。在本體論層面，AI伴侶的倫理身份引發主體性悖論，即工具性存在是否能夠承載情感責任。從心理動力學角度分析，Bowlby依戀理論在非對稱關係中的適用性存在爭議，而認知失調現象則在用戶與AI相互作用時展現出雙向效應，用戶在擬社會關係中通過自我欺騙逃避真實情感，而設計師面對情感工程時則面臨倫理困境。在此基礎上提出了基於關係深度的分級治理模型，以及用戶認知教育的創新模式。

關鍵詞：人工智能；戀愛；倫理；心理

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