When Chatbots Cause Trouble: The Role of Agent Type and Conversation Style in The Consumer Response to Chatbot Failure

Abhisek Kuanr, Essex Business School

Tapas Ranjan Moharana, XLRI Xavier School of Management, Jamshedpur, India

Min Yan, Essex Business School

Debasis Pradhan, XLRI Xavier School of Management, Jamshedpur, India

Dahlia El-Manstrly, Newcastle Business School, Northumbria University

Accepted for publication in the European Journal of Marketing

European Journal of Marketing

When Chatbots Cause Trouble: The Role of Agent Type and Conversation Style in The Consumer Response to Chatbot Failure

Journal:	*European Journal of Marketing*
Manuscript ID	EJM-08-2023-0663.R2
Manuscript Type:	Original Article
Keywords:	Chatbot, anthropomorphism, service criticality, service failure, artificial intelligence, brand avoidance

When Chatbots Cause Trouble: How Agent Type and Conversation Style Shape Consumer Responses to Service Failures

Abstract

Purpose

The primary objective of this study is to investigate the consumer response to service failure involving different types of service agents – specifically human agents, anthropomorphic chatbots, and non-anthropomorphic chatbots- in the services sector. In addition, the research underscores conversation style and service criticality as key moderating factors influencing consumer responses to chatbot service failure.

Design/methodology/approach.

The hypothesised relationships are tested across three between-subjects experiments. Study 1 (n=296) and study 2 (n=169) were conducted in the context of restaurant table reservations, while study 3 (n=176) involved booking doctors' appointments in a healthcare setting.

Findings

Customers showed stronger brand avoidance when they encountered a service failure by a virtual agent than by a human agent. This effect was stronger for a service failure by a non-anthropomorphic chatbot than by an anthropomorphic chatbot. Brand avoidance was exacerbated for high-critical services. Moreover, customers using anthropomorphic chatbots with a social message orientation demonstrated lower brand avoidance than with anthropomorphic chatbots with a task-oriented message.

Originality

This research provides new insights by revealing that service criticality and conversation style act as key boundary conditions in the link between chatbot failure and brand avoidance — an area previously unexplored. Moreover, by drawing on stress-coping theory, this research

suggests that psychological distress is s a novel mediating mechanism, demonstrating its pivotal role in shaping consumers' brand avoidance following chatbot service failures. This innovative perspective deepens our understanding of chatbot-related service failures in multiple contexts and offers key insights into the mitigation of brand avoidance.

Practical implications

Managers should prioritize the adoption of anthropomorphic chatbots over non-anthropomorphic ones to mitigate brand avoidance, as customers are more likely to avoid brands when less human-like chatbots are responsible for the failure. Additionally, firms should carefully design chatbot interactions in service failure contexts, high in criticality, where reliance on automated agents may heighten consumer discomfort and lead to brand avoidance.

Social implications

Our findings suggest that service failures by chatbots cause psychological distress in consumers, suggesting that caution is needed when considering the complete replacement of human service agents with chatbots.

Keywords: Chatbot, anthropomorphism, service criticality, service failure, artificial intelligence, brand avoidance.

Article classification: Research Paper

1. Introduction

Customer interactions with brands are undergoing a rapid transformation, increasingly shaped by the adoption of conversational technologies such as chatbots (Mostafa and Kasamani, 2022). Chatbots offer the unique advantage of immediacy and convenience to the customers. However, despite these benefits, chatbots are not immune to failure (Xing et al., 2022). When they fail (e.g., misinterpreting queries, or giving incorrect information), consumers may react with spreading negative word-of-mouth or switching brands altogether (Taylor et al., 2020; Press, 2023). Such failures can also trigger brand avoidance—the deliberate evasion or rejection of a brand despite its accessibility and affordability (Lee et al., 2009; Knittel et al., 2016).

Brand avoidance can reduce customer lifetime value, erode brand equity, and turn previously valuable brands into liabilities (Kuanr et al., 2021; Rattanapituk and Atthmongkolchai, 2023). Despite the widespread adoption of chatbots, their role in driving brand avoidance remains underexplored in both academia and practice (Honig and Oron-Gilad, 2018). To this end, our research investigates how and when chatbot service failure engenders brand avoidance with the aim of offering fresh insights into the choice of chatbot employment in service settings. We examine the influence of three different types of service agents — human agents, anthropomorphic chatbots, and non-anthropomorphic chatbots — on brand avoidance.

In line with Touré-Tillery and McGill (2015), we adopt a triadic typology to reflect that anthropomorphized agents lie on a continuum of humanness—more human than inanimate objects but less human than actual people—highlighting how partially anthropomorphic designs elicit different psychological responses compared to fully human agents. Therefore, this triadic typology allows for a more nuanced and layered understanding of how service agent design influences brand avoidance in increasingly automated service environments.

Additionally, to develop a more context-specific understanding of brand avoidance and effectiveness of chatbot types, we investigate whether two key boundary conditions—conversation style and service criticality—that possibly attenuate brand avoidance in response to chatbot failure.

We draw on stress-coping theory (Lazarus and Folkman, 1984), to argue that psychological distress—a state of emotional strain resulting from adverse experiences—underlies the psychological mechanism for the relationship between chatbot service failure and brand avoidance (Balaji et al., 2017; Park and Min, 2020). By doing so, we link immediate emotional responses to broader brand-related behaviours, offering a more complete account of the consumer experience with chatbots.

This research makes three key contributions to the literature on service failure and emerging artificial intelligence (AI)-enabled conversational agent research. First, we extend research on service failures by examining how different agent types—human agents, anthropomorphic chatbots, and non-anthropomorphic chatbots—shape brand avoidance during service failure episodes. Prior work has largely focused on performance comparisons between human and AI agents in routine interactions (Xing et al., 2022; Zhang et al., 2024).

Second, drawing on stress-coping theory (Lazarus and Folkman, 1984), we identify psychological distress as a key mediating mechanism linking chatbot failure to brand avoidance. Third, we introduce conversation style (task-oriented vs. social-oriented) and service criticality (low vs. high) as important moderating factors. We demonstrate that social-oriented conversational styles are more effective than task-oriented styles in high-criticality contexts, particularly when anthropomorphic chatbots are employed.

In sum, our research provides a comprehensive framework for understanding how chatbot service failures influence brand avoidance. By integrating agent type, conversation style, service criticality, and psychological distress, we offer both conceptual understanding and

actionable guidance. Brand managers should prioritize the adoption of anthropomorphic chatbots over non-anthropomorphic ones to mitigate brand avoidance as customers are more likely to avoid brands when less human-like chatbots are responsible for the failure, and in high vs low critical service settings. Additionally, brand managers should also consider designing anthropomorphic chatbots with a social versus task-oriented message to lower brand avoidance.

2. Theoretical background

2.1 Chatbot service failure: Emerging evidence and gaps

Service failure may occur during service provision or as an outcome of a service when the delivery of service falls below the consumer's expectations (Rai and Appiah, 2019; Lee *et al*., 2021), narrowing the consumer's zone of tolerance and having a negative influence on customer satisfaction (Zeithaml *et al*., 1993). While service failure is likely to occur in various customer–firm interactions, whether in physical or virtual locations, chatbot service failure has only received attention recently (Choi *et al*., 2020). Chatbot service failure has been attributed to the inability of chatbots to understand and listen to customers (Mimoun *et al*., 2017) or interact aggressively or intrusively with customers (Xing *et al*., 2022). Indeed, the inability of chatbots to provide the level of service required by clients still represents a significant barrier to their widespread deployment (Chong *et al*., 2021).

While there is an emerging stream of literature on service failure and recovery by chatbots (e.g. Huang and Philp, 2021), there are disagreements on the nature of consumer reaction. Specifically, past studies have examined how chatbot service failures lead to customer aggression (Huang and Dootson, 2022), how firms can leverage chatbots to mitigate the effect of service failure (Sands *et al*., 2022), and how chatbots engage in service recovery efforts (Song *et al*., 2022). Huang and Philp (2021) contended that consumers are less willing to share

negative word of mouth after a service failure caused by an artificial intelligence (AI) recommendation system, in contrast to a human agent, despite no difference in failure. Additionally, it has been shown that customers blame the company more than the chatbot when experiencing service failure, as they perceive chatbots as having less control over the process (Pavone *et al*., 2023).

Enabled by AI, chatbots differ from traditional frontline services because they can serve consumers at both functional and social levels (Belanche *et al*., 2020). Extant research on chatbots has revealed the use of different conversation styles to facilitate customer interaction (Stock and Merkle, 2018). One study found that due to customers' belief that chatbots lack emotional competence, they perceive lower satisfaction when receiving symbolic recovery from chatbots than from human employees (Zhang *et al*., 2023). However, how different conversation styles accentuate or mitigate the effects of chatbot service failures on consumers' negative reactions is unclear.

Moreover, studies have examined the effects of anthropomorphism on consumers' interaction with AI-based voice assistants. Li and Sung (2021) asserted that anthropomorphism positively influences consumers' attitudes, mediated by psychological distance. Several studies have supported this idea, showing that consumers place more trust in machines with anthropomorphic features and exhibit a positive attitude towards them (Baabdullah *et al*., 2022). AI-based anthropomorphism positively influences self–AI integration mediated by self-congruence (Alabed *et al*., 2022). The literature on chatbot service failure has also explored consumers' responses to service failures involving human agents vis-a-vis anthropomorphic chatbots (Sands *et al*., 2022). However, it is unclear how differently consumers respond to these instances of service failures while dealing with different types of agents. Table 1 summarises the literature on chatbots, including the gaps we endeavour to address in this study.

[Insert Table 1 here.]

2.2 Stress-coping theory

Stress occurs when there is an imbalance between an individual's perceived demands and the perceived resources to deal with them. Individuals employ cognitive and behavioural efforts to manage stress (Lazarus and Folkman, 1984). Lazarus (1991) argued that stress is not determined by an environmental stimulus or an individual's actual response to it but rather by the individual's cognitive process and how the individual interprets the event psychologically, known as cognitive appraisal. Depending on an individual's personality, thinking patterns, and environmental demands, the individual's cognitive appraisals of a stimulus or stressor may vary. Thus, people experience stress in significantly different ways (Carver and Connor-Smith, 2010).

Stress coping refers to individuals' cognitive appraisal of whether they have the resources needed to respond to a specific stressor (Folkman and Lazarus, 1980). Consumers evaluate a potential stressor before they decide on a coping strategy through two cognitive mechanisms: primary and secondary appraisals (Lazarus and Folkman, 1984). The primary appraisal involves understanding the current situation and whether it could have a negative impact on the individual's life, while the second appraisal is focused on whether the individual has the ability and resources to respond to the current situation. If individuals feel they have control over the situation, they are more likely to choose a problem-based (active) coping strategy that focuses on solving the issue. However, individuals may employ an emotion-focused (passive) coping strategy, such as avoidance, when they feel they cannot manage the situation using their available resources (Lazarus and Folkman, 1984).

Consumers who experience negative emotions towards a brand are likely to discontinue use or avoid repurchase behaviour (Sung and King, 2021). However, consumer behaviour research has largely overlooked this issue, instead focusing on consumers' cognitive process of coping with service failure. Thus, we apply stress-coping theory to uncover the role of

psychological stress as the underlying mechanism explaining the differential impact of service failure by different types of agents (i.e. human agents, anthropomorphism chatbot, and non-anthropomorphism chatbot) on consumers' brand avoidance behaviour.

3. Hypothesis development

3.1 Chatbot service failure and brand avoidance

Brand avoidance is triggered by consumers' negative experiences with brands (Romani *et al*., 2012) when specific events/cues elicit negative emotions (Watson and Spence, 2007). Following a service failure, consumers often experience negative emotions, leading them to attribute blame to the brand (Pavone *et al*., 2023), which can ultimately result in brand avoidance. Drawing on stress-coping theory, we suggest that negative emotions and consequent brand avoidance are likely to be more pronounced in the case of a chatbot conversational agent than a human one. Stress-coping theory suggests that when customers encounter a stressful situation, such as chatbot service failure, they may deal with it using problem-focused or emotion-focused coping strategies (Folkman and Lazarus, 1980). Problem-focused coping concentrates on the stressor and involves directing one's efforts to resolve the stressful situation by taking action or seeking assistance (Goussinsky, 2012). Conversely, emotion-focused coping focuses on the outcome of the stressor and involves an effort to reduce the emotional distress caused by the stressful event. These emotion-focused coping efforts could manifest as escaping stressful situations through denial/avoidance or seeking emotional support (Carver and Connor-Smith, 2010). In the case of service failure by human conversational agents, individuals believe that they can alter the situation or control the situation by working with human agents, as human agents are perceived to have the capacity to deliver services with more appropriate interpersonal and social communication (Roy and Naidoo, 2021). With chatbot conversational agents, customers are more likely to employ emotion-focused coping strategies, considering the uncertainties involved with a chatbot (Huang and Dootson, 2022). This

uncertainty suggests the difficulty of altering the situation through constructive action, thereby triggering emotion-focused coping and engendering negative emotional reactions. Therefore, customers are more likely to avoid brands following a chatbot service failure than one involving a human agent.

Moreover, we propose that the extent of customers' negative reactions to a service failure also depends on the type of chatbot employed. Specifically, for anthropomorphised chatbots, which closely mimic human conversations, customers are more likely to engage in problem-focused coping strategies than they would with non-anthropomorphised chatbots. During human-to-chatbot interaction, people can easily apply the social scripts and expectations of human-to-human interaction (Nass and Moon, 2000). Thus, anthropomorphism design can be more effective in service provision when the perceived humanlike features of the technology are similar to those of the customer (Al-Natour *et al*., 2011). Thus, we hypothesise the following:

H1a: Chatbot (vs. human agents) service failure generates greater brand avoidance.

H1b: Non-anthropomorphic (vs. anthropomorphic) chatbot service failure generates greater brand avoidance.

A two key boundary conditions that may affect consumers' brand avoidance reaction to service failure are conversation style and service criticality. These two moderators were selected because, unlike consumer-side factors such as personality traits or prior experiences (Mende et al., 2019; Khamitov et al., 2020), they are designable and controllable by firms at the point of service delivery (Wang et al., 2023; Ostrom and Iacobucci, 1995). Moreover, both moderators directly shape consumers' emotional and cognitive appraisals during service encounters, making them highly relevant for explaining variation in brand avoidance (Zhu et al., 2023; Rao Hill and Tombs, 2022).

3.2 Moderating role of service criticality

Service criticality refers to consumers' perception of the importance of successful service delivery during a service encounter (Ostrom & Iacobucci, 1995). Consumers consider a service failure more serious when they perceive the service as critical (Ostrom & Iacobucci, 1995), with failures in high-criticality services like healthcare or finance triggering stronger emotional reactions such as outrage and betrayal (Watson, 2012). Disgruntled consumers may attempt to punish the brand (Bechwati & Morrin, 2003) or avoid it altogether (Kuanr et al., 2021). Compared to human agents, chatbots are typically perceived as less knowledgeable, less empathetic, and less capable of understanding nuanced emotional needs (Luo et al., 2019). These limitations become particularly salient in high-criticality service encounters, where consumers place greater emotional and functional demands on service providers. In critical contexts, a service failure by a chatbot not only leads to functional dissatisfaction but also intensifies feelings of disappointment, betrayal, and anger (Cho et al., 2017). Such negative emotions are magnified because consumers expect higher standards of care, competence, and responsiveness when the stakes are high. Consequently, chatbot failures in critical services are more likely to provoke severe consumer reactions such as brand avoidance, compared to failures in low-criticality settings where the perceived risk and emotional stakes are lower. Thus, we advance the following hypothesis:

H2a: High (low) service criticality accentuates (attenuates) the effect of chatbot (vs. human agents) service failure on brand avoidance.

Moreover, robots with anthropomorphic features have a greater influence on consumers' intentions in critical (vs. non-critical) service settings (Blut *et al*., 2021). Consumers' feelings of empathy are associated with the level of anthropomorphic features in the technology (Burgoon *et al*., 2000), leading to positive customer behaviour in highly critical situations (Lu *et al*., 2024). Therefore, when experiencing a chatbot service with non-

anthropomorphic features, consumers' negative emotions are less likely to be assuaged in critical service failure situations, intensifying brand avoidance. Thus, we advance the following hypothesis:

H2b: High (low) service criticality accentuates (attenuates) the effect of non-anthropomorphic (vs. anthropomorphic) chatbot service failure on brand avoidance.

3.3 Moderating role of social versus task-orientated conversation style

Conversation style, typically classified as task-oriented or social-oriented (Wang et al., 2023; Zhu et al., 2023), defines how service agents, including chatbots, engage with users and shape customer experiences. Task-oriented conversation styles emphasize clarity, brevity, and efficiency, focusing on goal completion through straightforward and formal communication. In contrast, social-oriented styles use empathy, friendliness, and warmth to foster human-like interaction, characterized by casual conversations, customary greetings, small talk, emotional support, and positive expressions to achieve socioemotional goals (Chattaraman et al., 2019; Kreijns et al., 2003; Verhagen et al., 2014). Prior research shows that conversation style significantly affects consumers' satisfaction and loyalty during service encounters (Webster and Sundaram, 2009; Huang et al., 2021; Lu et al., 2024). A social-oriented conversation style helps create a warm and pleasant atmosphere, reducing anxiety and promoting psychological comfort (Roongruangsee et al., 2022), while a task-oriented style emphasizes functional efficiency but may feel distant and impersonal.

Despite the established role of conversation style in enhancing satisfaction, its ability to mitigate brand avoidance during service failures—particularly across different agent types—remains underexplored. We argue that when a customer encounters a service failure, a social-oriented conversation style can help reduce anxiety and thereby mitigating brand avoidance (Lu et al., 2024). Conversely, a task-oriented conversation style may exacerbate

feelings of helplessness and alienation during service failure, strengthening brand avoidance (Lu et al., 2024). Thus, we hypothesise the following:

H3: A social (task) orientated conversation style mitigates (strengthens) the effect of anthropomorphic (vs. non-anthropomorphic) chatbot service failure on brand avoidance.

3.4 Mediating role of psychological distress

Psychological distress occurs when an individual experiences an unpleasant sensation (Kessler et al., 2003). A psychologically distressed consumer associates negative emotions (e.g. anger, sadness, worry) with the companies or products, leading to avoidance or switching decisions (Sung and King, 2021). Based on stress-coping theory, a consumer copes with a stressful condition and engages in subsequent behaviour based on a continuous cycle of cognitive appraisals and coping (Lazarus, 1991). Thus, chatbot service failure may lead to unpleasant feelings, as each consumer interprets the situation differently based on the individual's cognitive appraisals. Consumers are likely to utilise a problem-based coping strategy when they feel they have control over the situation (Folkman and Lazarus, 1980). However, when individuals judge a conversation with a chatbot as negative or stressful and cannot manage the situation based on their resources, they will adopt an emotional coping strategy, such as avoidance (Lazarus and Folkman, 1984). Researchers have demonstrated that psychological distress and unpleasant feelings result in a negative emotional state, restricting consumers' brand repurchase intentions (Akhtar *et al*., 2020). Therefore, based on stress-coping theory, we argue that the impact of chatbot service failure on consumers' brand avoidance is mediated by psychological distress. When experiencing a chatbot service failure, a consumer who interprets the condition as psychologically distressful is more likely to take an avoidance coping strategy. This leads to the following hypothesis:

H4: Psychological distress positively mediates the relationship between chatbot service failure and brand avoidance.

3.5 Moderated mediation – Psychological distress

Chatbots with a social message orientation are more likely to establish a sustainable relationship with consumers by addressing the importance of consumers' social, emotional, and relational needs (Lee *et al*., 2017). When consumers perceive service chatbots as task-oriented, they focus on the agents' functional aspects, such as perceived usefulness and capabilities. In contrast, when consumers perceive chatbots as social elements (i.e. partners), consumers tend to focus on their relational aspects (Schweitzer *et al*., 2019). Drawing on stress-coping theory, studies have shown that when consumers' perceived control over the challenge is high, they are more likely to apply a disturbance-handling (problem- and emotion-focused) coping effort. Consumers prefer a 'self-preservation' (emotionally focused) strategy when perceived control is lower than the challenge (Elie-Dit-Cosaque and Straub, 2011). In most situations, consumers may not consider service failure as an irreparable error; instead, they evaluate it as somewhat stressful but still under control. Thus, consumers will apply problem-focused adaptations to deal with the situation first. During this adaptation, compared with a task-orientated conversation style, a social-oriented conversation style would be considered more understandable and accommodating, making consumers feel less upset and reducing their psychological stress level. If the problem-focused adaption is helpful, the consumer's emotional stability will be restored, and the avoidance outcomes could be reduced (Somerfield and McCrae, 2000). Thus, we argue that social (versus task) orientated conversation styles reduce the mediating effect of psychological distress between chatbot service failure and brand avoidance.

H5: The mediating effect of psychological distress between anthropomorphic (vs. non-anthropomorphic) chatbot service failure and brand avoidance is mitigated (strengthened) by a social (task) oriented conversation style.

4. Overview of studies

We tested the theoretical framework (Figure 1) through three experiments. Study 1 investigated the impact of agent type (human vs. anthropomorphic vs. non-anthropomorphic service agents) on brand avoidance. It further evaluated the role of service criticality as a boundary condition in this relationship. Study 2 examined the role of social (vs. task) conversation style in the relationship between chatbot agent type and brand avoidance in a restaurant setting. Moreover, the study further evaluated the mediating mechanism of psychological distress in the relationship between agent type and brand avoidance. Study 3 also explored three-way interactions of agent type, service criticality, and social (vs. task) conversation style and validated our conceptual model in a healthcare setting, a new service context, to increase external validity.

[Insert Figure 1 here.]

4.1 Study 1: Chatbot service failure and brand avoidance

Study 1 examined two major relationships. First, we examined whether service failure is more likely to lead to brand avoidance when consumers encounter service failure through virtual agents such as chatbots than through human agents. Second, we explored whether non-anthropomorphic (vs. anthropomorphic) chatbot service failures lead to higher brand avoidance in a service failure situation. Furthermore, we examined whether the influence of chatbot service failure on brand avoidance was stronger for critical services – when the customer requires an important vs. unimportant service.

4.1.1 Methods

Design and stimuli

Study 1 employed a 3 (service agent: human vs. anthropomorphic vs. non-anthropomorphic) × 2 (service criticality: high vs. low) between-subjects design. The experiment was conducted in a large computer laboratory, and the participants were randomly exposed to one of the six experimental conditions through a Qualtrics link. We developed three different stimuli (i.e., images) representing service failure while encountering a human agent, an anthropomorphic chatbot, and a non-anthropomorphic chatbot. We contextualised the interactions around the reservation of a dinner table in a restaurant to celebrate a marriage anniversary. However, in each condition, the stimulus indicated the inability of service agents to handle the customers' query and book a dinner table in the restaurant, indicating a service failure. We used a fictitious restaurant brand, 'Bohemian Hall', to eliminate any possible confounding effect of brand familiarity on the outcome variable.

This study employed visual and textual cues to manipulate the service agent type. We used chatbot names, display pictures, and verbal descriptions to manipulate the anthropomorphic chatbots, as suggested by Crolic *et al*. (2022) and Kwak *et al*. (2017). A verbal description, displayed before the image stimuli, indicated whether the customer was interacting with a human vs. an anthropomorphic vs. a non-anthropomorphic chatbot. Additionally, appropriate display pictures were used to distinguish the human agent, the anthropomorphic chatbot, and the non-anthropomorphic chatbot (see Appendix A manipulations). All texts used in the manipulations were written in the first-person (i.e., using 'I', 'we', and 'our') for both the human agent and anthropomorphic chatbot conditions. However, they were written in the third person (e.i, using 'they' and 'it') for the non-anthropomorphic chatbot condition. We designed the look and feel of the text-based image manipulations to imitate an actual mobile application interaction. The images were designed to fit the screen of a smartphone, giving the impression of a real-time chat. Apart from the

components intended for experimental manipulation, all other components – size, colour, display, space, and fonts – were kept identical to eliminate any possible confounding variables.

Further, we operationalised service criticality as its level of importance to the customer (Ostrom and Lacobucci, 1995). Separate descriptions of the contexts were developed to manipulate service criticality, following the method suggested by Crisafulli and Singh (2017). For high-critical conditions, the participants were asked to imagine a situation in which they had to book a table for an important event (anniversary celebration). In contrast, in low-critical conditions, the participants imagined a scenario in which they had to book a dining table at Bohemian Hall. This aligns with the service criticality manipulations adopted for experiential services by Ostrom and Lacobucci (1995). Appendix A contains full copies of the images used for each condition.

Pretest

A pretest was conducted involving 31 (12 female) student participants recruited through the behavioural lab of a reputed Asian university, in which the participants were randomly exposed to one of the six experimental conditions through a Qualtrics link. They were given one minute to observe the stimulus, and then their responses to manipulation questions related to anthropomorphism and service criticality were recorded. Participants were asked to indicate the extent to which they thought the interaction was with a chatbot (tending towards 1) or human (tending towards 7) on a seven-point semantic differential scale, which was used to check the manipulation of the service agent type. Two items – 'To what extent do you agree that booking a dinner table was critical for me?' and 'To what extent do you agree that you had limited time left and had limited alternatives for the dinner table booking?' – were used to check the manipulation of service criticality. The manipulations were based on those used by Ostrom and Lacobucci (1995), which considered time and urgency as key factors for service

criticality. The results showed that the participants' perceived human interaction was significantly higher for the human condition (M = 5.80) than for the anthropomorphic chatbot condition (M = 4.00, $F_{(1,19)} = 8.68$, $p < .009$) or the non-anthropomorphic chatbot condition (M = 2.27, $F_{(1,20)} = 78.46$, $p < .000$). Further, the linear trend was significant ($F_{(1,30)} = 45.87$, $p < .000$). Perceived service criticality was significantly higher in the high-critical service condition (M = 5.66) than in the low-critical service condition (M = 2.83, $F_{(1,30)} = 77.14$, $p < .000$). Manipulation checks using two-way analysis of variance (ANOVA) showed that the interaction effects on perceived human interaction ($p > 0.7$) and perceived criticality ($p > 0.59$) were non-significant, indicating that manipulation of one variable did not affect the other variable.

Participants and procedure

We recruited 296 MBA students enrolled at a reputed Asian business school for this study, similar to the chatbot study conducted by Whang *et al*. (2022). Younger people are more likely to integrate emerging technologies into their lives (Moore, 2012), and chatbots are one of their preferred options (De Cicco *et al*., 2020). Therefore, we chose a sample of adult students for an initial investigation of this study's propositions. We provided an initial briefing to the participants on chatbots and their growing use across industries. The study started with an initial screening of the respondents through a qualifying question, which asked them to report the number of times they had interacted with a chatbot in the past six months. We assumed that at least one exposure was sufficient to qualify for the study sample. Eight respondents were removed for not having a single chatbot exposure in the past six months.

A time gap of one minute was set in the Qualtrics form to ensure that the respondents read the text manipulations carefully. Immediately after one minute of exposure to the stimulus,

the participants were asked to report the restaurant's name provided in the stimulus to check their level of attention. Two responses were deleted for not passing the attention check, resulting in a final sample size of 286 (73% male; M_{age} = 24.28 years, standard deviation [SD] = 3.35). We conducted a power analysis for the ANOVA using G*power, an open-source power analysis program (Faul *et al*., 2007). The results suggested that the sample size was adequate for the assumptions of an alpha value of 0.05, a medium effect size (f2 = 0.25), and a power of 0.80 (Cohen, 1988).

We exposed the participants to one of the six possible conditions. The experiment started by describing service agents and how companies use humans and chatbots for this purpose. Subsequently, the subjects were randomly exposed to one of the two manipulations of service criticality. Next, we exposed the participants to one of the three service agent image manipulations. Participants were then asked to indicate their responses to manipulation questions about anthropomorphism and service criticality, similar to the pretests. The scenarios were tested for realism using a two-item ('The situation described was realistic' and 'I had no difficulty imagining myself in the situation') seven-point (1 = 'Strongly Disagree' and 7 = 'Strongly Agree') scale adopted from Freberg (2012). The mean realism score (M=5.18) and mean imagine score (M=5.24) were significantly higher than the mid-value ($p<0.01$) and were acceptable (Freberg, 2012). Next, we asked them to respond to four items, each rated on a seven-point (1 = strongly disagree, 7 = strongly agree) brand avoidance scale ($\alpha = 0.85$) adapted from Kuanr *et al*. (2021). Table 2 lists the psychometric properties of all measured constructs. Finally, we gathered demographic data from the participants, including their age, gender, and annual household income (Table 3). Further, they were asked how familiar they were with the brand "Bohemian Hall" on a scale of 1 (extremely low) to 7 (extremely high). Results indicated that mean familiarity (M_{Fam} = 2.73) was significantly below the mid-value ($p < 0.001$),

indicating low familiarity. Upon completion of the study, we debriefed each respondent and found that none of the respondents knew the actual objective of the study.

4.1.2 Results

The results confirmed that the manipulations of the agent type were successful. The participants' perceived human interaction was significantly higher in the human condition (M = 5.31) than in the anthropomorphic chatbot condition (M = 3.69, $F(1,199) = 42.79$, $p < .00$) or the non-anthropomorphic chatbot condition (M = 1.86, $F(1,187) = 349.30$, $p < .000$). Moreover, the results showed that the linear trend was significant ($F(1,285) = 232.55$, $p < .000$). Perceived service criticality was significantly greater in the high-critical service condition (M = 5.60) than in the low-critical service condition (M = 4.65, $F(1,285) = 36.28$, $p < .000$). Manipulation checks using two-way analysis of variance (ANOVA) showed that the interaction effects on perceived human interaction ($p > 0.78$) and perceived criticality ($p > 0.30$) were non-significant, indicating that manipulation of one variable did not affect the other variable. After obtaining the desired results for the manipulation test, we tested the hypothesised relationships.

ANOVA results confirmed a significant main effect of service agent type on brand avoidance (MHuman = 5.31, SD = 0.93; MAnthro = 5.62, SD = 0.86; MNonanthro = 5.95, SD = 0.63; F= 13.93, P<0.00; $\eta 2 = 0.09$). An examination of planned contrasts demonstrated that those in the human agents' condition had a lower brand avoidance than those in the anthropomorphic condition (Fcontrast= 6.90, P<0.01; $\eta 2 = 0.02$) and non-anthropomorphic condition (Fcontrast= 27.84, P<0.00; $\eta 2 = 0.09$). Further, participants in the anthropomorphic condition demonstrated lower brand avoidance than those in the non-anthropomorphic condition (Fcontrast= 7.36, P<0.01; $\eta 2 = 0.02$), supporting Hypotheses 1a and 1b.

A two-way ANOVA of service criticality, service agent type, and their interaction as independent variables revealed a significant interaction effect ($F= 4.17$, $p < 0.016$, $\eta 2 = 0.03$),

as shown in Figure 2. Planned contrast analyses revealed that when participants were in the high-critical service condition, the anthropomorphic (vs. human) agent had a significantly higher effect on brand avoidance (MHuman= 5.04, SD = 0.91 vs. MAnthro= 5.61, SD=0.67; F= 9.66, $p < 0.01$, $\eta 2 = 0.05$), the non-anthropomorphic (vs. human) agent service failure had a significantly higher influence on brand avoidance (MHuman=5.04, SD = 0.91 vs. MNonanthro= 6.02, SD=0.63; F = 36.19, $p < 0.001$, $\eta 2 = 0.16$), and the non-anthropomorphic (vs. anthropomorphic) agent had a significantly higher influence on brand avoidance (MAnthro= 5.61, SD = 0.67 vs. MNonanthro= 6.02, SD = 0.63; F = 7.00, $p < 0.01$, $\eta 2 = 0.04$). For low-critical service conditions, all three agent conditions did not significantly differ in brand avoidance scores (M_{Human}= 5.54, SD = 0.89; M_{Anthro}= 5.63, SD = 0.99; $M_{Nonanthro}$= 5.86, SD = 0.63; F= 1.86, $p > 0.16$; $\eta^2 = 0.01$). Therefore, we found support for Hypothesis 2.

[Insert Figure 2 here.]

4.1.3 Discussion

The results indicated that non-anthropomorphic chatbot service failure results in greater brand avoidance than human agents' service failure. We also confirmed that adding a human component to a chatbot service mitigates the impact of chatbot service failure on brand avoidance. Further, our findings demonstrate that the influence of non-anthropomorphic (vs. human) agents on brand avoidance is accentuated when consumers are in high-critical service conditions.

4.2 Study 2: Role of psychological distress and the conversation style (social vs. task orientation) of chatbots

The objective of Study 2 was threefold. First, we revalidated the results of Study 1 using a different sample with a diverse demographic profile, contributing to the external validity of the results. We further confirmed that the impact of chatbot service failure on consumer brand avoidance could be mitigated by anthropomorphising the chatbots. Second, we investigated a

mechanism (psychological distress) underlying the influence of conversational agent service failure and brand avoidance. Third, we investigated whether the influence of anthropomorphic (vs. non-anthropomorphic) chatbot service failure on brand avoidance was mitigated when the conversation style was perceived as social rather than task-oriented.

4.2.1 Methods

Design and stimuli

Study 2 used a 2 (service agent type: anthropomorphic vs. non-anthropomorphic chatbot) × 2 (conversation style: social vs. task) between-subjects design. The participants were randomly exposed, through a Qualtrics link, to one of four conditions. Like Study 1, image stimuli were developed, depicting failed service interactions with anthropomorphic and non-anthropomorphic chatbots. The manipulations were similar to Study 1, where we used chatbot names, display pictures, and verbal descriptions to manipulate the anthropomorphic chatbots, as suggested by Crolic *et al*. (2022) and Kwak *et al*. (2017). The look and feel, verbal and textual cues, and context of the textual interaction were similar to those in Study 1.

Further, we manipulated conversation style (social vs. task) using the method suggested by van Pinxteren *et al*. (2023). Textual manipulations were incorporated into the image stimuli, in which a customer has a failed service interaction and the contextual description. In the social-oriented style, the dialogues were conversational, whereas in the task-oriented style, the dialogues were based on performing the task. For instance, social conversations included phrases such as 'I shall accompany you', 'Okay, Dear. Would you mind telling me…', and 'Yes, Dear. Happy to help.' in the conversational chat stimuli. In contrast, the task condition included phrases such as 'I shall take care of you', 'Alright. Please tell me…', and 'Yes. At your service.' Appendix B contains a full copy of the images used for each condition. *Pretest*

The pretest involved 66 participants recruited from Amazon's Mechanical Turk (MTurk), in which participants were randomly exposed to one of the four conditions through a Qualtrics link. The participants were asked to report their responses to manipulation questions. The manipulation checks for anthropomorphic (non-anthropomorphic) chatbots were measured with items similar to Study 1. Next, two items were used to check the manipulation of conversation style: 'Please rate the degree to which you perceived that the service agent conversation style is social' and 'Please rate the degree to which you perceived that the service agent conversation style is task-oriented'. The perception of human-like interaction was significantly higher in the anthropomorphic condition (M = 5.58) than in the non-anthropomorphic chatbot condition (M = 3.79, $F_{(1,65)} = 29.21$, $p < .000$). The results also confirmed that the manipulations of the social (vs. task) conversation style through the text description were successful. The participants exposed to the social conversation condition reported a higher perception of the service agent as a social (M = 5.38) than those in the task-oriented condition (M = 2.82, $F_{(1,65)} = 72.72$, $p < .000$). Similarly, the participants exposed to the task-oriented condition reported a higher perception of task-oriented conversation (M = 5.50) than those in the social orientation condition (M = 4.03, $F_{(1,65)} = 18.73$, $p < .000$). Manipulation checks using two-way ANOVA showed that the interaction effects on perceived human interaction ($p > 0.22$), task-oriented conversation style ($p > 0.72$) and social-oriented conversation style ($p > 0.20$) were non-significant, indicating that manipulation of one variable did not affect the other variable.

Participants and procedure

We used MTurk and recruited 175 participants from the United Kingdom (58.90% female, $M_{age} = 36.72$ years, SD = 10.34) who received a financial incentive for completing the task. A time gap of one minute was set in the Qualtrics form to ensure that the respondents read the text manipulations carefully. An attention check similar to that used in Study 1 was

conducted by asking respondents the name of the restaurant provided in the stimulus. Six responses were deleted because they did not pass the attention check, resulting in a final sample size of 169. A power analysis was conducted for the ANOVA using G*power, with the assumptions of an alpha value of 0.05, a medium effect size ($f^2 = 0.25$), and a power of 0.80 (Cohen, 1988), indicating that the sample size was adequate.

The experiment started by describing service agents and how companies use chatbots for this purpose. Subsequently, we randomly exposed the participants to one of the four possible conditions. The participants were then asked to indicate their responses to manipulation questions about anthropomorphism and service criticality, similar to the pretests. We checked for scenario realism, like Study 1. The mean realism score (M = 5.32) and mean imagine score (M = 5.06) were significantly higher than the mid-value ($p < .01$) and were acceptable (Freberg, 2012). Next, we asked the participants to respond to an eight-item psychological distress scale ($\alpha = 0.71$) adapted from Duong (2021) and a four-item brand avoidance scale ($\alpha = 0.83$) adapted from Kuanr *et al*. (2021). Table 2 presents the psychometric properties of all measured constructs. Further, they were asked how familiar they were with the brand "Bohemian Hall" on a scale of 1 (extremely low) to 7 (extremely high). Results indicated that mean familiarity ($M_{Fam} = 2.43$) was significantly below the mid-value ($p < 0.001$), indicating low familiarity. Finally, the respondents reported their demographic data, including age, gender, and annual household income (Table 3).

4.2.2 Results

The results confirmed that the manipulations of the agent type were successful. The perception of human-like interaction was significantly higher in the anthropomorphic condition (M = 5.28) than in the non-anthropomorphic chatbot condition (M = 4.28, $F_{(1,168)} = 16.47$, $p < .001$). The results also confirmed that the manipulations of the social (vs. task) conversation style were successful. The participants exposed to the social-orientation style reported a higher

perception of social conversation (M = 5.26) than those in the task-oriented condition (M = 4.06, $F_{(1,168)}$= 23.65, p < .001). Similarly, the participants exposed to the task-oriented condition reported a higher perception of task-oriented conversation (M = 5.55) than those in the social-orientation condition (M = 4.86, $F_{(1,168)}$= 10.63, p < .001). Manipulation checks using two-way ANOVA showed that the interaction effects on perceived human interaction (p > 0.45), task-oriented conversation style (p > 0.14), and social-oriented conversation style (p > 0.59) were non-significant, indicating that manipulation of one variable did not affect the other variable.

Next, we tested the main effects using a one-way ANOVA, and the results confirm a significant main effect of non-anthropomorphic (vs. anthropomorphic) chatbot service failure on brand avoidance (M_{Anthro}= 5.12, SD = 1.24; $M_{Nonanthro}$= 5.46, SD = 0.82; $F_{(1,167)}$= 4.34, p < 0.03, η^2 = 0.03). In particular, those in the anthropomorphic chatbot service failure condition exhibited lower levels of brand avoidance than those in the non-anthropomorphic chatbot condition (M_{Anthro} = 5.12 < $M_{Nonanthro}$ = 5.46). These results confirm the findings of Study 1 in terms of the main effects (H1).

Further, we performed a two-way ANOVA with non-anthropomorphic (vs. anthropomorphic) service agents and conversation style orientation as the independent variables and brand avoidance as the outcome variable. Based on the results, the interaction was significant ($F_{(1,165)}$ = 6.66, p < .01, η2 = 0.04), such that perceptions of a social (vs. task) conversation style mitigated the impact of an anthropomorphic (vs. non-anthropomorphic) chatbot on brand avoidance, supporting Hypothesis 3. Specifically, when the participants were in the social conversation style condition, anthropomorphic (vs. non-anthropomorphic) chatbot service failure had a significantly lower effect on brand avoidance (M_{Anthro} = 4.92; SD = 1.46 vs. $M_{Nonanthro}$ = 5.66, SD = 0.79; $F_{(1,85)}$ = 8.67, p < .01, η^2 = 0.09). Conversely, when they were in task-oriented conditions, the anthropomorphic (vs. non-anthropomorphic) chatbot did not

influence brand avoidance (M_{Anthro} = 5.24; SD = 0.94 vs. $M_{Nonanthro}$ = 5.33, SD = 0.81; $F_{(1,81)}$ = 0.21, p > .65, η^2 = 0.00). This moderation effect is depicted in Figure 3.

[Insert Figure 3 here.]

We conducted a mediation analysis using Hayes PROCESS Model 4 (Hayes, 2018). The mediation model was estimated based on 10,000 bootstrap samples using a 95% confidence interval (CI; Hayes, 2018), with agent type as the independent variable, psychological distress as the mediating variable, and brand avoidance as the outcome variable. The results indicated that the indirect effect of a non-anthropomorphic (vs. anthropomorphic) chatbot service failure on brand avoidance (b = 0.22, standard error [SE] = 0.11, CI = [0.0261, 0.4419]) via psychological distress was significant, with a non-significant direct effect (b = 0.26, SE = 0.14, CI = [-0.0136, 0.5343]), supporting Hypothesis 4.

Furthermore, we conducted a moderated mediation analysis using Hayes PROCESS Model 7 with 10,000 bootstraps (Hayes, 2018) to estimate the overall model. We used brand avoidance as the outcome variable, non-anthropomorphic (vs. anthropomorphic) chatbot service failure as the predictor variable, psychological distress as the mediating variable, and social (task) conversation style as the moderator variable. Our findings showed that the social (task) conversation style moderated the impact of non-anthropomorphic (vs. anthropomorphic) chatbot service failure on psychological distress. The interaction term (agent type × conversation style) had a significant impact on psychological distress (B = 1.41, SE = 0.28, 95% CI: [0.8603, 1.9579]). The results also indicated that the social (task) conversation style moderated the strength of the mediating effect of psychological distress (i.e. agent type → psychological distress → brand avoidance path), with a significant index of moderated mediation (B = 0.93, SE = 0.21, 95% CI: [0.5428, 1.3776]). Thus, Hypothesis 5 was supported.

4.2.3 Discussion

The results of the study confirmed the main findings of Study 1. Specifically, they showed that service failure leads to a higher level of brand avoidance when it involves a non-humanised chatbot rather than a humanised chatbot. Additionally, this study highlighted psychological distress during service failure as a novel psychological mechanism to explain the influence of chatbot service failure on brand avoidance. Finally, we found that the impact of humanised chatbot service failure on brand avoidance could be mitigated by manipulating the chatbot conversation style such that chatbots are viewed as social partners rather than as mere machines performing a task.

4.3 Study 3: Interaction of conversation style and service criticality and competing models

Study 3 contributed in four ways in addition to extending the findings of the previous studies. First, we tested the proposed conceptual model, which included both moderating variables: service criticality and chatbot conversation style. The study investigated moderated moderation, specifically whether conversation style moderated the moderation effect of service criticality. Second, going beyond restaurant services, the study investigated the proposed relationships in a healthcare setting, a different service context from Studies 1 and 2. Patients with certain health conditions seeking an appointment with a doctor through chatbots instantiate a greater degree of criticality than those booking a dining table; thus, a greater degree of brand avoidance. Confirmation of our model in a different context enhances the applicability of the results to multiple settings. Third, this study was conducted on a different sample drawn from field data, increasing the model's external validity. While the previous two studies recruited participants from a university (Study 1) and M-Turk (Study 2), Study 3 drew participants from a field-like situation. We collected data from patients who were seeking doctors' appointments at a large multi-specialty hospital. This increased the generalisability of the study's findings. Fourth, the study investigated and ruled out possible alternative explanations for the proposed relationships and underlying mechanisms.

4.3.1 Methods

Design and stimuli

Study 3 employed a 2 (service agent type: anthropomorphic vs. non-anthropomorphic chatbot) × 2 (conversation style: social vs. task) x 2 (service criticality: critical vs. non-critical) between-subjects design. The experiment included patients visiting one of the largest hospitals in South Asia, who were randomly exposed to one of the eight experimental conditions. We collected data through paper-and-pencil responses. As in Study 1, image stimuli were developed, depicting failed service interactions with anthropomorphic and non-anthropomorphic chatbots. We designed the interactions around booking a doctor's appointment in a hospital. In each condition, the stimulus indicated the inability of service agents to handle the customers' query and, as a result, to book the appointment, indicating a service failure. We used a fictitious hospital brand, 'Lifeline Clinic', to eliminate any possible confounding effect of brand familiarity on the outcome variable. We used chatbot names, avatars, and verbal descriptions to manipulate the anthropomorphic chatbots (see Appendix C), as suggested by Crolic *et al*. (2022). A verbal description, displayed before the image stimuli, indicated whether the customer was interacting with an anthropomorphic vs. non-anthropomorphic chatbot. A display picture was used for the anthropomorphic chatbot, adopted from Crolic *et al*. (2022). We designed the look and feel of the text-based image manipulations to imitate an actual mobile application interaction. The images were designed to fit the screen of a smartphone, giving the impression of a real-time chat. Apart from the components intended for experimental manipulation, all other components (e.g. size, colour, display, space, and fonts) were kept identical to eliminate any possible confounding variables.

Further, we manipulated service criticality by presenting two situations for doctors' appointments. In high-critical conditions, the participants were asked to imagine a situation in

which they had undergone bypass surgery at Lifeline Clinic just last week, and now they had to book a doctor's appointment for a follow-up consultation due to some critical medical condition. In the low-critical condition, the participants imagined a scenario in which they had undergone treatment for a toothache at Lifeline Clinic just last week, and now they had to book a doctor's appointment for a follow-up due to minor tooth pain. We manipulated the conversation style (social vs. task) using verbal cues, similar to Study 2. Appendix C contains full copies of the images used for each condition.

Pretest

We pretested the manipulations by recruiting 98 participants (34 female) from the online crowd-sourcing platform 'www.prolific.ac', providing £0.5 per participant as compensation. The participants were randomly exposed to one of the eight conditions through a Qualtrics link. They were allowed one minute to observe the stimulus. Subsequently, they were asked to report their responses to manipulation questions regarding anthropomorphism, service criticality, and conversation style (social vs. task). The respondents indicated how anthropomorphic the chatbot was using a nine-item, seven-point Likert scale adapted from Crolic *et al*. (2022). Table 4 includes all the scale items. Next, as in Studies 1 and 2, a two-item scale for service criticality and another two-item scale for conversation style orientation were used to check the manipulations. The results confirmed that the manipulations of the agent type via the chat images were successful. The perception of anthropomorphism was significantly higher in the anthropomorphic condition ($M = 5.08$) than in the non-anthropomorphic chatbot condition ($M = 3.84$, $F_{(1,97)} = 24.48$, $p < .001$). Meanwhile, perceived service criticality was significantly higher in the high-critical service condition ($M = 4.49$) than in the low-critical service condition ($M = 3.37$, $F_{(1,97)} = 12.47$, $p < .001$). The results also confirmed that the manipulations of the conversation style (i.e. social vs. task) through the text description were successful. The participants in the social conversation condition reported a higher perception

of social orientation (M = 4.56) than those in the task-oriented condition (M = 2.72, $F_{(1,97)}$ = 47.19, p < .001). Similarly, the participants in the task-oriented condition reported a higher perception of task-oriented conversation (M = 5.39) than those in the social orientation condition (M = 3.06, $F_{(1,97)}$ = 99.86, p < .001). Manipulation checks using three-way ANOVA showed that the interaction effects on perceived human interaction (p > 0.95), perceived criticality (p > 0.21), task-orientated conversation style (p > 0.99) and social-oriented conversation style (p > 0.24) were non-significant, indicating that manipulation of one variable did not affect the other variable.

Participants and procedure

A sample of patients who were visiting a large hospital in South Asia was used in this study. The hospital was selected at the convenience of the authors, as it was a location where they had access to the participants. A local agency was hired for data collection. Patients visiting the outpatient department were asked to participate in the study voluntarily. We selected the final sample using a systematic random sampling design, where every third patient visiting the hospital was asked to be a respondent. The respondents voluntarily participated in this study in exchange for a coupon worth $3, which could be exchanged at the counter as the doctors' consultation fee. We approached 250 patients. Similar to Study 1, we started with an initial screening of the respondents through a qualifying question, which asked them to report the number of times they had interacted with a chatbot to access healthcare services in the past six months. Of the 250 participants approached, 74 were excluded for not having adequate experience using chatbots for health and medical care services. We ruled out non-response bias, as the t-test revealed non-significant differences (p < 0.05 for all demographic variables, including gender, age, and income) between the selected and excluded samples. Ultimately, 176 respondents (M_{age} = 34.5 years; 32.7 per cent female) participated in the study. A power analysis was conducted for the ANOVA using G*power, with the assumptions of an alpha

value of 0.05, a medium effect size ($f^2 = 0.25$), and a power of 0.80, indicating that the sample size was adequate (Cohen, 1988).

We randomly exposed the participants to one of the eight possible conditions using a paper-and-pencil-based method. The experiment started by describing service agents and how companies use humans and chatbots for this purpose. The participants were presented with a booklet that started with a text description of the scenario. Next, we exposed the participants to one of the eight image manipulations. We gave the participants one minute to observe the stimulus to ensure that they read the text manipulations carefully. An attention check similar to that in Study 1 was conducted by asking respondents to state the name of the hospital provided in the stimulus. None of the respondents failed the attention check. Next, the participants were asked to respond to the manipulation check questions about anthropomorphism, service criticality, and conversation style (social vs. task). Subsequently, a scenario realism test was performed as in Study 1, and the mean realism score (M = 4.58) and mean imagine score (M = 4.61) were significantly higher than the mid-value ($p < 0.001$). Next, we asked the participants to respond to four items, each using a seven-point (1 = strongly disagree, 7 = strongly agree) brand avoidance scale ($\alpha = 0.91$) adapted from Kuanr *et al*. (2021). Further, we asked them to respond to an eight-item psychological distress scale ($\alpha = 0.94$) adapted from Duong (2021).

Customers' compassion for errors made by agents might act as an underlying mechanism in the relationship between agent type and brand avoidance in a service failure context. Specifically, participants may be more compassionate to human-like chatbots than non-human chatbots, which might lead to brand avoidance. Therefore, to examine alternate explanations for our model, we measured compassion for errors made by agents ($\alpha = 0.85$) using a five-item Likert scale adapted from Shiota *et al*. (2006). Furthermore, we expected that participants' active negative emotions, such as customer anger in a service failure situation,

might confound the results and provide an alternative explanation to our outcome. While psychological distress may lead to brand avoidance, active emotions such as anger could lead to brand avoidance along with more intense customer reactions, such as complaining to authorities, posting comments on social media, and providing negative reviews (Strizhakova *et al*., 2012). To investigate whether our manipulations impacted customer anger as an alternative explanation, we measured customer anger ($\alpha = 0.88$) using a two-item scale adapted from Crolic *et al*. (2022). Table 2 depicts the psychometric properties of all measured constructs. Further, they were asked how familiar they were with the brand "Lifeline Clinic" on a scale of 1 (extremely low) to 7 (extremely high). Results indicated that mean familiarity ($M_{Fam} = 2.62$) was significantly below the mid-value ($p < 0.001$), indicating low familiarity. Finally, the respondents reported their demographic data, including age, gender, and annual household income (see Table 3). Upon completion of the study, we debriefed each participant and found that none of the respondents could state the actual objective of the study.

4.3.2 Results

The results confirmed the desired manipulations. The participants' perceived anthropomorphism was significantly higher in the anthropomorphic condition ($M = 4.77$) than in the non-anthropomorphic chatbot condition ($M = 3.01$, $F_{(1,175)} = 86.54$, $p < .001$). Perceived service criticality was significantly higher in the high-critical service condition ($M = 4.47$) than in the low-critical service condition ($M = 3.60$, $F_{(1,175)} = 12.42$, $p < .001$). The findings also confirmed that the manipulations of the conversation style (i.e. social vs. task) were successful. The participants exposed to the social conversation condition reported a higher perception of the social-oriented conversation style ($M = 4.46$) than those in the task-oriented condition ($M = 2.60$, $F_{(1,175)} = 86.98$, $p < .001$). Similarly, the participants in the task-oriented condition reported a higher perception of task-oriented conversation ($M = 5.65$) than those in the social-orientation condition ($M = 3.14$, $F_{(1,175)} = 178.89$, $p < .001$). Manipulation checks using three-

way ANOVA showed that the interaction effects on perceived human interaction ($p > 0.60$), perceived criticality ($p > 0.71$), task-oriented conversation style ($p > 0.99$), and social-oriented conversation style ($p > 0.30$) were non-significant, indicating that manipulation of one variable did not affect the other variables.

The ANOVA results revealed a significant effect of service agent type on brand avoidance (M_{Anthro}= 3.46, SD = 1,41; $M_{Nonanthro}$= 4.66, SD = 1.44; $F_{(1,175)}$ = 31.18, $p < 0.00$; η^2 = 0.09), confirming the findings of Study 1 and supporting Hypotheses 1. Next, we tested the moderation effects of service criticality and conversation style. A two-way ANOVA with service agent type and service criticality as independent variables revealed a significant interaction effect ($F = 15.42$, $p < 0.00$, $\eta^2 = 0.08$), as shown in Figure 4a. The results indicated that service criticality accentuated the impact of non-anthropomorphic (vs. anthropomorphic) chatbot service failure on brand avoidance. Specifically, when participants were in the high critical condition, non-anthropomorphic (vs. anthropomorphic) chatbot service failure had a significantly higher effect on brand avoidance (M_{Anthro} = 3.04; SD = 0.99 vs. $M_{Nonanthro}$ = 5.07, SD = 1.40; $F_{(1,84)}$ = 46.578.67, $p < .00$, $\eta^2 = 0.36$). Conversely, when participants were in low critical conditions, non-anthropomorphic (vs. anthropomorphic) chatbot service failure did not influence brand avoidance (M_{Anthro} = 3.66; SD = 1.54 vs. $M_{Nonanthro}$ = 3.97, SD = 1.26; $F_{(1,90)}$ = 0.96, $p > .33$, $\eta^2 = 0.01$). Thus, Hypothesis 2 was supported.

Moreover, a two-way ANOVA with service agent type and social (vs. task) conversation style as independent variables revealed a significant interaction effect ($F = 15.98$, $p < 0.00$, η^2 = 0.09), as shown in Figure 4b. The results indicated that a social (vs. task) communication style mitigated the impact of non-anthropomorphic (vs. anthropomorphic) chatbot service failure on brand avoidance. Specifically, when the participants were in the social-orientation condition, anthropomorphic (vs. non-anthropomorphic) chatbot service failure had a lower effect on brand avoidance (M_{Anthro} = 3.34; SD = 1.19 vs. $M_{Nonanthro}$ = 5.27, SD = 1.11; $F_{(1,93)}$ =

66.05, $p < .00$, $\eta^2 = 0.43$). Conversely, when the participants were in task-oriented conditions, non-anthropomorphic (vs. anthropomorphic) chatbot service failure did not influence brand avoidance ($M_{Anthro} = 3.58$; SD = 1.62 vs. $M_{Nonanthro} = 3.87$, SD = 1,47; $F_{(1,81)} = 0.75$, $p > .39$, $\eta^2 = 0.00$), again supporting Hypothesis 3.

[Insert Figure 4a and 4b here.]

Next, we performed a moderated moderation analysis, using a three-way ANOVA, to investigate the effect of the three-way interaction of service agent type, service criticality, and social (vs. task) conversation style on brand avoidance. The results showed a significant three-way interaction effect on brand avoidance ($F_{(1,175)} = 9.90$, $p < .002$, $\eta^2 = 0.06$). We further examined participants' brand avoidance scores for social (vs. task) conversation style separately for high and low service criticality, as shown in the slope analysis in Figure 5. For participants exposed to high-critical service conditions, the interaction effect of service agent type and social (vs. task) conversation style was significant ($F_{(1,84)} = 27.46$, $p < .001$, $\eta^2 = 0.25$). The social conversation style condition was significantly associated with lower brand avoidance when the participants interacted with an anthropomorphic chatbot ($M_{Anthro} = 2.88$; SD = 1.01) rather than a non-anthropomorphic chatbot ($M_{Nonanthro} = 5.88$, SD = 0.61). There was a non-significant difference in brand avoidance scores between anthropomorphic and non-anthropomorphic chatbots in the task conversation style condition ($M_{Anthro} = 3.54$; SD = 0.81; $M_{Nonanthro} = 3.87$, SD = 1.39). Conversely, for participants in low-critical service conditions, the interaction effect of service agent type and social (vs. task) conversation style was non-significant ($F_{(1,90)} = 0.01$, $p > .98$, $\eta^2 = 0.00$). The brand avoidance scores showed a similar trend for social-oriented ($M_{Anthro} = 3.78$; SD = 1.19; $M_{Nonanthro} = 4.06$, SD = 0.85) and task-oriented ($M_{Anthro} = 3.58$; SD = 1.74; $M_{Nonanthro} = 3.88$, SD = 1.62) conversation styles.

[Insert Figure 5 here.]

We tested the mediation effects using a simple mediation model PROCESS Model 4 (Hayes, 2018), using 10,000 bootstrap samples and a 95% CI (Hayes, 2018). The results indicated that the indirect effect of a non-anthropomorphic (vs. anthropomorphic) chatbot service failure on brand avoidance (b = 0.86, SE = 0.16, CI = [0.5370, 1.1617]) via psychological distress was significant, with a significant direct effect (b = 0.35, SE = 0.15, CI = [0.0185, 0.0593]), offering further support for Hypothesis 4. We expected that two mechanisms – customers' compassion for error and active negative emotions (e.g. anger) – could offer an alternative explanation for the impact of non-anthropomorphic (vs. anthropomorphic) chatbots on brand avoidance. Therefore, we examined whether customers' compassion for error and customer anger mediated the relationship between non-anthropomorphic (vs. anthropomorphic) chatbot service failure and brand avoidance. Two separate mediation analyses using Hayes PROCESS Model 4 with 10,000 bootstraps (Hayes, 2018) were re-estimated with customers' compassion for error and customer anger as separate mediators (i.e. instead of psychological distress) to examine these alternate explanations. The mediation analysis results revealed non-significant indirect effects of customers' compassion for error (B = –0.002, SE = 0.03, 95% CI [–0.1108, 0.1051]) and customer anger (B = –0.002, SE = 0.08, 95% CI [–0.1757, 0.1518]). Further, we found a non-significant impact of non-anthropomorphic (vs. anthropomorphic) agent type on customers' compassion for error (B = –0.002, SE = 0.08, 95% CI [–0.1757, 0.1518]) and customer anger (B = –0.02, SE = 0.03, 95% CI [–0.0447, 0.1330]). This result clearly ruled out the possibility of a mediating role of customers' compassion for error and customer anger, rendering the alternative explanation (compassion for error) unreasonable.

Furthermore, we conducted a moderated mediation analysis using Hayes PROCESS Model 7 with 10,000 bootstraps (Hayes, 2018) to estimate the overall model. We estimated two separate models using service criticality and social (vs. task) conversation style as separate

moderators. We employed brand avoidance as an outcome variable, non-anthropomorphic (vs. anthropomorphic) chatbot service failure as the predictor variable, and psychological distress as the mediating variable. The results indicated that both service criticality (index of moderated mediation: B = 1.23, SE = 0.34, 95% CI: [0.5997, 1.9204]) and social (task) conversation style (index of moderated mediation: B = 1.35, SE = 0.25, 95% CI: [0.4477, 1.8272]) moderated the strength of the mediating effect of psychological distress (i.e. agent type → psychological distress → brand avoidance path), supporting Hypothesis 5.

4.3.3 Discussion

The results of the study matched our predictions and confirmed the findings of the previous studies. We successfully refuted alternative explanations for our proposed model (customers' compassion for error and customer anger). The findings increased the external validity of our proposed model by re-establishing the hypothesised relations in a different service setting. Considering the criticality of patients' appointments with doctors using chatbots in the healthcare industry, the results of this study increased the generalisability of our findings. We confirmed that non-anthropomorphic chatbot service failure results in greater brand avoidance than failure by anthropomorphic chatbots in a critical service failure context. We also confirmed that the impact of humanised chatbot service failure on brand avoidance can be mitigated by manipulating chatbot conversation styles such that the chatbots are viewed as social partners rather than merely as machines performing a task. Furthermore, our findings demonstrated that brand avoidance can be mitigated by using a social conversation style and anthropomorphic agent in a critical service failure condition. However, a social conversation style did not have any effect in a low-critical service failure context.

5. Discussion

5.1 General discussion

Service agents have emerged as the first touchpoint in the customer journey in multiple industries and are thus employed to build customer relationships. However, these service agents often fall short of customers' expectations (Sheehan *et al*., 2020), resulting in service failures (Crolic *et al*., 2022). In this context, our study proposes effective strategies for mitigating the unintended effects of service failures. The results offer valuable insights into how and whether it is possible to minimise brand avoidance by utilising different types of service agents and conversation styles in varying service contexts based on the criticality of the service setting.

The findings indicate that consumers demonstrate stronger brand avoidance when encountering a service failure by a chatbot than a human agent. Furthermore, brand avoidance is exacerbated in the case of non-anthropomorphic chatbots compared to anthropomorphic chatbots. This finding corroborates the results of previous works regarding the favourable effects of human agents and anthropomorphic design on customer perceptions (Tsai *et al*., 2021). In other words, the type of agent or the agent's identity is crucial in a technology-based service environment, as they determine consumers' response to service failures. Further, we found that chatbot (vs. human) service failures are more likely to lead to brand avoidance in a critical (vs. low-critical) service context. The results also demonstrate that chatbots featuring anthropomorphic elements mitigate the impact of service failure on brand avoidance in the context of critical services. Moreover, our findings suggest that the impact of anthropomorphic chatbot service failure on brand avoidance is weaker when the chatbot engages in social- rather than task-oriented conversation. In addition, our results reveal a novel mediating mechanism (i.e. psychological distress) between service failure and brand avoidance. Specifically, psychological distress mediates the impact of service failure by anthropomorphic (vs. non-anthropomorphic) agents on brand avoidance. Finally, the moderated mediation analysis

showed that social-oriented (vs. task-oriented) conversation moderated the impact of anthropomorphic (vs. non-anthropomorphic) chatbot service failure on brand avoidance through psychological distress.

Considering that companies are struggling with poor consumer acceptance of conversational agents and facing impending regulatory changes requiring disclosure of the type of conversational agent used (Pavone *et al*., 2023), our research suggests that conversational strategies should be developed that 1) consider service criticality and appropriate agents, 2) foster socially oriented conversations, and 3) help customers cope with the psychological distress associated with chatbot service failures.

5.2 Theoretical implications

Our research makes three contributions to service failure research and the literature related to anti-consumption. First, we contribute to the emerging research on service failures and conversational agents by examining consumers' responses to different conversational agents in multiple service settings. Existing research on this issue is fragmented and inconclusive, with multiple perspectives and conflicting findings (Tan *et al*., 2024). One stream of research suggests that consumers have favourable attitudes and empathy towards human agents in the event of service failure compared to chatbots, thereby limiting their negative reactions (Chen *et al*., 2021). Conversely, another stream of research based on expectation confirmation theory suggests that customers have higher expectations of human agents, so their negative reactions may be more pronounced (Pavone *et al*., 2023). The literature on consumer reactions to service failures involving anthropomorphic and non-anthropomorphic chatbots remains similarly inconclusive (Choi *et al*., 2021). Our research is one of the first studies to address this knowledge gap by demonstrating how consumers react to service failures when

engaging with various conversational agents, including humans, anthropomorphic chatbots, and non-anthropomorphic chatbots.

Second, the application of stress and coping theory (Lazarus and Folkman, 1984) introduces a novel perspective on why customers may avoid brands after a service failure. Our research is the first to demonstrate how psychological distress caused by a service failure involving a chatbot can lead to brand avoidance. This approach is unique in that it combines theoretical lenses from research on marketing (i.e. Kuanr *et al*., 2022), service failure (i.e. Van Vaerenbergh *et al*., 2014), and human–chatbot interaction (i.e. Lu *et al*., 2024), which allows us to develop new strategies and offer key insights. We propose a novel theoretical framework focusing on the role of psychological distress in technology-enabled service settings. Further, we use the framework to generate empirical evidence showing different outcomes involving consumer response to chatbot services based on the interplay of the type of conversational agent, service context, and conversation orientation.

Third, we contribute to the literature on chatbot conversation styles in the context of service failure (Lu *et al*., 2024). We offer new evidence showing that agent conversation styles, particularly social conversational styles, mitigate consumers' brand avoidance when they experience anthropomorphic chatbot service failure. The results indicate that the influence of service failure on brand avoidance is mitigated when customers perceive the agent as a social partner rather than a task-performing chatbot. When customers perceive anthropomorphic agents as socially oriented, they exhibit weaker brand avoidance behaviour with non-anthropomorphic chatbots. However, interestingly, the customers in this study reported equally high brand avoidance intentions for anthropomorphic and non-anthropomorphic chatbots when they perceived their conversation style as task-oriented. Human communications are often perceived as incorporating warmth, empathy, and emotions (Roy and Naidoo, 2021), which leads customers to evaluate their interactions with human agents favourably. Humanlike

interaction mitigates intense brand avoidance when consumers perceive the service agent as a social companion. Therefore, when consumers experience chatbot service failure, the non-completion of the assigned task results in greater brand avoidance than when the chatbot has a social orientation.

Fourth, our study adds to the literature on service failure by demonstrating that service failure in high-critical service encounters leads to stronger brand avoidance than in a low-critical condition. This finding is consistent with the results of Mozafari *et al*. (2021), suggesting that customers may not consider it prudent to rely on chatbots for accomplishing critical tasks. A critical service encounter affects how consumers value services, their customer journey, and their lifetime value (Voorhees *et al*., 2017). Therefore, in a service failure context, service criticality plays a vital role in customers' brand evaluation (Teng *et al*., 2014). In high critical service contexts, customers urgently need the service. Moreover, they might not be inclined to postpone the resolution of the failure, making them less forgiving toward the brand (Crisafulli and Singh, 2017). This behaviour becomes more intense when customers attribute the failure to technology, such as a chatbot, and thus blame the brand for utilising a defective technology. However, interacting with a human agent mitigates the negative influence of service failure on brand avoidance because customers hold the human agent responsible for the service failure rather than the brand.

Finally, our research contributes to the existing literature on brand avoidance in the service failure context. Specifically, it extends the research on negative consumer–brand relationships (Anaza *et al*., 2021) by developing and testing a comprehensive framework of brand avoidance in a chatbot service failure context. In so doing, we contribute to the scarce literature on negative emotions towards brands (Pantano, 2021), particularly because past research has placed heavy emphasis on understanding customer attitudes toward chatbots (De Cicco *et al*., 2020), their acceptance of chatbots (Chi *et al*., 2023), and their continued usage

of chatbots (Li and Wang, 2023). This study reveals novel consequences of chatbot service failure, advancing our understanding of the role of negative brand experiences in the chatbot failure context.

5.3 Practical implications

Our research has important practical implications. Consumer–machine interactions in chatbot services have become a white-hot topic. The drumbeat of vendor marketing agencies is loud, and they are making big promises about the effectiveness of chatbots. However, despite the claimed advantages and optimistic predictions, automated forms of service interactions may not always be what customers prefer (Kaplan and Haenlein, 2020). According to Forrester's latest research, 54% of online consumers in the United States think that interactions with customer service chatbots will negatively impact their lives and expect worse service when interacting with chatbots (Jacobs, 2019). This frustration eventually spills over to the brand and leads to brand avoidance. Therefore, managers can use our findings to better understand the factors motivating individuals' inclination to avoid a brand in the case of a chatbot failure and devise mitigation strategies to prevent such negative outcomes.

The findings further reveal that customers are more likely to avoid brands when a non-anthropomorphic chatbot causes failures rather than an anthropomorphic chatbot or human agent. As such, increasing the adoption of anthropomorphic chatbots in this context appears to be a less risky strategy than adopting non-anthropomorphic chatbots. This is an interesting result considering the findings of previous studies, which suggest that consumers perceive lower dissatisfaction with a service request rejection when the service is handled by a robot versus a human agent (Yu *et al*., 2022).

In addition, this research sheds further light on the nature of anthropomorphism, which may be useful for chatbot designers. Our findings suggest that brands that use chatbots with a

social communication orientation are less likely to be avoided than those that use chatbots with a task orientation. Although it is generally agreed that customers prefer warm and friendly chatbots, they can have unintended consequences. Thus, firms should be cautious when designing overly friendly chatbot interactions. However, when it comes to service inquiries with a higher level of criticality, consumers do not feel secure enough to rely on chatbots. This can hamper their service experience and, in turn, their relationship with the service provider in the case of a chatbot service failure. Thus, firms should be cautious when deploying chatbots in highly critical service settings.

5.3 Limitations and future research directions

This research is not free of limitations. Screenshots of a conversation were shown to the study participants to ensure high internal validity. Future studies should allow the study participants to interact with a chatbot to increase external validity. Other researchers could examine brand avoidance and the role of anthropomorphism in complex service scenarios. The service context used in this research (i.e. restaurant booking) is considered low in terms of credence quality (Mazaheri *et al*., 2012). Hence, future research could test the relationship between chatbot service failure and brand avoidance in service settings with high credence quality and investigate whether brand avoidance caused by chatbots or human agents leads to different service recovery times for regaining customers. Furthermore, future research could investigate whether the results change if customers are deceived into believing they are interacting with another human and not a chatbot (McGuire *et al*., 2023). This is especially important, as new regulations may soon require companies to take a more transparent approach and disclose the identity of AI-based service agents (European Commission, 2021).

We acknowledge that assigning inconsistent names to chatbots across different experimental conditions may have potential confounding effects. Further, using avatars and

names to manipulate anthropomorphism could involve gender biases. Thus, future research could explore the impact of chatbot avatars and names on consumer behaviours. Future research could evaluate the role of cultural orientation (Hofstede *et al*., 2010) as an individual variable in the relationship between chatbot service failure and brand avoidance in comparisons of the performance of anthropomorphic and non-anthropomorphic chatbots.

Furthermore, one limitation of this study lies in the interpretation of language styles —specifically, the distinction between social-oriented and task-oriented communication. While the manipulation was grounded in prior research (van Pinxteren et al., 2023), interpretations of conversational tone are inherently subjective and may vary across cultural contexts (Folk et al., 2025). What is perceived as "social" or "task" language in one cultural setting may be interpreted differently in another, potentially influencing how participants respond to chatbot interactions. As such, the generalizability of findings related to conversation style may be limited by the cultural background of the sample. Future research could explore cross-cultural variations in the perception and effectiveness of chatbot language styles to increase the generalizability of the findings.

References

Strizhakova, Y., Tsarenko, Y., & Ruth, J. A. (2012). "I'm mad and I can't get that service failure off my mind" coping and rumination as mediators of anger effects on customer intentions. Journal of Service Research, 15(4), 414-429.

Shiota, M. N., Keltner, D., & John, O. P. (2006). Positive emotion dispositions differentially associated with Big Five personality and attachment style. The journal of positive psychology, 1(2), 61-71.

Akhtar, N., Sun, J., Chen, J. and Akhtar, M. N. (2020), "The role of attitude ambivalence in conflicting online hotel reviews", *Journal of Hospitality Marketing & Management*, Vol. 29 No. 4, pp. 471-502.

Alabed, A., Javornik, A. and Gregory-Smith, D. (2022), "AI anthropomorphism and its effect on users' self-congruence and self–AI integration: A theoretical framework and research agenda", *Technological Forecasting and Social Change*, Vol. 182, pp. 121786.

Al-Natour, S., Benbasat, I., & Cenfetelli, R. (2011). The adoption of online shopping assistants: Perceived similarity as an antecedent to evaluative beliefs. *Journal of the Association for Information Systems*, 12(5), 2.

Anaza, N. A., Saavedra, J. L., Hair Jr, J. F., Bagherzadeh, R., Rawal, M., & Osakwe, C. N. (2021). Customer-brand disidentification: Conceptualization, scale development and validation. *Journal of Business Research*, 133, 116-131.

Balaji, M. S., Roy, S. K., & Quazi, A. (2017). Customers' emotion regulation strategies in service failure encounters. *European Journal of Marketing*, 51(5/6), 960-982.

Baabdullah, A. M., Alalwan, A. A., Algharabat, R. S., Metri, B. and Rana, N. P. (2022), "Virtual agents and flow experience: An empirical examination of AI-powered chatbots", *Technological Forecasting and Social Change*, Vol. 181, pp. 121772.

Bechwati, N. N., & Morrin, M. (2003). Outraged consumers: Getting even at the expense of getting a good deal. *Journal of Consumer Psychology*, 13(4), 440-453.

Belanche, D., Casaló, L. V., Flavián, C. and Schepers, J. (2020), "Robots or front-line employees? Exploring customers' attributions of responsibility and stability after service failure or success", *Journal of Service Management*, Vol. 31 No. 2, pp. 267-289.

Blut, M., Wang, C., Wünderlich, N. V. and Brock, C. (2021), "Understanding anthropomorphism in service provision: a meta-analysis of physical robots, chatbots, and other AI", *Journal of the Academy of Marketing Science*, Vol. 49, pp. 632-658.

Burgoon, J. K., Bonito, J. A., Bengtsson, B., Cederberg, C., Lundeberg, M. and Allspach, L. (2000), "Interactivity in human–computer interaction: A study of credibility, understanding, and influence", *Computers in Human Behaviour*, Vol. 16 No. 6, pp. 553-574.

Carver, C. S., & Connor-Smith, J. (2010). Personality and coping. *Annual review of psychology*, 61(1), 679-704.

Chattaraman, V., Kwon, W. S., Gilbert, J. E., & Ross, K. (2019). Should AI-Based, conversational digital assistants employ social-or task-oriented interaction style? A task-competency and reciprocity perspective for older adults. *Computers in Human Behavior*, 90, 315-330.

Cho, S. B., Jang, Y. J. and Kim, W. G. (2017), "The moderating role of severity of service failure in the relationship among regret/disappointment, dissatisfaction, and behavioural intention", *Journal of Quality Assurance in Hospitality & Tourism*, Vol. 18 No. 1, pp. 69-85.

Choi, S., Mattila, A. S., & Bolton, L. E. (2021). To err is human (-oid): how do consumers react to robot service failure and recovery?. *Journal of Service Research*, 24(3), 354-371.

Chen, N., Mohanty, S., Jiao, J., & Fan, X. (2021). To err is human: Tolerate humans instead of machines in service failure. *Journal of Retailing and Consumer Services*, 59, 102363. Cohen, J. (1988), *Statistical power analysis for the behavioural sciences*, Academic press, New York.

Chen, Q., Gong, Y., Lu, Y., & Tang, J. (2022). Classifying and measuring the service quality of AI chatbot in frontline service. *Journal of Business Research*, 145, 552-568.

Chi, O. H., Chi, C. G., Gursoy, D., & Nunkoo, R. (2023). Customers' acceptance of artificially intelligent service robots: The influence of trust and culture. *International Journal of Information Management*, 70, 102623.

Chong, T., Yu, T., Keeling, D. I., & de Ruyter, K. (2021). AI-chatbots on the services frontline addressing the challenges and opportunities of agency. *Journal of Retailing and Consumer Services*, 63, 102735.

Crisafulli, B. and Singh, J. (2017), "Service failures in e-retailing: Examining the effects of response time, compensation, and service criticality", *Computers in Human Behaviour*, Vol. 77, pp. 413-424.

Crolic, C., Thomaz, F., Hadi, R. and Stephen, A. T. (2022), "Blame the bot: Anthropomorphism and anger in customer–chatbot interactions", *Journal of Marketing*, Vol. 86 *No.* 1, pp. 132-148.

Cui, Y. (2022). Sophia Sophia tell me more, which is the most risk-free plan of all? AI anthropomorphism and risk aversion in financial decision-making. *International Journal of Bank Marketing*, 40(6), 1133-1158.

De Cicco, R., Silva, S. C., & Alparone, F. R. (2020). Millennials' attitude toward chatbots: an experimental study in a social relationship perspective. *International Journal of Retail & Distribution Management*, 48(11), 1213-1233.

Duong, C. D. (2021), "The impact of fear and anxiety of Covid-19 on life satisfaction: Psychological distress and sleep disturbance as mediators", *Personality and Individual Differences*, Vol. 178, pp. 110869.

Elie-Dit-Cosaque, C.M. and Straub, D.W. (2011), "Opening the black box of system usage: user adaptation to disruptive IT", *European Journal of Information Systems*, Vol. 20 No. 5, pp. 589-607.

European Commission (2021), "Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts" (April 1), https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0206.

Faul, F., Erdfelder, E., Lang, A. G. and Buchner, A. (2007), "G* Power 3: A flexible statistical power analysis program for the social, behavioural, and biomedical sciences", *Behaviour research methods*, Vol. 39 No. 2, pp. 175-191.

Freberg, K. (2012). Intention to comply with crisis messages communicated via social media. *Public Relations Review*, 38(3), 416-421.

Folkman, S. and Lazarus, R. S. (1980), "An analysis of coping in a middle-aged community sample", *Journal of health and social behaviour*, Vol. 21, No. 3, pp. 219-239.

Folk, D. P., Wu, C., & Heine, S. J. (2023). Cultural Variation in Attitudes Toward Social Chatbots. *Journal of Cross-Cultural Psychology*, Vol. 56, No. 3.

Goussinsky, R. (2012). Coping with customer aggression. *Journal of Service Management*, 23(2), 170-196.

Hayes, A. F. (2018), *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford publications, New York.

Honig, S. and Oron-Gilad, T. (2018), "Understanding and resolving failures in human-robot interaction: Literature review and model development", *Frontiers in Psychology*, Vol. 9, pp. 861.

Hofstede, G. (2010). The GLOBE debate: Back to relevance. *Journal of international business studies*, 41, 1339-1346.

Huang, B. and Philp, M. (2021), "When AI-based services fail: examining the effect of the self-AI connection on willingness to share negative word-of-mouth after service failures", *The Service Industries Journal*, Vol. 41 No. 13-14, pp. 877-899.

Huang, Y. S. S. and Dootson, P. (2022), "Chatbots and service failure: When does it lead to customer aggression", *Journal of Retailing and Consumer Services*, Vol. 68, pp. 103044.

Huang, Y., Gursoy, D., Zhang, M., Nunkoo, R., & Shi, S. (2021). Interactivity in online chat: Conversational cues and visual cues in the service recovery process. *International Journal of Information Management*, 60, 102360.

IDC (2021), "The Premier Global Market Intelligence Company", available at: https://www.idc.com/getdoc.jsp?containerId=IDC_P42577 (accessed 20 July 2023)

Jacobs, I. (2019, February 4). Forrester's Latest Infographic: Consumers Don't Believe The Chatbot Hype. *Forrester*. https://www.forrester.com/blogs/forresters-latest-infographic-consumers-dont-believe-the-chatbot-hype/#:~:text=What%20we%20found%20in%20our

Kaplan, A., & Haenlein, M. (2020). Rulers of the world, unite! The challenges and opportunities of artificial intelligence. Business Horizons, 63(1), 37-50.

Kang, J. and Hyun, S. S. (2012), "Effective communication styles for the customer-oriented service employee: Inducing dedicational behaviours in luxury restaurant patrons. *International Journal of Hospitality Management*, Vol. 31 No. 3, pp. 772-785.

Kessler, R. C., Barker, P. R., Colpe, L. J., Epstein, J. F., Gfroerer, J. C., Hiripi, E., ... & Zaslavsky, A. M. (2003), "Screening for serious mental illness in the general population", *Archives of general psychiatry*, Vol. 60 No. 2, pp. 184-189.

Khamitov, M., Grégoire, Y., & Suri, A. (2020). A systematic review of brand transgression, service failure recovery and product-harm crisis: integration and guiding insights. *Journal of the Academy of Marketing Science*, 48, 519-542.

Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: a review of the research. *Computers in human behavior*, 19(3), 335-353.

Knittel, Z., Beurer, K. and Berndt, A. (2016), "Brand avoidance among Generation Y consumers", *Qualitative Market Research: An International Journal*, Vol. 19 No. 1, pp.27-43.

Kuanr, A., Pradhan, D., Lyngdoh, T. and Lee, M. S. (2021), "Why do consumers subvert brands? investigating the influence of subjective well-being on brand avoidance", *Psychology & Marketing*, Vol. 39 No. 3, pp. 612-633.

Kwak, H., Puzakova, M. and Rocereto, J. F. (2017), "When brand anthropomorphism alters perceptions of justice: The moderating role of self-construal", *International Journal of Research in Marketing*, Vol. 34 No. 4, pp. 851-871.

Lazarus, R. S. and Folkman, S. (1984), *Stress, appraisal, and coping*, Springer publishing company, New York.

Lazarus, R. S. (1991), "Progress on a cognitive-motivational-relational theory of emotion", *American psychologist*, Vol. 46 No. 8, pp. 819.

Lee, M. S., Conroy, D. and Motion, J. (2009a), "Brand avoidance: a negative promises perspective", *ACR North American Advances*.

Lee, B., Kwon, O., Lee, I. and Kim, J. (2017), "Companionship with smart home devices: The impact of social connectedness and interaction types on perceived social support and companionship in smart homes", *Computers in Human Behaviour*, Vol. 75, pp. 922-934.

Lee, J. S., Kim, J., Hwang, J., & Cui, Y. G. (2021). Does love become hate or forgiveness after a double deviation? The case of hotel loyalty program members. *Tourism Management*, 84, 104279.

Li, X. and Sung, Y. (2021), "Anthropomorphism brings us closer: The mediating role of psychological distance in User–AI assistant interactions", *Computers in Human Behaviour*, Vol. 118, pp. 106680.

Li, M., & Wang, R. (2023). Chatbots in e-commerce: The effect of chatbot language style on customers' continuance usage intention and attitude toward brand. *Journal of Retailing and Consumer Services*, 71, 103209.

Lu, Z., Min, Q., Jiang, L., & Chen, Q. (2024). The effect of the anthropomorphic design of chatbots on customer switching intention when the chatbot service fails: An expectation perspective. *International Journal of Information Management*, 76, 102767.

Luo, X., Tong, S., Fang, Z. and Qu, Z. (2019), "Frontiers: Machines vs. humans: The impact of artificial intelligence chatbot disclosure on customer purchases", *Marketing Science*, Vol. *38* No. 6, pp. 937-947.

Mazaheri, E., Richard, M. O., & Laroche, M. (2012). The role of emotions in online consumer behavior: a comparison of search, experience, and credence services. *Journal of Services Marketing*, 26(7), 535-550.

McCollough, M. A., Berry, L. L. and Yadav, M. S. (2000), "An empirical investigation of customer satisfaction after service failure and recovery", *Journal of service research*, Vol. *3* No. 2, pp. 121-137.

McGuire, J., De Cremer, D., Hesselbarth, Y., De Schutter, L., Mai, K. M., & Van Hiel, A. (2023). The reputational and ethical consequences of deceptive chatbot use. *Scientific Reports*, 13(1), 16246.

Mende, M., Scott, M. L., Van Doorn, J., Grewal, D., & Shanks, I. (2019). Service robots rising: How humanoid robots influence service experiences and elicit compensatory consumer responses. *Journal of marketing research*, 56(4), 535-556.Mimoun, M. S. B., Poncin, I., & Garnier, M. (2017). Animated conversational agents and e-consumer productivity: The roles of agents and individual characteristics. *Information & Management*, 54(5), 545-559.

Mostafa, R.B. and Kasamani, T. (2022), "Antecedents and consequences of chatbot initial trust", *European journal of marketing*, Vol. 56 No. 6, pp.1748-1771.

Moore, M. (2012). Interactive media usage among millennial consumers. *Journal of Consumer Marketing*, 29(6), 436-444.

Mozafari, N., Weiger, W. H., & Hammerschmidt, M. (2021). Trust me, I'm a bot–repercussions of chatbot disclosure in different service frontline settings. *Journal of Service Management*, 33(2), 221-245.

Nass, C., & Moon, Y. (2000). Machines and mindlessness: Social responses to computers. *Journal of social issues*, 56(1), 81-103.

Ostrom, A. and Lacobucci, D. (1995), "Consumer trade-offs and the evaluation of services", *Journal of Marketing*, Vol. 59 No. 1, pp. 17-28.

Park, J., & Min, H. K. (2020). Turnover intention in the hospitality industry: A meta-analysis. *International Journal of Hospitality Management*, 90, 102599.

Pavone, G., Meyer-Waarden, L. and Munzel, A. (2023), "Rage against the machine: experimental insights into customers' negative emotional responses, attributions of responsibility, and coping strategies in artificial intelligence–based service failures", *Journal of Interactive Marketing*, Vol. 58 No. 1, pp. 52-71.

Pantano, E. (2021). When a luxury brand bursts: Modelling the social media viral effects of negative stereotypes adoption leading to brand hate. *Journal of Business Research*, 123, 117-125.

Press, G. (2023, February 1). One Negative Chatbot Experience Drives Away 30% of Customers. Forbes. https://www.forbes.com/sites/gilpress/2023/02/01/one-negative-chatbot-experience-drives-away-30-of-customers/

Rai, D., & Appiah, K. (2019). Online service failure and recovery strategy and customer retention. *Harnessing omni-channel marketing strategies for fashion and luxury brands*, 225-242.

Rao Hill, S., & Tombs, A. G. (2022). When does service employee's accent matter? Examining the moderating effect of service type, service criticality and accent service congruence. *European Journal of Marketing*, *56*(7), 1985-2013.

Romani, S., Grappi, S., & Dalli, D. (2012). Emotions that drive consumers away from brands: Measuring negative emotions toward brands and their behavioral effects. *International Journal of Research in marketing*, 29(1), 55-67.

Roongruangsee, R., Patterson, P., & Ngo, L. V. (2022). Professionals' interpersonal communications style: does it matter in building client psychological comfort?. *Journal of Services Marketing*, 36(3), 379-397.

Roy, R. and Naidoo, V. (2021), "Enhancing chatbot effectiveness: The role of anthropomorphic conversational styles and time orientation", *Journal of Business Research*, Vol. 126, pp. 23-34.

Sands, S., Campbell, C., Plangger, K. and Pitt, L. (2022), "Buffer bots: The role of virtual service agents in mitigating negative effects when service fails", *Psychology & Marketing*, Vol. 39 No. 11, pp. 2039-2054.

Schweitzer, F., Belk, R., Jordan, W. and Ortner, M., 2019. Servant, friend or master? The relationships users build with voice-controlled smart devices", *Journal of Marketing Management*, Vol. 35 No. 7-8, pp. 693-715.

Sheehan, B., Jin, H. S. and Gottlieb, U. (2020), "Customer service chatbots: Anthropomorphism and adoption", *Journal of Business Research*, Vol. 115, pp. 14-24.

Somerfield, M. R. and McCrae, R. R. (2000), "Stress and coping research: Methodological challenges, theoretical advances, and clinical applications", *American psychologist*, Vol. *55* No. 6, pp. 620.

Söderlund, M. and Oikarinen, E.L. (2021), "Service encounters with virtual agents: an examination of perceived humanness as a source of customer satisfaction", *European Journal of Marketing*, Vol. 55 No. 13, pp.94-121.

Song, M., Du, J., Xing, X., & Mou, J. (2022). Should the chatbot "save itself" or "be helped by others"? The influence of service recovery types on consumer perceptions of recovery satisfaction. *Electronic Commerce Research and Applications*, 55, 101199.

Song, M., Zhang, H., Xing, X., & Duan, Y. (2023). Appreciation vs. apology: Research on the influence mechanism of chatbot service recovery based on politeness theory. *Journal of Retailing and Consumer Services*, 73, 103323.

Stock, R. M. and Merkle, M. (2018, January), "Can humanoid service robots perform better than service employees? A comparison of innovative behaviour cues", In *Proceedings of the 51st Hawaii international conference on system sciences*.

Sung, Y. K. and King, B. (2021), "Restaurant preventive behaviours and the role of media during a pandemic", *International Journal of Hospitality Management*, Vol. 95, pp. 102-906.

Tan, A., Jiang, C., & Zhu, Y. (2024, May). To Err is Bot, Not Human: Asymmetric Reactions to Chatbot Service Failures. *In Wuhan International Conference on E-business* (pp. 396-407). Cham: Springer Nature Switzerland.

Taylor, C.R., Kitchen, P.J., Sarkees, M.E. and Lolk, C.O. (2020), "Addressing the Janus face of customer service: a typology of new age service failures", *European journal of marketing*, Vol. 54 No. 10, pp.2295-2316.

Teng, C.-I., Chen, A. S.-Y., Chang, H.-Y. and Fu, C.-W. (2014), "Service failure, time pressure, and conscientiousness of service providers: the dual processing model perspective", *Service Business*, Vol. 8, pp. 659-677.

Touré-Tillery, M., & McGill, A. L. (2015). Who or what to believe: Trust and the differential persuasiveness of human and anthropomorphized messengers. *Journal of Marketing*, 79(4), 94-110.

Tsarenko, Y., Strizhakova, Y., & Otnes, C. C. (2019). Reclaiming the future: Understanding customer forgiveness of service transgressions. *Journal of Service Research*, 22(2), 139-155.

Tsai, W. H. S., Liu, Y., & Chuan, C. H. (2021). How chatbots' social presence communication enhances consumer engagement: the mediating role of parasocial interaction and dialogue. *Journal of Research in Interactive Marketing*, 15(3), 460-482.

Van Doorn, J., Mende, M., Noble, S.M., Hulland, J., Ostrom, A.L., Grewal, D. and Petersen, J.A., 2017. Domo arigato Mr. Roboto: Emergence of automated social presence in organisational front-lines and customers' service experiences", *Journal of service research*, Vol. 20 No. 1, pp. 43-58.

Van Pinxteren, M. M., Pluymaekers, M., Lemmink, J. and Krispin, A. (2023), "Effects of communication style on relational outcomes in interactions between customers and embodied conversational agents", *Psychology & Marketing.*

Van Vaerenbergh, Y., Orsingher, C., Vermeir, I., & Larivière, B. (2014). A meta-analysis of relationships linking service failure attributions to customer outcomes. *Journal of Service Research*, 17(4), 381-398.

Verhagen, T., Van Nes, J., Feldberg, F., & Van Dolen, W. (2014). Virtual customer service agents: Using social presence and personalization to shape online service encounters. *Journal of Computer-Mediated Communication*, 19(3), 529-545.

Voorhees, C. M., Fombelle, P. W., Gregoire, Y., Bone, S., Gustafsson, A., Sousa, R., & Walkowiak, T. (2017). Service encounters, experiences and the customer journey: Defining the field and a call to expand our lens. *Journal of Business Research*, 79, 269-280.

Wang, W. (2017), "Smartphones as Social Actors? Social dispositional factors in assessing anthropomorphism", *Computers in Human Behaviour*, Vol. 68, pp. 334-344.

Wang, S., Yan, Q., & Wang, L. (2023). Task-oriented vs. social-oriented: Chatbot communication styles in electronic commerce service recovery. *Electronic Commerce Research*, 1-33.

Watson, S. (2012), "Consumer responses to service situations: Tests for main and interaction effects", *Journal of Retailing and Consumer Services*, Vol. 19 No. 3, pp. 287-296.

Watson, L., & Spence, M. T. (2007). Causes and consequences of emotions on consumer behaviour: A review and integrative cognitive appraisal theory. *European Journal of Marketing*, 41(5/6), 487-511.

Webster, C. and Sundaram, D. S. (2009), "Effect of service provider's communication style on customer satisfaction in professional services setting: the moderating role of criticality and service nature", *Journal of Services Marketing*, Vol. 23 No. 2, pp.103-113.

Weun, S., Beatty, S. E. and Jones, M. A. (2004), "The impact of service failure severity on service recovery evaluations andpost-recovery relationships", *Journal of Services Marketing*, Vol. 18 No. 2, pp.133-146.

Whang, J. B., Song, J. H., Lee, J. H. and Choi, B. (2022), "Interacting with Chatbots: Message type and consumers' control", *Journal of Business Research*, Vol. 153, pp. 309-318.

Wirtz, J., Patterson, P.G., Kunz, W.H., Gruber, T., Lu, V.N., Paluch, S. and Martins, A. (2018), "Brave new world: service robots in the front-line", *Journal of Service Management*, Vol. 29 No. 5, pp.907-931.

Xing, X., Song, M., Duan, Y., & Mou, J. (2022). Effects of different service failure types and recovery strategies on the consumer response mechanism of chatbots. *Technology in Society*, 70, 102049.

Yu, S., Xiong, J. and Shen, H. (2022), "The rise of chatbots: The effect of using chatbot agents on consumers' responses to request rejection", *Journal of Consumer Psychology*.

Zaslavsky, A. M. (2003), "Screening for serious mental illness in the general population", *Archives of general psychiatry*, Vol. 60 No. 2, pp. 184-189.

Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1993). The nature and determinants of customer expectations of service. *Journal of the academy of Marketing Science*, 21, 1-12.

Zhang, J., Zhu, Y., Wu, J. and Yu-Buck, G. F. (2023), "A natural apology is sincere: Understanding chatbots' performance in symbolic recovery", *International Journal of Hospitality Management*, Vol. 108, pp. 103387.

Zhang, R. W., Liang, X., & Wu, S. H. (2024). When chatbots fail: exploring user coping following a chatbots-induced service failure. *Information Technology & People*, 37(8), 175-195.

Zhu, J., Jiang, Y., Wang, X., & Huang, S. (2023). Social-or task-oriented: how does social crowding shape consumers' preferences for chatbot conversational styles?. *Journal of Research in Interactive Marketing*, 17(5), 641-662.

Ethics Procedures

These studies were conducted in accordance with the ethical standards of the institutional research committee. Ethical approval was obtained by the second author from the Institutional Review Board (IRB) of XLRI – Xavier School of Management, Jamshedpur, India. All participants provided informed consent prior to their inclusion in the studies. Participation was voluntary, and respondents were assured of the confidentiality and anonymity of their responses.