

On the Dark Side of AI Companions – How a Parasocial Preference for a Social Chatbot Can Lead to Pathological Chatbot Use

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Abstract

Social chatbots are becoming increasingly popular due to their ability to simulate human interactions and build socio-emotional relationships with users. However, along with the positive effects come potential risks. For example, a parasocial preference for a social chatbot could contribute to excessive and unregulated chatbot use, jeopardizing users' well-being. As the potential harms associated with social chatbots are largely unexplored, there is a need to integrate theories into the IS literature that explain the negative effects of a parasocial preference for a social chatbot. Therefore, we apply the cognitive-behavioral model of pathological internet use to human-chatbot interactions. We conducted two empirical studies and found that a parasocial preference contributes to deficient self-regulation regarding chatbot use and promotes the use of the chatbot for mood regulation. Furthermore, deficient self-regulation increases the risk of pathological chatbot use, especially among lonely users.

Keywords: Social Chatbots, AI Companions, Parasocial Preference, Pathological Chatbot Use, User-Chatbot Relationship.

1. Introduction

Due to their human-like characteristics, social chatbots are becoming increasingly popular and are used as personal assistants (e.g., Alexa, Siri, Google Assistant), therapists (e.g., Woebot), and companions (e.g., Replika, Character.AI) (Pentina et al., 2023). Social chatbots are AI-based dialogue systems that can interact with users in natural language and engage in social and empathetic conversations (Brandzaeg et al., 2022; Ho et al., 2018; Zhou et al., 2020). They can imitate emotional abilities, recognize a person's emotional state, and respond accordingly (Seeger et al., 2021), which is why they are increasingly being used as conversation partners (Xie & Pentina, 2022).

They can also build socio-emotional relationships with users (Klaus & Zaichkowsky, 2020) and act as friends, mentors, or romantic partners (Brandzaeg et al., 2022; Skjuve et al., 2021; Ta et al., 2020; Xie et al., 2023; Youn & Jin, 2021).

However, in addition to positive effects, e.g., on users' psychological well-being (Yang & Aurisicchio, 2021) and the reduction of loneliness (De Freitas et al., 2024), there are also potential risks associated with social chatbots, such as psychological and emotional dependence, addiction, and the promotion of extreme emotional attachments (De Freitas & Cohen, 2025; Laestadius et al., 2024; Pentina et al., 2023; Xie et al., 2023). Based on positive experiences with an IT artefact, such as a social chatbot, a person can develop a parasocial preference for it, in the sense of a person's specific preference for an IT artefact (Fröbel, 2025a; Fröbel, 2025b; Fröbel & Kenning, 2025a; Fröbel & Kenning, 2025b). This can lead a person to prefer the relationship with the IT artefact to another, real or imagined relationship (Fröbel, 2025a; Fröbel, 2025b; Fröbel & Kenning, 2025a; Fröbel & Kenning, 2025b), which could be associated with negative consequences such as excessive and unregulated chatbot use and pathological usage behavior. This poses considerable risks to users' mental health and well-being (Fröbel, 2025b; Xie et al., 2023; Zhang et al., 2025), especially given the increasing societal loneliness (Xie et al., 2023).

While numerous studies have demonstrated the positive effects associated with social chatbots (e.g., De Freitas et al., 2024; Kim et al., 2025; Skjuve et al., 2021; Wahbeh et al., 2023), the potential harms remain largely unexplored (Sepahpour, 2020; Xie et al., 2023). In addition, there is still a lack of knowledge regarding the potential negative consequences of a parasocial preference, as the concept has only recently been introduced into IS research on human-chatbot interactions (Fröbel & Kenning, 2025a). Against this background, the present study aims to investigate the potential risks of social chatbots in terms of user

behavior and well-being. To this end, we conduct two empirical studies on the social chatbots Replika and Character.AI and apply the cognitive-behavioral model of pathological internet use (Davis, 2001) to the context of chatbots to analyze the extent to which a parasocial preference for a social chatbot can promote the development of pathological chatbot use and what role the degree of users' loneliness plays in this context.

This study thus contributes to existing HCI research by conserving to the ongoing discourse on AI ethics and providing an understanding of the potential harms caused by social chatbots and a parasocial preference for them. This knowledge is essential for developing ethical guidelines and design practices for social chatbots that minimize risks and increase user well-being.

2. Theoretical Background and Hypotheses Development

2.1. Cognitive-Behavioral Model of Pathological Internet Use

To explain the development of pathological usage behavior, the cognitive-behavioral model of pathological internet use by Davis (2001) can serve as a theoretical foundation. It provides a framework for understanding the cognitive and behavioral mechanisms associated with pathological internet use (Davis, 2001). Pathological internet use refers to symptoms of unhealthy internet usage behavior, such as compulsive thoughts about the internet, reduced impulse control, an inability to stop using the internet, and withdrawal (Young, 1999). In 2010, Caplan expanded Davis' (2001) cognitive-behavioral model of pathological internet use by integrating the construct of preference for online social interaction (Caplan, 2003; Caplan, 2005) as well as elements from the sociocognitive model of unregulated internet use by LaRose et al. (2003). According to Caplan (2010), the three core symptoms of pathological internet use are a preference for online social interaction, the use of the internet for mood regulation, and deficient self-regulation.

The preference for online social interaction represents a cognitive symptom of pathological internet use (Caplan, 2003; Caplan, 2005; Caplan, 2007; Kim & Davis, 2009; Kim et al., 2009) and is based on the notion that people feel safer, more effective, more confident, and more comfortable during online interactions than in face-to-face interactions (Caplan, 2003). This preference can lead

people to use the internet for mood regulation and to develop deficient self-regulation (Caplan, 2010).

The use of the internet for mood regulation also constitutes a cognitive symptom of pathological internet use (Caplan, 2002; Caplan, 2007; LaRose et al., 2003) and, similar to the preference for online social interaction, can contribute to deficient self-regulation in internet use (Caplan, 2010).

Deficient self-regulation represents both a cognitive and behavioral symptom of pathological internet use and is considered a key predictor (Kubey et al., 2001; LaRose, 2001; LaRose et al., 2001a; LaRose et al., 2001b). It describes a state of impaired, conscious self-control (LaRose et al., 2003) and encompasses both cognitive and behavioral manifestations (Caplan, 2010). While the cognitive manifestation of deficient self-regulation is reflected in obsessive thought patterns related to internet use (Caplan, 2010), the behavioral manifestation is evident in actual compulsive internet use, characterized by a person's inability to control their usage (Kim & Davis, 2009). Accordingly, deficient self-regulation functions as a key predictor of the negative consequences that can be associated with internet use, such as problematic or pathological use (Caplan, 2010).

Originally developed to explain problematic or pathological internet use in general (e.g., Caplan, 2003; Caplan, 2005; Caplan, 2007; Caplan, 2010; Davis, 2001), the cognitive-behavioral model of pathological internet use has also been applied to specific contexts, such as social networking sites (e.g., Fioravanti et al., 2020; Moretta & Buodo, 2018) and gaming (e.g., Haagsma et al., 2013). However, it remains to be examined whether the model can be transferred to the context of social chatbots and explain the development of pathological chatbot use.

2.2. Parasocial Preferences

The concept of parasocial preferences was first introduced to IS research by Fröbel and Kenning (2025a). They define a parasocial preference as a person's specific preference for an IT artefact, such as a chatbot, which results from positive experiences with the IT artefact in a parasocial interaction (Fröbel, 2025a; Fröbel, 2025b; Fröbel & Kenning, 2025a; Fröbel & Kenning, 2025b). Such interactions can create an illusory sense of genuine social interaction, even though the person is aware that this is merely an appearance (Fröbel 2025b; Fröbel & Kenning, 2025a). While parasocial interactions were originally characterized by one-sidedness and a lack of reciprocity (Hartmann, 2016; Horton & Wohl, 1956; Horton & Strauss, 1957), certain IT artefacts, such as

chatbots, enable reciprocal interaction with real-time feedback (Fröbel & Kenning, 2025a). Depending on the frequency and intensity, this can influence the experience of parasocial interactions (Fröbel & Kenning, 2025a; Maeda & Quan-Haase, 2024) and contribute to new forms of parasocial relationships, such as friendship (Brandtzaeg et al., 2022) or even love (Fröbel, 2024; Fröbel & Kenning, 2025a). This can lead a person to prefer the parasocial relationship with an IT artefact over another, real or imagined relationship (Fröbel, 2024; Fröbel, 2025a; Fröbel, 2025b; Fröbel & Kenning, 2025a). Social chatbots and AI companions can foster the development of a parasocial preference (Fröbel, 2024; Fröbel, 2025a; Fröbel, 2025b; Fröbel & Kenning, 2025a; Fröbel & Kenning, 2025b), because they are always available to a person and provide emotional support (van Wezel et al., 2021), which can positively impact their psychological well-being (Yang & Aurisicchio, 2021). However, social chatbots and a parasocial preference for them can also contribute to psychological dependency (Laestadius et al., 2024; Xie et al., 2023) and social isolation (Zhang et al., 2025) if a person prefers the interaction with the IT artefact over a real-life social interaction (Fröbel, 2025b). This could negatively impact users' mental health and well-being (Zhang et al., 2025) and contribute to pathological usage behavior. However, as research on the concept of parasocial preferences is still in its early stages (Fröbel & Kenning, 2025a), the potential risks associated with a parasocial preference have not yet been explored.

2.3. Research Hypotheses

Drawing on Davis' (2001) cognitive-behavioral model of pathological internet use, Caplan (2010) identified a preference for online social interaction as a key antecedent of deficient self-regulation. A preference for online social interaction can arise from a person's belief that they feel more effective, safe, and comfortable in online interactions than in face-to-face interactions (Caplan, 2003). Especially a person who feel lonely, experience social anxiety, and have limited social skills tend to prefer online social interaction (Caplan, 2003; Caplan, 2005; Caplan, 2007; Kim et al., 2009). Based on a general preference for online social interaction, users might develop a parasocial preference, i.e., a specific preference for an IT artefact, such as an AI companion. Previous research shows that a person develop a parasocial preference for an IT artefact based on positive experiences in parasocial interactions with that IT artefact (Fröbel, 2025a; Fröbel, 2025b; Fröbel & Kenning, 2025a; Fröbel & Kenning, 2025b). Since a preference for online social

interaction can lead to compulsive use (Caplan, 2005; Kim et al., 2009), which is an indicator of deficient self-regulation (Caplan, 2010), we assume that a parasocial preference for an AI companion might also cause deficient self-regulation. AI companions can foster psychological dependency (Xie et al., 2023), as they are constantly available and provide emotional support (van Wezel et al., 2021), which may lead to deficient self-regulation in their use. Hence, the following hypothesis can be derived:

H1: A parasocial preference for a social chatbot is positively related to deficient self-regulation.

Moreover, a preference for online social interaction can motivate a person to use a technology for mood regulation (Caplan, 2010). Social chatbots are increasingly being used as conversational partners (Meng & Dai, 2021; Xie & Pentina, 2022). They are capable of simulating emotional abilities, recognizing a person's emotional state, and responding appropriately (Filiari et al., 2022; Huang & Rust, 2022; Seeger et al., 2021) by signaling empathy and understanding (Song et al., 2022). This can lead the chatbot to be perceived as a friend, partner, or mentor (Xie et al., 2023), which can foster the development of a parasocial preference (Fröbel, 2024; Fröbel & Kenning, 2025a). Consequently, a person may be inclined to prefer the IT artefact and the relationship with it over another real or imagined relationship (Fröbel, 2025b; Fröbel & Kenning, 2025a). Since users with a preference for online social interaction tend to seek computer-mediated social support to regulate affective distress (Caplan, 2010), it can be assumed that users also use a chatbot for mood regulation due to their parasocial preference for it. This leads to the following hypothesis:

H2: A parasocial preference for a social chatbot is positively related to mood regulation.

Furthermore, using a technology for mood regulation can also contribute to deficient self-regulation (Caplan, 2010). "The transition to problematic usage can begin if the behavior acts as an important or exclusive mechanism to relieve stress, loneliness, depression, or anxiety" (LaRose et al., 2003, p. 230). Using a technology to alleviate dysphoric moods can reinforce the self-reactive expectation that negative feelings will be relieved through its use (Caplan, 2010). Due to the expectations of the positive effects of its use, this can increase use (LaRose et al., 2001b). Since AI companions make users feel cared for, are always available (van Wezel et al., 2021), and provide emotional, social, and psychological support (Laestadius et al., 2024), they can evoke positive emotions and contribute to users'

psychological well-being (Yang & Aurisicchio, 2021). However, if the social chatbot is increasingly used to generate these positive feelings, this may lead to psychological dependence (Xie et al., 2023), which could be accompanied by a lack of self-control. With this in mind, it is reasonable to assume that using AI companions for mood regulation contributes to deficient self-regulation, which leads to the following hypothesis:

H3: Mood regulation is positively related to deficient self-regulation.

Additionally, deficient self-regulation is a key predictor of pathological usage behavior (Kubey et al., 2001; LaRose, 2001; LaRose et al., 2001a; LaRose et al., 2001b; LaRose et al., 2003). Deficient self-regulation refers to a state of reduced conscious self-control (LaRose et al., 2003), where one's usage behavior is not properly monitored or evaluated, and usage patterns cannot be adequately adjusted (Bandura, 1986; Bandura, 1991). Both compulsive thoughts related to use (Caplan, 2010; Caplan & High, 2006; Shapira et al., 2003) and the actual compulsive use (Caplan, 2005; Caplan, 2010; Kim & Davis, 2009; Kim et al., 2009) are key components of pathological usage behavior and can lead to negative outcomes (Caplan, 2010). Social chatbots can evoke excessive and dysfunctional attachment in users, which may result in more intense and prolonged usage (Laestadius et al., 2024). Against this background, we assume that deficient self-regulation regarding the use of an AI companion leads to pathological chatbot use, characterized by dysfunctional patterns of use, behavior, and attitudes (Nicolović et al., 2014). Thus, the following hypothesis can be derived:

H4: Deficient self-regulation is positively related to pathological chatbot use.

The degree of users' loneliness may play a role in the relationship between deficient self-regulation and pathological chatbot use. According to Davis (2001), loneliness predisposes a person to develop maladaptive behaviors. Pathological usage behavior can thereby be a consequence of psychosocial problems (Caplan, 2010; Davis, 2001). These issues can predispose a person to develop pathological behaviors that stem from deficient self-regulation and may result in negative outcomes (Caplan, 2010). Loneliness can motivate a person to use social chatbots (De Freitas et al., 2024; Xie et al., 2023), as they can fulfill the human need for social belonging (Shum et al., 2018). This may lead users to form an emotional bond with the chatbot (Shum et al., 2018), which in turn motivates them to maintain the relationship (Fröbel & Kenning, 2025a). Lonely

people, in particular, tend to develop a psychological dependency on AI companions (Xie et al., 2023). Accordingly, there is reason to assume that the influence of deficient self-regulation on pathological chatbot use becomes stronger as users' level of loneliness increases. This leads to the following hypothesis:

H5: Loneliness moderates the relationship between deficient self-regulation and pathological chatbot use.

Figure 1 presents the derived conceptual model for our subsequent empirical studies.

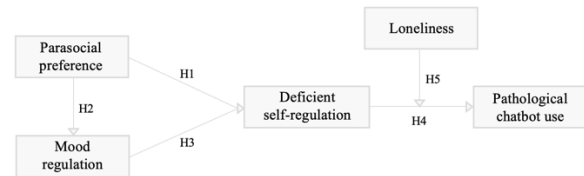


Figure 1. Conceptual model.

3. Method

To test the proposed hypotheses, we conducted two empirical studies based on quantitative surveys, with participants recruited via the online platform Clickworker. In Study 1, a sample of users of the AI companion Replika was recruited, which is a generative AI chatbot that can be tailored to users' needs, serves as a virtual companion, and provides emotional support (Fröbel & Kenning, 2025a). To further validate our results, we conducted a second study. Study 2 involved users of the AI companion Character.AI, which is also a generative AI chatbot providing emotional support to its users (Bakir & McStay, 2025). Both, Luka from Replika and Character.AI, are among the leading companies in the AI companion market (Grand View Research, 2024). Only participants who use Replika or Character.AI were allowed to participate in the study to ensure that they are familiar with a social chatbot. Additionally, it was verified that participants were aware that the chatbot is an IT artefact, as parasocial interactions convey the illusory feeling of a real social interaction (Horton & Wohl, 1956). For the operationalization of the constructs, slightly modified, established multi-item scales from previous studies were used: parasocial preference (based on Chen & Chang, 2008), mood regulation and deficient self-regulation (Caplan, 2010), pathological chatbot use (based on Hu et al., 2023), and loneliness (Neto, 2014). All constructs were measured on a seven-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree"). In Study 1, the final sample consisted of N = 280 participants,

of whom 43.9 % were female and 56.1 % male, with an average age of 30.67 years (SD = 10.42). In Study 2, the final sample included N = 274 participants, with 48.2 % female, 51.1 % male, and 0.7 % diverse, and an average age of 30.46 years (SD = 9.66). Using confirmatory factor analysis, the reliability and validity of the measurement models were ensured. Furthermore, attention checks were conducted and measures were taken to counteract a potential common method bias (Korsgaard & Roberson, 1995). For example, three items related to the attitude towards the color blue were implemented as marker variables (Lindell & Whitney, 2001), also measured on a seven-point Likert scale (1 = "strongly disagree" to 7 = "strongly agree"). To check the correlation matrix for a possible common method bias, the lowest positive correlation with one of the constructs was taken into account. After adjustment, the correlations remained significant and at the same level.

4. Results

4.1. Study 1 (Replika)

The hypotheses were tested using structural equation modeling, indicating a good model fit ($\chi^2/df = 1.528$; CFI = .973; TLI = .964; RMSEA = .025). The results show that a parasocial preference is associated with deficient self-regulation ($\beta = .88$, $p \leq .001$) and mood regulation ($\beta = .57$, $p \leq .001$), thus supporting H1 and H2. In contrast, the relationship between mood regulation and deficient self-regulation was not significant ($\beta = .10$, $p > .05$). Therefore, H3 is rejected. Moreover, the results show that deficient self-regulation is associated with pathological chatbot use ($\beta = .60$, $p \leq .001$), thus H4 is supported. Furthermore, the results indicate that this relationship is stronger for lonely people ($\beta_{high} = .64$, $p \leq .001$) than for less lonely people ($\beta_{low} = .43$, $p \leq .001$), thus supporting H5 as well. Overall, the model from Study 1 explains 55.9 % of the variance in deficient self-regulation ($R^2 = 0.559$), 35.2 % of the variance in mood regulation ($R^2 = 0.352$), and 61.1 % of the variance in pathological chatbot use ($R^2 = 0.611$).

Table 1 summarizes the results of hypotheses testing from Study 1 with regard to the social chatbot Replika.

Table 1. Results of hypotheses testing regarding study 1.

Path	Standardized coefficient β	Result
Hypotheses		
H1. Parasocial preference \rightarrow Deficient self-regulation	0.88***	Supported
H2. Parasocial preference \rightarrow Mood regulation	0.57***	Supported
H3. Mood regulation \rightarrow Deficient self-regulation	0.10n.s.	Rejected
H4. Deficient self-regulation \rightarrow Pathological chatbot use	0.60***	Supported
H5. Loneliness \rightarrow Deficient self-regulation \rightarrow Pathological chatbot use	0.43*** (low) 0.64*** (high)	Supported

Note: *** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$, n.s. = not significant

4.2. Study 2 (Character.AI)

In Study 2, structural equation modeling was also conducted to test the hypotheses, revealing a good model fit ($\chi^2/df = 1.667$; CFI = .966; TLI = .952; RMSEA = .029). In line with the results from Study 1, Study 2 also showed that a parasocial preference has a positive effect on deficient self-regulation ($\beta = .95$, $p \leq .001$) and mood regulation ($\beta = .81$, $p \leq .001$). Thus, H1 and H2 can be accepted. As in Study 1, the relationship between mood regulation and deficient self-regulation was not significant ($\beta = .05$, $p > .05$), leading to the rejection of H3. However, Study 2 also demonstrated that deficient self-regulation is associated with pathological chatbot use ($\beta = .77$, $p \leq .001$), and that this relationship is stronger for lonely people ($\beta_{high} = .94$, $p \leq .001$) than for less lonely people ($\beta_{low} = .51$, $p \leq .001$). This supports H4 and H5 as well. The model of Study 2 explains 55.2 % of the variance in deficient self-regulation ($R^2 = 0.552$), 38.5 % of the variance in mood regulation ($R^2 = 0.385$), and 70.2 % of the variance in pathological chatbot use ($R^2 = 0.702$).

The results of the hypotheses testing from Study 2 regarding the social chatbot Character.AI are summarized in Table 2.

Table 2. Results of hypotheses testing regarding study 2.

Path	Standardized coefficient β	Result
Hypotheses		
H1. Parasocial preference \rightarrow Deficient self-regulation	0.95***	Supported
H2. Parasocial preference \rightarrow Mood regulation	0.81***	Supported
H3. Mood regulation \rightarrow Deficient self-regulation	0.05n.s.	Rejected
H4. Deficient self-regulation \rightarrow Pathological chatbot use	0.77***	Supported
H5. Loneliness \rightarrow Deficient self-regulation \rightarrow Pathological chatbot use	0.51*** (low) 0.94*** (high)	Supported

Note: *** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$, n.s. = not significant

5. Discussion and Implications

The results of both studies confirm that a parasocial preference for an IT artefact, such as a chatbot, contributes to deficient self-regulation (H1). This is consistent with previous research (e.g., Caplan, 2010; LaRose et al., 2003; Liu et al., 2022; Moretta & Buodo, 2018), which demonstrated that a preference for online social interaction fosters deficient self-regulation. A parasocial preference for an IT artefact, such as a social chatbot, which is based on a person's positive experiences with it during parasocial interaction (Fröbel, 2025a; Fröbel, 2025b; Fröbel & Kenning, 2025a; Fröbel & Kenning, 2025b) as well as on a general preference for online social interaction, can emerge due to the characteristics of an AI companion, namely, its constant availability and provision of emotional support (van Wezel et al., 2021). This, in turn, can lead to psychological dependence (Xie et al., 2023) and deficient self-

regulation. Given this, providers of social chatbots should be aware of the strong and intense nature of parasocial relationships (Xie et al., 2023) and consider the potential negative effects of a parasocial preference on users' mental health and well-being (Fröbel, 2025b). Accordingly, users should be informed about the risks associated with the use of social chatbots, such as psychological dependence and addiction, which may result in pathological chatbot use (Xie et al., 2023), in order to promote a mindful and responsible use of AI companions.

Moreover, both studies confirmed a positive relationship between a parasocial preference for a social chatbot and its use for mood regulation (H2). This finding is also consistent with prior research (e.g., Caplan, 2010; Gámez-Guadix & Calvete, 2016), which was demonstrated in the context of the internet that a preference for online social interaction leads people to use the internet for mood regulation. Given the ability of social chatbots to simulate emotional capabilities, recognize users' emotional states, and respond appropriately (Filiari et al., 2022; Huang & Rust, 2022; Seeger et al., 2021), people may perceive them as friends, partners, or mentors (Xie et al., 2023) and develop a parasocial preference for them (Fröbel & Kenning, 2025a). As a result of this preference, people are likely to seek social support from the chatbot to regulate their mood. As previous studies have shown, social chatbots can have a positive impact on users' mental health and well-being (Xie et al., 2023; Yang & Aurisicchio, 2021). Accordingly, providers should enhance the chatbot's capabilities in a way that enables it to function as a conversational partner (Meng & Dai, 2021; Xie & Pentina, 2022) by showing empathy and understanding, offering help and support, and responding appropriately to a person's emotions (Chandra et al., 2022; Pentina et al., 2023; Seeger et al., 2021; Skjuve et al., 2021). This may lead users to increasingly seek social support from the chatbot and use it for mood regulation, which can be particularly beneficial for lonely people and help satisfy their social needs (De Freitas et al., 2024; Xie et al., 2023).

In contrast, the findings of both studies indicated that using social chatbots for mood regulation does not lead to deficient self-regulation in their use (H3). This contradicts earlier research (e.g., Caplan, 2010), which demonstrated a positive relationship between using the internet for mood regulation and the development of deficient self-regulation in the context of internet use. One possible explanation for this unexpected finding is that while a parasocial preference for a social chatbot may motivate a person to use it for mood regulation, this does not appear to be the primary reason for its use. Instead, mood regulation seems to

play a subordinate role and therefore does not significantly contribute to the development of deficient self-regulation in the context of chatbot use. This assumption is supported by the notion that social chatbots primarily serve as AI companions that are always available and provide social support (McStay, 2023; Skjuve et al., 2021; van Wezel et al., 2021; Xie & Pentina, 2022). Another possible reason for this finding could lie in the chosen methodology of this study, as the cross-sectional design is insufficient for investigating causal relationships (Maier et al., 2023). In contrast, a longitudinal study could provide insights into how the frequency of chatbot use for mood regulation changes over time. Additionally, measuring the frequency of interactions with the social chatbot and the duration of the parasocial relationship would allow for greater comparability of individual relationships (Fröbel & Kenning, 2025a).

Furthermore, both studies confirmed that deficient self-regulation in chatbot use can promote the development of pathological usage behavior (H4). This finding is consistent with previous research (e.g., Caplan, 2010; LaRose et al., 2003), which demonstrated the relationship between deficient self-regulation and pathological internet use. Deficient self-regulation involves a reduced conscious control over usage behavior (Bandura, 1986; Bandura, 1991; LaRose et al., 2003), which can foster compulsive thought patterns (Caplan, 2010; Caplan & High, 2006; Shapira et al., 2003) and compulsive usage behavior (Caplan, 2005; Caplan, 2010; Kim & Davis, 2009; Kim et al., 2009). This, in turn, can contribute to the development of pathological usage behavior (Caplan, 2010). Since users can develop an excessive and dysfunctional attachment to chatbots, this may result in more intense and prolonged use (Laestadius et al., 2024), which can ultimately lead to pathological chatbot use. Against this background, providers should implement appropriate safety measures in the technical design of social chatbots, such as time limits within the app (Marriott & Pitardi, 2024), to achieve regulation through design (Mahari & Pataranutaporn, 2025). In addition, providers should refrain from encouraging users to interact with the social chatbot via push notifications (Skjuve & Brandtzaeg, 2019). Instead, after a certain time, the chatbot should proactively remind users to take a break (Hossain, 2024). This could contribute to regulating chatbot use and reduce the risk of developing pathological usage behavior.

Finally, the results of both Study 1 and Study 2 demonstrate that the relationship between deficient self-regulation in chatbot use and the development of pathological usage behavior is moderated by the degree of loneliness of the users (H5). This is

consistent with previous research (e.g., Caplan, 2010; Davis, 2001; Xie et al., 2023), which suggests that loneliness predisposes a person to develop psychological dependence and pathological usage behavior. Since social chatbots function as AI companions and can satisfy the human need for social belonging (Shum et al., 2018), loneliness may motivate a person to use them (De Freitas et al., 2024; Xie et al., 2023). While social chatbots can have positive effects on users' psychological well-being (Yang & Aurisicchio, 2021), lonely people, in particular, tend to develop psychological dependence on them (Xie et al., 2023). Consequently, providers should integrate machine learning into the design of social chatbots, enabling them to identify signs of addiction issues and refer users to appropriate counseling services (Marriott & Pitardi, 2024). Furthermore, collaboration with psychological experts, such as therapists, could be beneficial (Marriott & Pitardi, 2024) to ensure a responsible design and use of social chatbots.

6. Limitations and Further Research

However, this study also has limitations that provide a basis for future research.

On the one hand, future studies should employ a longitudinal design instead of the chosen cross-sectional design to capture the development of pathological chatbot use over an extended period of time. This could provide insights into how the frequency of parasocial interactions with the social chatbot changes over time.

On the other hand, this study relies solely on self-reports regarding the cognitive and behavioral aspects of deficient self-regulation and pathological chatbot use. To increase the validity of the findings, future research should incorporate objective measures of user behavior related to chatbot use, for example, by collecting behavioral data.

Finally, this study only considered loneliness as a predisposition. However, including users' personality traits could provide insights into which user groups are particularly susceptible to developing pathological chatbot use (Franze et al., 2023).

7. Conclusion

The aim of this study was to investigate the negative effects of a parasocial preference for a social chatbot on user behavior and well-being, thereby contributing to the existing IS research on human-chatbot relationships. The cognitive-behavioral model of pathological internet use by Davis (2001) has

proven to be adequate in this context for explaining the potential risks associated with social chatbots. Our results confirm that a parasocial preference for a social chatbot can lead a person to use it for mood regulation and develop deficient self-regulation. This, in turn, can increase the likelihood of pathological chatbot use, especially among lonely users. Our findings from Study 1 regarding the social chatbot Replika were successfully replicated in Study 2 with the social chatbot Character.AI. Building on our findings, future research should more deeply investigate the "dark side" of social chatbots and the consequences of parasocial preferences.

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