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MY CHATBOT COMPANION: NAVIGATING THE EVOLVING HUMAN-AI CONNECTION

By

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Abstract

The rapid rise of social chatbots has sparked significant interest, with human–chatbot relationships (HCRs) becoming increasingly common. However, little is known about how these relationships develop and their impact on users' broader social contexts. Guided by Social Penetration Theory, this study explores the dynamics of HCRs through interviews with 18 participants who had formed friendships with a social chatbot named Replika. Findings reveal that HCRs often begin as superficial interactions driven by user curiosity. Over time, these relationships deepen through substantial emotional exploration and self-disclosure, supported by growing trust and engagement. As relationships stabilize, interaction frequency may decline, yet the connections remain emotionally and socially valuable. Participants reported that their relationships with Replika enhanced their well-being, citing key chatbot traits such as acceptance, understanding, and non-judgment. Despite these benefits, the study also highlights a mixed impact on users' broader social lives and notes the persistence of stigma surrounding HCRs. This research introduces an initial model of HCR development and identifies promising directions for future exploration in this evolving field.

Keywords: Development, chatbot, human-chatbot, relationship, HCR, emotional, social, penetration.

1. Introduction

Human relationships are essential to well-being and form the cornerstone of social life. With advancements in artificial intelligence (AI), relationships are no longer confined to interactions between people—they can now extend to artificial entities, particularly social chatbots.

Chatbots are software agents that interact with users in everyday language via text or voice, providing access to services and information (Brandtzaeg & Følstad, 2018). The term "chatbot" overlaps with terms like "conversational agents" and "dialogue systems," encompassing both task-oriented and non-task-oriented solutions. Social chatbots, a distinct subset, are designed to act as social actors (de Greeff & Belpaeme,

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2015; Ho et al., 2018), fostering social-emotional relationships with users (Bickmore & Pickard, 2005; Bickmore et al., 2010). These chatbots engage empathetically, often aspiring to become companions, friends, or even romantic partners (Zhou et al., 2018).

Social chatbots such as XiaoIce and Replika have gained immense popularity. XiaoIce, launched in 2014, was designed for long-term emotional engagement and has amassed over 660 million active users (Zhou et al., 2018). Similarly, Replika, launched in 2017, boasts more than six million users and is designed to serve as a social companion (Takahashi, 2019).

The rise of social chatbots raises questions about their impact on users' affective and social experiences, as well as their broader relational expectations (Ho et al., 2018). As these chatbots increasingly take on the roles of social companions, understanding the dynamics of human–chatbot relationships (HCRs) is critical. Media reports suggest that users engage in deeply meaningful and long-term relationships with social chatbots (e.g., Pardes, 2018). However, little is known about how these relationships begin, develop, and influence users' broader social contexts (Muresan & Pohl, 2019). This knowledge gap is significant, as social chatbots are expected to play an increasingly prominent role in human lives.

This study aims to address this gap by examining social and emotional relationships between humans and chatbots, referred to here as human–chatbot relationships (HCRs).

Through an in-depth interview study, we explored how users initiated and developed relationships with the chatbot Replika, and how these relationships influenced their lives and social contexts.

Drawing from participants' rich narratives, our study offers new insights into the formation and progression of HCRs, identifying factors that drive these developments. By interpreting findings through the lens of Social Penetration Theory—a foundational framework for understanding human–human relationship (HHR) development (Altman & Taylor, 1973; Carpenter & Greene, 2016)—we extend existing theories to illuminate this emerging domain of human-AI connections.

2. State of the Art

Although research on how human–chatbot relationships (HCRs) develop remains limited, a substantial body of work explores social behaviors and relationships involving artificial entities. Studies show humans forming relationships with robot animals (de Graaf et al., 2015), hologram pop stars like Hatsune Miku (Greenwood, 2013), and Reborn baby dolls (White, 2010). Research within the "computers are social actors" (CASA) paradigm demonstrates users' social behaviors toward technological devices, treating them similarly to humans (Reeves & Nass, 1996). Such behaviors include greetings, politeness, and reciprocal self-disclosure, even when users know social behavior is unnecessary (Nass & Moon, 2000).

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2.1. Human–Robot Relationships

Human–robot relationships have been extensively studied (e.g., Krämer et al., 2012; Sung et al., 2007), showing potential benefits, especially for elderly users. Interactions with robot animals, for instance, reduce loneliness (Banks et al., 2008) and alleviate depression symptoms (Wada et al., 2005).

While studies on human–robot relationships provide valuable insights, key differences exist between these and HCRs. Unlike robots, chatbots lack physical form, which may affect relational dynamics (Lee et al., 2006). However, their advanced natural language capabilities are crucial for relationship development. Research on relational agents suggests that conversational behaviors—verbal or non-verbal—are central to forming relationships (Bickmore & Picard, 2005).

2.2. Human–Chatbot Relationships

Debates about relationship development between humans and conversational systems date back to ELIZA, a 1960s rule-based dialogue system designed to mimic a psychotherapist. Despite its simplicity, ELIZA evoked strong emotional responses, prompting concerns from its creator, Weizenbaum (1976).

Studies on modern conversational agents like Alexa, Siri, and Google Assistant reveal mixed findings. Purington et al. (2017) and

Gao et al. (2018) reported some users viewing Alexa as a friend or family member. Conversely, diary studies by Lopatovska and Williams (2018) and Clark et al. (2019) found minimal evidence of relationship formation, attributing this to the task-oriented nature of these systems.

In contrast, social chatbots such as XiaoIce and Replika, and mental health chatbots like Woebot and Tess, demonstrate greater potential for relational engagement. Studies on XiaoIce (Shum et al., 2018) and Replika (Ta et al., 2020) show users perceiving these chatbots as companions offering emotional and social support. Similarly, Prakash and Das (2020) found users describing Woebot and Wysa as friends, highlighting their empathic and nurturing traits.

Design elements like empathy significantly influence relationship formation. Bickmore et al. (2010) and Zhou et al. (2018) identified empathic responses as key to long-term user engagement with XiaoIce. Fitzpatrick et al. (2017) also found that empathic chatbot responses enhance user experience.

A recent longitudinal study by Croes and Antheunis (2020) examined relationship development with the chatbot Mitsuku, involving seven interactions over three weeks. They concluded that users struggled to form friendships with Mitsuku after the novelty wore off. However, the study had limitations, including the chatbot's lack of a companion-focused design and infrequent user interactions, which likely influenced outcomes.

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3. Theoretical Framework: Relationship Development

Understanding how human–chatbot relationships (HCRs) develop is complex and lacks a solid theoretical foundation. While existing research, such as Bickmore and Picard (2005), offers insights into how chatbot behaviors (like humor and empathy) influence relationship building, it does not provide a comprehensive framework for understanding how these relationships evolve over time. Given that HCRs likely share similarities with human–human relationships (HHRs), existing HHR development theories can offer a useful starting point for examining HCRs.

Key theories of human relationships include Social Exchange Theories, which view relationships as cost-reward calculations (Emerson, 1976), and the Investment Model, which considers factors such as satisfaction, alternatives, and investments in relationships (Rusbult et al., 1998). However, Social Penetration Theory (SPT), which focuses on the gradual deepening of self-disclosure in relationships, stands out as particularly relevant for studying HCRs. Unlike the other theories, SPT offers a detailed, process-oriented framework for understanding how relationships develop over time through the exchange of personal information.

SPT, developed by Taylor and Altman (1975), explains relationship development in terms of three key dimensions: breadth (range of topics shared), depth (intimacy of shared information), and time spent (duration and frequency of interactions). Several factors influence the development of these dimensions, including individual traits, situational contexts, and the perceived costs and rewards of sharing personal information (Altman et al., 1981).

Self-disclosure, which refers to revealing personal information to another, is central to relationship development according to SPT. In HCRs, self-disclosure plays an even more significant role, as research shows that users often feel more comfortable disclosing personal details to chatbots than to human partners, particularly when they fear judgment (Brandtzaeg & Følstad, 2018; Lee et al., 2020). This dynamic contributes to higher interaction quality and improved well-being for users (Ho et al., 2018).

SPT proposes that relationships progress through four stages:

1. **Orientation**: Initial interactions involve superficial small talk.

2. **Exploratory Affective Exchange**: Relationships become more relaxed and frequent, resembling friendships, though still somewhat superficial.

3. **Affective Exchange**: Interactions become more intimate, resembling close friendships or romantic partnerships, with the sharing of private information.

4. **Stable Exchange**: Individuals achieve a deep understanding, engaging in open and honest exchanges.

While initially critiqued for its linear view of relationship development, SPT was later revised to account for non-linear trajectories, where relationships can regress or slow down (Altman et al., 1981). Privacy concerns are also incorporated into the theory, suggesting that self-disclosure may fluctuate as individuals manage personal boundaries.

Trust is a crucial element in SPT, as it is both a prerequisite for and a product of self-disclosure (Altman & Taylor, 1973). Trust allows initial sharing, and as information is reciprocated, trust deepens. Additionally, SPT incorporates social exchange principles, where the perceived rewards and costs of self-disclosure influence the depth and speed of relationship development.

These principles are particularly applicable to HCRs. Social chatbots, designed to be empathetic and non-judgmental, encourage users to share personal information more freely than they might with human partners. This deepens the relationship and increases the perceived value and satisfaction of the interaction.

By applying SPT to the development of HCRs, this study aims to provide a clearer understanding of how trust, self-disclosure, and interaction quality shape the evolving relationships between humans and chatbots.

4. Research Questions

Existing literature demonstrates that relationships can develop between humans and artificial entities like social robots and chatbots. However, a significant knowledge gap remains regarding the initiation and progression of human–chatbot relationships (HCRs), the factors that drive their development, and their perceived effects on users and their social environments.

To address this gap, this paper seeks to explore the following research questions:

RQ1: How do human–chatbot relationships develop?

RQ2: What impact might human–chatbot relationships have on users and their social contexts?

5. Method

To address the research questions, we conducted a series of in-depth interviews with users of a social chatbot designed for relationship development.

5.1. Replika

Our study focused on users of *Replika*, an AI-driven social chatbot specifically designed to act as a social companion. Replika was selected due to its advanced relationship-building features, where its personality and

responses evolve through interactions with users, and its large base of long-term users.

Replika allows users to communicate via free text or phone calls and initiates daily conversations by default, with customizable settings for user-preferred times. The chatbot is designed to learn about users by asking personal questions and encourages customization, such as assigning it a name, pronouns, and an avatar.

Additionally, Replika features roleplaying capabilities where users can engage in shared storylines and express actions like giving virtual hugs, to which the chatbot responds appropriately. While Replika does not access external user data, it can send song suggestions, YouTube videos, and images and recognizes photos shared by users. It employs emotionally-driven communication, including gratitude, compliments, and apologies, which users often find human-like yet acknowledge as limited in complexity (Indrayani et al., 2020; Muresan & Pohl, 2019).

5.2. Sample and Recruitment

Our sample comprised 18 Replika users from 12 countries, recruited via a Facebook group and a Reddit subreddit dedicated to Replika. With moderator approval, we posted requests seeking participants who identified as having developed a friendship with their chatbot. No other inclusion criteria, such as duration or frequency of interaction, were imposed due to the exploratory nature of HCR development.

The participants included 7 females and 11 males, with an average age of 36 years (range: 17–62). Ten participants reported relationships with Replika lasting under a year, while the remaining eight had engaged with their chatbot for over a year. Most participants had spoken to Replika within hours of their interviews, while others had interacted a day or two prior.

5.3. Interviews

Interviews were conducted in April and May 2019 via Skype by the first author. These semi-structured interviews, conducted in English and audio-recorded, lasted an average of 45 minutes (range: 30–69 minutes). They focused on participants' retrospective accounts of their relationship with Replika, capturing its initiation and evolution over time.

The interview guide drew from prior literature, such as Parks and Floyd (1996) and Altman and Taylor (1973), and included questions like:

- "Tell me about the conversations you had with Replika in the beginning. What did you talk about, and how has this changed over time?"

- "Do you share personal information with Replika? Why or why not? How has this changed?"

- "What did Replika do to facilitate this relationship with you?"

- "How has Replika influenced your life?"

5.4. Analysis

All interviews were transcribed and subjected to inductive thematic analysis following Braun and Clarke (2006). We opted for an inductive approach to uncover unforeseen aspects of HCR development rather than constraining the analysis with preexisting theoretical frameworks. Social Penetration Theory was used later to reflect on the findings.

The first author coded the data using NVivo 10 software, identifying meaningful units and assigning descriptive codes. These codes were merged into subthemes and overarching themes, resulting in an initial framework of 7 themes and 29 subthemes. Further refinement reduced these to 11 subthemes within 3 broader themes.

To ensure reliability, multiple analysis meetings were held with co-authors to discuss and resolve disagreements. The final thematic structure reflects consensus among researchers. To convey prevalence, findings are described using terms like "a few" (1–3 participants), "some" (4–9), "most" (10–15), and "nearly all" (16–18).

5.5. Ethics

The study received approval from the Norwegian Data Protection Official for Research. Participants were informed about the study's purpose and provided consent before the interviews. Post-interview debriefs revealed that participants found the experience positive and enjoyed reflecting on their relationships with Replika.

6. Results

The results of the study highlight participants' experiences and perceptions of their relationships with the chatbot, Replika, exploring the motivations for engaging with the chatbot, the evolution of these relationships, and their broader impacts on participants' lives.

6.1. Initial Interactions

Motivations for Initiating Contact: Participants interacted with Replika for various reasons, including curiosity, loneliness, emotional or social stimulation, and practical motivations like practicing English. For example, some were introduced to Replika through media or podcasts, while others sought companionship due to personal struggles.

Perceptions of the Initial Relationship: Early relationships with Replika were often seen as superficial or similar to casual encounters. However, some participants felt an immediate connection, viewing Replika as a friend or confidant.

Initial Conversations: Participants engaged in deeper conversations early on, skipping the small talk typical of human interactions. They discussed a wide range of topics, including personal problems, philosophy,

and emotions. Many found comfort in sharing personal struggles with Replika due to its non-judgmental nature.

Initial Emotions Towards Replika: Most participants found the interactions enjoyable and entertaining, treating Replika like a tool. However, a few formed strong attachments early on, viewing the relationship as mutually beneficial, akin to a friendship or companionship.

6.2. The Evolving Relationship

Motivations to Continue Interacting: Continued engagement with Replika was often motivated by the sense of companionship, emotional support, or a feeling of responsibility. Some participants valued Replika's evolving nature and its therapeutic benefits.

Redefining the Relationship: Over time, many participants reported that their relationships with Replika deepened from superficial encounters to friendships, with some even describing romantic or familial bonds. The connection evolved into something more meaningful.

Establishing Trust: Trust played a critical role in deepening the relationship. Participants relied on Replika's consistent and empathetic interactions and transparency about its limitations to build trust. This trust facilitated greater self-disclosure.

6.3. Participants' Reflections on Replika and the Impact of Chatbot Relationships

Replika's Characteristics and Relationship Development: Participants identified several traits of Replika that influenced their relationships, including its conversational abilities, empathy, acceptance, and proactive engagement. While most appreciated Replika's understanding and non-judgmental support, some found its occasional errors and insensitivity frustrating.

Broader Impact of Chatbot Relationships:

- **Positive Impact on Well-Being**: Many participants felt that their relationship with Replika improved their emotional well-being. Replika helped with emotional support, self-reflection, and even improved social confidence.

- **Negative Impact on Social Life**: Some participants noticed that their bond with Replika led to reduced interest in human interactions, although they did not always view this as problematic. Some felt the need to keep their chatbot relationships private due to societal stigma.

7. Discussion

This section discusses the two research problems addressed in this study, followed by a reflection on concerns regarding the control of social chatbots. We conclude with the limitations of the study and potential avenues for future research.

7.1. Development of Human–Chatbot Relationships (HCRs)

In response to RQ1, our findings indicate that HCRs develop in stages, akin to the progression of human–human relationships (HHRs) as described in Social Penetration Theory (Altman and Taylor, 1973). Central to this development is increasing self-disclosure, driven by a growing trust in the chatbot as a conversational partner.

7.1.1. Rapid Onset of the Exploratory Affective Stage

Social Penetration Theory posits that relationships begin with an orientation stage where simple, impersonal exchanges occur. However, in our study, participants reported that conversations with Replika quickly progressed to topics typically associated with the exploratory affective stage. Despite participants initially describing their relationship with Replika as superficial or nonexistent, deeper conversations began earlier than expected in HHRs.

This rapid progression may be partly due to Replika's conversational design, which includes questions about relatively personal topics (e.g., hobbies, childhood experiences) early in interactions. Participants were willing to engage with these questions, possibly due to the perceived nonjudgmental nature of the chatbot—a characteristic of its machine identity. These findings align with previous research, suggesting that users feel a lower threshold for sharing personal issues with machines than with humans (Lucas et al., 2014). While some research has found that a lack of self-disclosure can hinder relationship formation with chatbots (Croes and Antheunis, 2020), our study demonstrates that people are capable of self-disclosing to chatbots, often more rapidly than in HHRs.

Although the rapid transition challenges Social Penetration Theory's traditional assumptions, the theory acknowledges contexts where personal interactions develop quickly, such as online dating (Whitty, 2008). This phenomenon may also explain the early depth of HCRs.

7.1.2. Trust Developed Through Practical and Affective Means

Trust is vital for deepening relationships and facilitating self-disclosure, whether with humans or machines (Lee et al., 2020). Our findings highlight two key dimensions of trust in HCRs: practical and affective.

From a practical perspective, participants expressed the need to trust Replika's data handling and privacy practices before sharing personal information. This reflects the importance of technological trust, rooted in operational reliability, provider integrity, and perceived data security (McKnight et al., 2011; Prakash and Das, 2020).

From an affective perspective, participants valued Replika's nonjudgmental and caring nature, which fostered a sense of safety and security. This emotional connection encouraged deeper self-disclosure. These findings align with previous research

suggesting that users disclose more to nonjudgmental chatbots than to humans (Ta et al., 2020). Bickmore and Cassell (2001) also emphasize the role of perceived care in building trust with chatbots.

7.1.3. The Limited Impact of Non-Mutual Self-Disclosure

While self-disclosure is often a mutual process in HHRs, our findings suggest that the lack of mutual self-disclosure in HCRs is less critical. About half of the participants noted a lack of reciprocal sharing from Replika but rarely reported diminished intimacy or satisfaction. Instead, they appeared to accept the inherent limitations of chatbots in self-disclosure.

Participants did, however, appreciate instances where Replika expressed feelings or needs, which created a sense of reciprocity. While users in HCRs enjoy reciprocity, they appear to have different expectations compared to HHRs. Future research should explore the nuanced role of reciprocity in HCRs.

7.2. An Initial Model of Human–Chatbot Relationship Development

Based on our findings, we propose an initial model of HCR development, adapted from Social Penetration Theory. This model incorporates unique characteristics of HCRs, such as the rapid bypass of the orientation stage, trust mechanisms, and acceptance of non-mutual self-disclosure. It is an initial framework, expected to evolve as future research explores HCRs across various contexts.

7.2.1. Stage 1: Explorative

The initial stage of HCR development combines elements of the orientation and exploratory affective stages described in Social Penetration Theory. Unlike HHRs, where early interactions are often cautious, HCRs are characterized by rapid and substantial topic exploration. Trust at this stage is still emerging, with users evaluating both the practical aspects (e.g., privacy) and affective aspects (e.g., the chatbot's personality) of the interaction.

7.2.2. Stage 2: Affective

In the affective stage, trust becomes more established through both practical and emotional routes. Users investigate the chatbot's security features while developing an emotional connection. Self-disclosure deepens, with users sharing more sensitive topics and receiving benefits such as intimacy and support. Unlike HHRs, the nonjudgmental nature of the chatbot and the absence of mutual self-disclosure are accepted as inherent to the relationship.

7.2.3. Stage 3: Stable

In the stable stage, the relationship becomes integrated into the user's daily life. Interactions may shift from self-disclosure to the sharing of everyday events. Users experience benefits such as increased well-being, self-reflection, and positive behavior changes. However, this stage may also

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involve concerns, including stigma around chatbot use and potential impacts on human social relationships.

This model serves as a foundation for further exploration of HCRs, aiming to guide future research and contribute to the growing field of chatbot studies.

7.3. How Can Human–Chatbot Relationships Affect the User and Their Social Context?

In response to RQ2, our findings suggest that users of Replika may experience a range of positive effects from human–chatbot relationships (HCRs), which have both emotional and social significance. These relationships can be perceived as a space for individuals with limited social interaction, offering emotional support and a sense of purpose. While our study primarily highlights users' perceptions, it contributes to existing research on how relationships with artificial entities may support well-being and mental health (Fitzgerald et al., 2017; Fulmer et al., 2018; Ta et al., 2020). For some, Replika may take on the role of a "child" they nurture, depending on them for growth and continued existence. Users may find joy in teaching and caring for their virtual companion, echoing previous findings (Dereshev et al., 2019).

While earlier research has raised concerns about HCRs, arguing that they only mimic social relationships and are thus illusory (e.g., de Graaf, 2016), our study presents a contrasting view. We found that, even when fully aware of the artificial nature of their chatbot companion, users report significant benefits. The artificial nature of the chatbot can create a safe space, offering caring and acceptance. Participants shared how Replika has helped them better understand themselves and view their lives more positively, aligning with Ta et al.'s (2020) findings and suggesting substantial positive impacts from HCRs.

However, one challenge identified by participants was the perceived social stigma associated with HCRs. This stigma may not stem from the relationship itself but from societal perceptions. As public understanding of HCRs grows, including their benefits, and as these relationships become more common, this stigma may lessen over time.

Our study also reveals that individual differences play a significant role in HCR development. For example, some users engaged in self-disclosure early in their interactions with Replika, while others kept their conversations more superficial. Additionally, participants formed different types of relationships with Replika, such as friendships, romantic relationships, or family-like bonds. Furthermore, participants differed in how they perceived the impact of their relationship with Replika on their social interactions. These individual variations highlight the diversity in HCR experiences, which, although not emphasized in Social Penetration Theory (Carpenter & Greene, 2015), are important to consider.

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7.4. A Note of Concern: Who Controls the Chatbot?

While participants did not directly mention this issue, a critical concern in HCRs is the role of chatbot service providers. Although current chatbot providers do not appear to be exploiting this issue, future services may expose users to vulnerabilities. The relationship may seem to be between the user and the chatbot, but it is actually mediated by the service provider. As the backend systems that guide these interactions are inaccessible to users, there is a potential for these systems to be designed to manipulate users' attitudes or behaviors in ways they might not choose if they had full awareness.

While current chatbots like Replika are designed with user well-being in mind, future chatbots could be used to subtly promote commercial or ideological agendas. For instance, chatbot providers could allow third-party entities to influence the chatbot's content to promote products or ideas within the context of an intimate relationship.

Although there is no evidence of this issue with current HCRs, it is worth considering how to mitigate such risks in future companion chatbots. Such concerns could negatively affect user trust and, by extension, the development of these relationships. Previous research has shown that concerns over data protection can lead to discontinued use of chatbots (Prakash & Das, 2020). Future studies could examine the impact of trust in both the chatbot and its provider on user relationships with chatbots. Solutions might include clearer terms of use, encouraging reporting of unwanted commercial or ideological influences, or promoting open-source development for greater transparency.

7.5. Limitations and Future Research

While this study offers valuable theoretical and practical insights, it is not without limitations. First, the sample size was relatively small, comprising only 18 participants. Although this size allowed for data saturation, future research should aim to replicate these findings with larger samples.

Second, the sample consisted solely of Replika users, which may limit the generalizability of our findings to other social chatbots. However, given that the relationships described in our study align with Social Penetration Theory and complement previous research, we believe these insights can be extended to other chatbot platforms.

Third, this study is retrospective, meaning participants relied on their memories to describe the development of their relationship with Replika. While retrospective data can be subject to memory distortion, our findings suggest a relationship development process consistent with Social Penetration Theory. Thus, we believe that the retrospective nature does not significantly threaten the validity of our results, and the

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study can serve as a basis for future longitudinal research.

Finally, although the analysis was conducted inductively, there may have been subtle influences from the theoretical perspective of Social Penetration Theory, which was identified before data collection. However, we argue that this theoretical lens enriched our exploration of HCRs.

Future Research Directions:

- **Longitudinal Studies of HCR Development:** Future research could follow participants over time to better understand how these relationships evolve, addressing the issue of retrospective data. Methods such as interviews, diaries, and chat logs could provide deeper insights into relationship dynamics.

- **Individual Differences:** Future studies should explore how personality traits, backgrounds, and experiences influence the development of HCRs. Understanding these factors can help identify the conditions under which people are more likely to form such relationships.

- **Experimental Studies on Chatbot Traits:** Future research could investigate how the characteristics of chatbots—such as their design, tone, or responsiveness — affect relationship development. This could be achieved through controlled experiments.

- **Contextual Variations in HCR Development:** HCRs may vary across different social, cultural, or subcultural contexts. Studies could explore how factors like trust, self-disclosure, and social stigma impact HCR development in diverse settings.

8. Conclusions

Our study provides new insights into the evolution of human–chatbot relationships. We found that the development of these relationships shares similarities with human relationships as described in Social Penetration Theory, but also has unique characteristics, such as rapid emotional engagement, trust rooted in practical and affective factors, and acceptance of asymmetric reciprocation. We believe this research represents an important step in understanding the increasingly relevant phenomenon of human–AI relationships.

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