



# A Framework and Content Analysis of Social Cues in the Introductions of Customer Service Chatbots

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**Abstract.** Organizations are increasingly implementing chatbots to address customers' inquiries, but customers still have unsatisfactory encounters with them. In order to successfully deploy customer service chatbots, it is important for organizations and designers to understand how to introduce them to customers. Arguably, how a chatbot introduces itself as well as its services might influence customers' perceptions about the chatbot. Therefore, a framework was developed to annotate the social cues in chatbot introductions. In order to validate our framework, we conducted a content analysis of introductions of customer service chatbots ( $n = 88$ ). The results showed that the framework turned out to be a reliable identification instrument. Moreover, the most prevalent social cue in chatbot introductions was a humanlike avatar, whereas communication cues, indicating the chatbot's functionalities, hardly occurred. The paper ends with implications for the design of chatbot introductions and possibilities for future research.

**Keywords:** Self-introduction · Customer service chatbots · Social cues · Anthropomorphism · Content analysis

## 1 Introduction

Organizations are increasingly implementing online conversational agents, such as chatbots, for customer service purposes to increase productivity while simultaneously reducing costs [16]. Chatbots are systems which are designed to communicate with customers using natural language, i.e., through text or speech [16]. Nowadays chatbots address about 80% of customers' inquiries [20]. The chatbot market revenue is currently 106.6 million and is expected to increase to 454.8 million in 2027 [39].

Although the number of customer service chatbots increases, customers have unsatisfactory encounters with them. For example, customers perceive chatbots to lack empathy and chatbot conversations as impersonal [8, 31]. Also, chatbots are not always able to provide adequate responses to customers' requests due to poor intent recognition [12, 14, 23]. These unsatisfactory encounters indicate a gap between customers' expectations and the chatbot's performance [30], which leads to resistance against chatbots.

In order to successfully deploy customer service chatbots, it is important for organizations and designers to understand how to introduce them to customers [1]. The look and feel as well as the initial chatbot messages may influence customers' perceptions about the chatbot and the organization. For example, Kull et al. [22] show brand engagement increases when the initial messages emphasize the chatbot's helpfulness.

Previous research identified several cues in the chatbot's introduction and how they influence users' perceptions, but a well-defined classification of potential chatbot introduction cues that allows more valid comparisons across studies, is lacking. It is therefore valuable to obtain an overview of cues of chatbot introductions. Such a framework is useful for chatbot designers who develop customer service chatbots, and for researchers who aim to systematically investigate how different cues in chatbot introductions affect customers' perceptions of the chatbot and the affiliated organization. Furthermore, little is known about how organizations tailor these introductions to selectively reveal information about the chatbot. Our study extends the role of chatbot introductions and proposes a framework of social cues based on previous research. By means of a content analysis, we subsequently examined which social cues occur in the introductions of customer service chatbots. In summary, the following research questions have been investigated:

**RQ 1:** To what extent can social cues in the introductions of customer service chatbots be identified reliably?

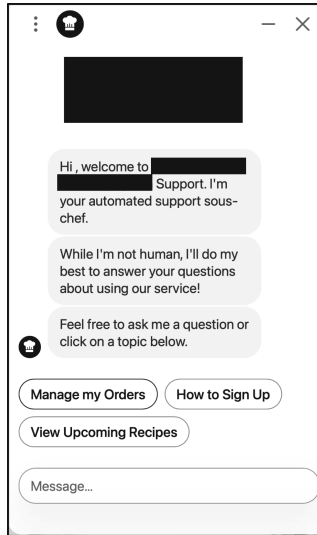
**RQ 2:** To what extent do the social cues identified in our framework occur in the introductions of customer service chatbots?

## 2 Theoretical Framework

### 2.1 Managing Customers' Expectations of Customer Service Chatbots with Chatbot Introductions

Organizations increasingly use chatbots to handle customers' service inquiries. Chatbots are implemented on websites, apps, and social media channels, and as such they provide a new form of human-computer interaction [11]: customers can request the information they need through a dialogue screen and receive information in natural language in return [41]. Customers primarily engage with customer service chatbots for efficiency reasons, i.e., they want to receive the requested information in a fast and convenient way [3, 13, 42].

However, chatbots generally fail to meet customers' expectations [4, 19, 30]. For example, they sometimes do not understand customers' requests correctly, their responses only partly address customers' requests, and they tend to communicate in an impersonal manner [8, 13, 23]. One way to manage customers' expectations is in the first stage of customers' communication journey with the chatbot, i.e., the chatbot introduction. Figure 1 shows an example of a chatbot introduction: the first screen of a chatbot of a meal kit delivery service. This introduction consists of three parts: 1) a header with an avatar depicting a chef's hat, 2) three welcome messages in which the chatbot discloses its artificial identity, and 3) customers' response options consisting of buttons and a text field.



**Fig. 1.** Chatbot introduction of an (anonymized) meal kit delivery service.

When customers engage in a conversation with a customer service chatbot, they have three conversation goals [30, 37]. The first goal concerns the task customers want to perform with the chatbot. For example, the response buttons in the chatbot introduction in Fig. 1 indicate customers can view upcoming recipes. The second goal concerns how customers can have a smooth conversation with the chatbot. For example, the introduction shows customers can communicate with the chatbot by clicking on the response buttons or by typing their query in the text field (see Fig. 1). The third goal refers to the relationship between the customer and the chatbot. Customers prefer personal interaction and a ‘human touch’ in service encounters, even when they converse with a chatbot [24, 36]. This can be achieved by using anthropomorphic cues, such as an avatar and a conversational communication style [1, 17, 26]. The chatbot in Fig. 1 introduces itself as a ‘support sous-chef’ and uses personal pronouns (e.g., ‘I’, ‘my’, ‘me’). Thus, customers’ expectations about reaching their goals with the chatbot can be managed by the cues present in the introduction.

## 2.2 Social Cues in Chatbot Introductions

The Computers Are Social Actors (CASA) paradigm demonstrates that people mindlessly apply social scripts from human-human interaction when they use computers [33, 34]. Recently, extensions to the paradigm have been suggested to account for technological advances and the changes in how people interact with technologies [15, 28]. Lombard and Xu [28] propose the Media are Social Actors (MASA) paradigm which explains the effects of social cues and psychological mechanisms (i.e., mindlessness and anthropomorphism) of social responses. Social cues can be defined as “biologically and physically determined features salient to observers because of their potential as channels of useful information” [10: 2]. Examples of social cues are a humanlike avatar or

informal language use. When a medium itself presents social cues, users are likely to perceive it as a social entity instead as a medium [27]. Therefore, if a chatbot contains social cues, such as a humanlike avatar, users will perceive its social entity and respond to it similarly as in human-to-human interaction [27, 28].

The effects of social cues in chatbots have been investigated in several experimental studies [1, 6, 17]. In these experiments, the manipulated social cues occur in multiple stages of the users' communication journey with the chatbot. For example, Go and Sundar [17: 308] created two versions of a chatbot that, amongst other variables, differed in the disclosure in the introduction (i.e., humanlike: 'Hi! I'm Alex, a sales associate' vs. machinelike: 'Hi! I'm Alex, an automated chatbot'). They also manipulated message interactivity: the chatbot was less (i.e., simple back-and-forth exchange) or more (i.e., contingent message exchange) responsive to participants' messages. An interaction effect was found between the introduction and message interactivity: participants evaluated the chatbot positively when it was introduced as human and delivered a highly interactive conversation than when it delivered a less interactive conversation.

Although experimental studies provide insights into the effects of one particular social cue in chatbot introductions, multiple social cues are present in the introductions of existing customer service chatbots as Fig. 1 demonstrates. Social cues do not occur in isolation and should be considered together as the combination of cues can strengthen or weaken their effects [9]. For example, the chatbot introduction in Fig. 1 contains visual and verbal identity cues (i.e., the avatar is a chef's hat, and the words 'automated sous-chef', and 'I'm not human' are used) which marks the chatbot's artificial identity. Thus, it is important to identify the social cues in chatbot introductions from existing literature. Building on a previous classification of social cues for chatbots [9] and research on social cues in chatbot introductions, we developed a framework (see Table 1) in which the identified cues were classified into four main categories: identity cues, competence cues, conversational cues, and communication cues.

**Identity Cues.** Is the interlocutor that pops up on the customer's screen a human service employee or a chatbot? There are several cues that can either mark or mask the chatbot's artificial identity. The first way is through a disclosure (e.g., 'I am a chatbot', 'I am a virtual assistant'). De Cicco et al. [7] investigated the effects of a disclosure in chatbot introductions. They found that the presence of a disclosure in a chatbot introduction led to less social presence, trust, and attitude towards the brand compared to the absence of a disclosure. Similar results were found by Luo et al. [31] who conducted a field study in which the chatbot did or did not disclose its artificial identity. Results showed a disclosure at the beginning of the conversation reduced purchase rates and customers perceived the chatbot as less knowledgeable and emphatic.

Other cues can also mask or mark the chatbot's artificial identity. One design aspect of customer service chatbots that received much attention in research and practice is anthropomorphism [2, 5, 13, 16]. This refers to humanizing chatbots by adding social cues, such as a name and an avatar. Several scholars conducted experimental studies in which oftentimes so-called humanlike chatbots are compared with machinelike chatbots. The operationalization of the humanlike chatbots differed across studies. Araujo [1], for example, used communication style and a name to differentiate between the humanlike and machinelike chatbot. Participants interacted with either a humanlike chatbot named

Emma that used informal language, or a machinelike chatbot named ChatBotX that used formal language. In contrast, Go and Sundar [17: 308] manipulated the disclosure and the avatar in the chatbot introduction. They created four versions of a chatbot introduction which ranged from machinelike (i.e., disclosure: ‘Hi! I’m Alex, an automated chatbot’, avatar: dialog bubble figure) to humanlike (i.e., disclosure: ‘Hi! I’m Alex, a sales associate’, avatar: a profile picture of an actual person). An expectancy violation effect was found: the attitudinal and behavioral outcomes were lower when the chatbot was introduced with a humanlike avatar and machinelike disclosure compared to an introduction with a machinelike avatar and machinelike disclosure [17].

**Competence Cues.** One way to increase customers’ trust in customer service chatbots is by stressing the chatbot’s competence [35]. For example, Mozafari et al. [32] investigated the effects of communicating expertise combined with a disclosure in the chatbot’s introduction on participants’ trust. Results showed merely disclosing negatively affected trust, whereas combining the disclosure with a statement about the chatbot’s expertise (e.g., ‘Due to my high efficiency I am able to find the best offer for you’) or weaknesses (e.g., ‘Please note that I’m only in use for a year now and am still learning’) positively affected trust [32: 2919]. Another study investigated the effects of communicating the chatbot’s expertise using metaphors [21]. A wizard-of-oz study was conducted in which participants received a prompt in which the expertise of the chatbot was explained with a metaphor (e.g., ‘The bot you are about to interact with is modeled after a shrewd travel executive’) [21: 9]. Next, participants engaged in a conversation with an agent. Findings showed that metaphors that communicated the chatbot’s low competence (e.g., ‘young student’) were evaluated higher than metaphors that communicated the chatbot’s high competence (e.g., ‘trained professional’). Kull et al. [22: 844] compared chatbot’s welcome messages in which its competence (e.g., ‘Years of experience in the travel industry enable me to answer any travel question’) or warmth (e.g., ‘I will take care of you and try answering any travel questions you might have’) was stressed. Participants’ brand engagement increased when the chatbot initiated the conversation with a warm welcome message.

**Conversational Cues.** How can the chatbot display conversational habits? Three verbal cues have been identified which influence the chatbot’s conversational etiquette. As chatbots mimic human-to-human communication [29], customers expect that chatbots express a word of welcome, such as ‘hi’ [5, 16, 19]. Another common social cue when meeting someone for the first time is a self-introduction (e.g., ‘My name is...’). Moreover, chatbots should adhere to turn-taking protocols [5]. After the chatbot has introduced itself, it has to give the turn to the customer (e.g., ‘How can I help you?’).

**Communication Cues.** How can the chatbot communicate which functionalities and which message types it can handle? Several cues have been identified which might improve the chatbot’s communicability [5, 40]. Several scholars argue that the chatbot’s purpose should be clarified in the introductory messages (i.e., what is the chatbot supposed to do?) in order to manage users’ expectations about the chatbot’s capabilities [5, 16, 19]. Besides, an explanation should be provided on how to communicate effectively with the chatbot, for example by typing keywords or clicking on response buttons [19].

**Table 1.** Framework of social cues in chatbot introductions

Identity cues	Competence cues	Conversational cues	Communication cues
Disclosure	Statement stressing expertise	Greeting	Explanation purpose
Avatar type	Statement stressing weakness	Self-introduction	Explanation interaction
Name type		Turn-taking	

In order to validate our framework, we conducted a content analysis of introductions of customer service chatbots. This analysis allowed us to investigate whether our framework is reliable to analyze social cues in chatbot introductions. Moreover, we obtained insights into which social cues organizations use in chatbot introductions and whether they correspond with the cues in our framework.

### 3 Method

#### 3.1 Sample of Chatbot Introductions

The introductions of customer service chatbots of various organizations in the Netherlands were manually searched in 2021. The search was narrowed to Dutch organizations to ensure a valid comparison between industries without confounding factors, such as variations in language and cultures. The sampling strategy consisted of three stages. First, different branches and organizations belonging to these branches were identified. Second, for each brand we noted an organization as well as its competitors. For example, in the financial branch we listed different banks. Third, the organizations' websites were visited and searched for the presence of a customer service chatbot which were usually located at the homepage, contact page, or specific domain pages. Once a customer service chatbot was found, a screenshot was made of the chatbot's first screen. In ten cases the chatbot immediately started with a call to action to the user, whereby the chatbot could be activated through clicking or typing. In all other cases, a screenshot of the chatbot's first screen was made without having any interaction with the bot. In seven cases, the introduction did not contain cues (i.e., disclosure and/or avatar) about the artificial identity of the agent. We interacted with the agent to determine whether it was a chatbot. Data saturation was reached at 88 chatbot introductions which belonged to 78 Dutch organizations: non-profit or governmental organizations ( $n = 8$ ), employment agency ( $n = 1$ ), education ( $n = 1$ ), electronics ( $n = 5$ ), financial ( $n = 6$ ), furniture ( $n = 4$ ), insurance ( $n = 14$ ), logistics and postal service ( $n = 3$ ), retail ( $n = 15$ ), telecom ( $n = 6$ ), travel ( $n = 2$ ), utility ( $n = 7$ ), other ( $n = 6$ ). The sample can be found on OSF (<https://osf.io/8wut9/>).

#### 3.2 Codebook

All screenshots were analyzed using a codebook to identify the social cues in chatbot introductions. The codebook was structured on the basis of the three parts of a chatbot

introduction: 1) the header, 2) the welcome messages, and 3) the customers' response options. The social cues were assigned to (either of) these three parts.

Regarding the header five subcategories were coded. The presence of an avatar was annotated (yes/no), and if so, its appearance (i.e., a brand logo, a robot, a human, an object, or other). The name of the chatbot (yes/no), and if so, the name type (i.e., brand name, robotlike name, human name, other) were also coded. Moreover, whether the chatbot disclosed itself with the label 'chatbot' (yes/no) was annotated. Lastly, the codebook contained an open category for other elements in the header (e.g., communicating expertise). In sum, the header's subcategories involved identity cues.

For the chatbot's welcome messages, nine subcategories were distinguished. First, the number of chatbot messages was coded. Thereafter, the presence of an avatar was coded (yes/no), and if so, its appearance (i.e., a brand logo, a robot, a human, an object, or other). Also, the presence of a greeting (e.g., 'Hello'; yes/no) and a self-introduction (e.g., 'My name is ...'; yes/no) was annotated. Furthermore, it was coded whether the chatbot's competence and/or its purpose was communicated, and if instructions were given to ensure a smooth interaction (all subcategories: yes/no). Lastly, it was coded whether the chatbot gave the turn to the customer at the end of the introduction (e.g., 'How can I help you?'). Thus, in the welcome messages two identity cues, three conversational cues, one competence cue, and two communication cues were identified.

For the response options, coders annotated the type of response options (buttons, open text field, or both). In case the chatbot allowed customers to communicate via buttons, the number of buttons was annotated. In case an open text field was present, it was annotated whether the chatbot indicated the number of characters customers can use to compose a written message (yes/no). Finally, the codebook contained an open field in which the coder could describe other observations regarding the chatbot introduction, such as whether the avatar in the first chatbot messages differed from the avatar in the header. The codebook can be found on OSF (<https://osf.io/8wut9/>).

### 3.3 Coding Procedure

Before coding the sample, a training was conducted by showing the chatbot introductions, discussing the codebook and illustrating it with examples. During the discussion two new cues were identified and added to the codebook, and one cue was slightly adjusted. These cues involved:

- Proactive cues. The discussed chatbot introductions often contained information the chatbot proactively provided. Two proactive cues were identified: 1) the presence of a privacy-disclaimer (yes/no), and 2) the presence of information about actions, offers, corona measures, or other topics (yes/no).
- Communication cues. The discussed chatbot introductions often contained messages in which the possibility to be redirected to a human employee (i.e., a handover [23]) was explained. This cue was added as a subcategory of communication cues as it explains what happens if a chatbot is not able to handle a message.
- Competence cue. The discussed chatbot introductions did not contain any statements about the chatbot's expertise, whereas statements about the chatbot's weaknesses did

occur. Therefore, we decided to annotate whether the chatbot's incompetence was communicated.

Next, a training set ( $n = 10$ ) of chatbot introductions was created. The training set was individually coded by six annotators. Subsequently, the codings were compared and discussed, leading to final agreement and minor revisions of the codebook. Thereafter, the sample was divided over the six trained coders. To calculate intercoder reliability, a seventh independent coder double coded a subset of 25 chatbot introductions.

### 3.4 Data Analysis

To examine the reliability of our framework, intercoder reliability scores (Krippendorff's  $\alpha$ ) were calculated with SPSS v. 27 using the KALPHA macro [18]. Subsequently, descriptive statistics (frequencies and percentages) were computed to determine to what extent the cues identified in our framework occur in the chatbot introductions. Finally, the sample was analyzed qualitatively to describe how organizations tailor chatbot introduction using different social cues.

## 4 Results

### 4.1 Reliability of Social Cues in Chatbot Introduction

Table 2 shows the reliability scores of the double-coded social cues in chatbot introductions. The scores of the cues in the header were acceptable to satisfactory. In two instances the coders disagreed about the chatbot's name type. The name types were related to the brands (e.g., 'Tracy' for a postal service), but could also belong to other subcategories (e.g., humanlike name). Also, the scores of the cues in the welcome messages were satisfactory. However, the subcategory greeting showed insufficient reliability, although the agreement percentage was high indicating category prevalence [38]. Finally, the reliability score of the response options was acceptable (Krippendorff's  $\alpha$ : 0.65; agreement percentage: 80.0). An explanation for this relatively low reliability score is that in some cases the buttons were less noticeable as they were integrated in the chatbot's message, whereas in other cases, the text field was less noticeable compared to buttons. The reliability score of the two other response cues were satisfactory to perfect (number of buttons: Krippendorff's  $\alpha$ : 0.92; agreement percentage: 90.91; number of characters in text field: Krippendorff's  $\alpha$ : 1.00; agreement percentage: 100).

### 4.2 Usage of Social Cues in Chatbot Introductions

Table 2 shows the social cues identified in the introductions of Dutch customer service chatbots. Our content analysis revealed half of the introductions' headers contained an avatar which was most often humanlike (16: 32.0%). Robotlike avatars and brand-related avatars occurred equally (14: 28.0%) as well as avatars depicting an object or something else (3: 6.0%). Names occurred in 44.3% of the introductions' headers and were mostly humanlike (26: 66.7%). Robotlike names (8: 20.5%) or other names (5: 12.8%) occurred



**Table 2.** Reliability scores (Krippendorff's  $\alpha$  and percentage agreement) usage of social cues (frequencies and percentages)

Category	Intercoder reliability scores		Usage of social cues ( $n = 88$ )	
	Krippendorff's $\alpha$	%	Frequencies	%
Header				
Avatar	1.00	100.00	50	56.8
Avatar type	0.91	93.33	16	32.0
Humanlike			14	28.0
Robotlike			14	28.0
Brand-related				
Object			3	3.4
Other			3	3.4
Name	0.92	96.00	39	44.3
Name type	0.65	80.00	26	66.7
Humanlike			8	20.5
Robotlike			5	12.8
Other				
Disclosure 'chatbot'	0.87	96.00	26	29.5
Welcome messages				
Number of messages	1.00	100.00		
Avatar	0.92	96.00	57	64.8
Avatar type	1.00	100.00		
Greeting	0.47	92.00	73	83.0
Self-introduction	0.89	96.00	56	63.6
Giving turn to customer	0.92	96.00	61	69.3
Statement incompetence	1.00	100.00	6	6.8
Explanation purpose	0.87	96.00	11	12.5
Explanation interaction	0.81	92.00	29	33.0
Explanation handover	1.00	100.00	16	18.2
Proactive information	0.71	92.00	8	9.1
Privacy disclaimer	1.00	100.00	5	5.7

less frequently. Almost three out of ten headers contained the disclosure 'chatbot'. In addition, other disclosure formulations were found as well, such as 'virtual assistant', 'digital assistant', and 'service bot'.

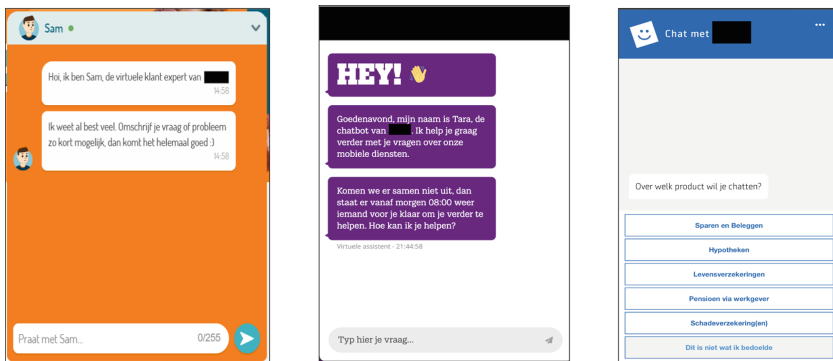
The mean number of welcome messages was 1.77 ( $SD$  0.85). An avatar accompanied these messages in almost two-thirds of the cases. Humanlike avatars were most frequent (21: 36.8%), followed by a brand logo (18: 31.6%) and robotlike avatars (14:

24.6%). Avatars depicting an object (1: 1.8%) or something else (3: 5.3%) were least frequent. The welcome messages often contained conversational cues. Greetings (73: 83.0%) were most frequent, followed by giving the turn to the customer (61: 69.3%) and self-introductions (56: 63.6%). Moreover, statements of incompetence, such as ‘I am new but do my best to help you’ or ‘chatbot in training’ hardly occurred (6: 6.8%). Also, welcome messages did not often contain communication cues. Explanations about the interaction (e.g., ‘Formulate your question briefly and concisely’) occurred most often (29: 33.0%), followed by the possibility to be redirected to a human agent (16: 18.2%), and explanations about the chatbot’s purpose (11: 12.5%, e.g., ‘I can help you with entrepreneurial questions’). Finally, welcome messages hardly contained pro-active information (8: 9.1%) and privacy disclaimers (5: 5.7%).

The response options mostly consisted of text boxes only (38: 43.2%). Buttons as well as the combination of a text box and buttons equally occurred (25: 28.4%). In almost five out of ten text boxes, the number of characters customers could use to compose a message was communicated (12: 19.0%). The mean number of buttons present in chatbot introductions was 3.88 (*SD* 2.50) and varied from 1 to 12 buttons.

### 4.3 Qualitative Analysis of Social Cues in Chatbot Introductions

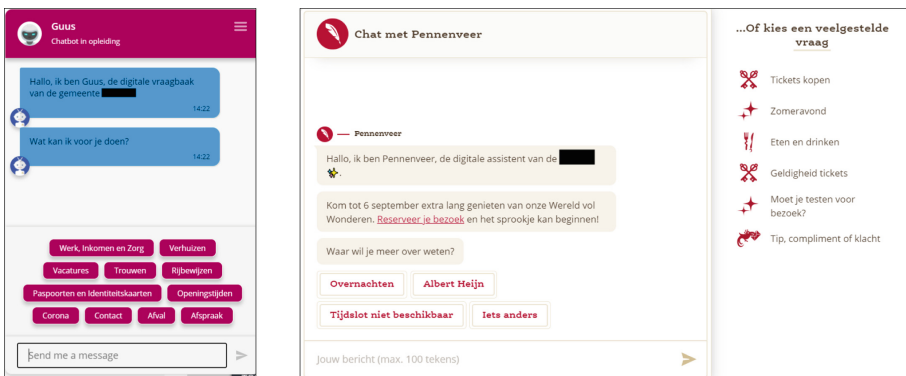
The current section discusses five examples of our sample. These examples were selected as they represent atypical and prototypical chatbot introductions.



**Fig. 2.** Anonymized atypical chatbot introductions of two telecom providers (left and middle) and an insurance company (right).

The chatbot introductions of two telecom providers are shown in Fig. 2. The left screenshot highlights an atypical chatbot introduction with some distinctive features. The header contains a humanlike avatar and a humanlike name (‘Sam’). Moreover, a green dot is present which mimics a convention from human computer-mediated communication, i.e., a person is online and available. The first chatbot message contains a greeting (‘Hi’), and a self-introduction (‘I am Sam, the virtual customer expert of [brand]’). Interestingly, second chatbot message contains mixed signals by describing the chatbot’s capabilities on the one hand, but also providing instructions on how to formulate questions on the

other hand: ‘I know quite a lot already. Describe your question or problem as short as possible, and everything will be alright:-)’. The latter is also stressed by the number of characters in the text field (i.e., 255 characters). Remarkably, the words ‘Talk to Sam’ are added in the text field to invite the customer in the conversation. The screenshot in the middle also illustrates an atypical introduction as it contains mixed signals regarding the chatbot’s identity. The header only contains the brand logo. Furthermore, the customer is greeted in an informal way in the first message (‘hey!’ and an emoji), which is presented in an irregular typeface and font size. The chatbot’s identity is disclosed in the second chatbot message, (i.e., ‘the chatbot of [brand]’). Lastly, the chatbot communicates the possibility of a handover in the third message, but with the notion that human employees are available as from the next day 8 o’clock. Below the messages, the words ‘virtual assistant’ are shown. The last example of an atypical chatbot introduction is from an insurance company (Fig. 2, right). The header contains an avatar (smiley in a square), which resembles the brand logo. The words ‘chat with [brand]’ do not make it explicit that the customer will chat with a chatbot, nor do the welcome message or response buttons. Furthermore, it is interesting that the chatbot poses an open question to the user (‘about which product would you like to chat?’), but the response buttons show the topics the chatbot is trained on.



**Fig. 3.** Anonymized prototypical chatbot introductions of a municipality (left) and theme park (right)

An example of a prototypical chatbot introduction is from a Dutch municipality, which is shown on the left in Fig. 3. The header contains a robotlike avatar, a human-like name (‘Guus’), a chatbot disclosure (‘chatbot’), and a description of the chatbot’s incompetence (‘in training’). Remarkably, the avatar next to the chatbot’s messages differs from the avatar in the header. Also, after the greeting (‘Hello’) and self-introduction (‘I am Guus’), the chatbot refers to itself with the unusual words ‘digital Q&A’. Even though the chatbot’s incompetence was communicated in the header, the appearance of eleven response buttons and an open text field suggests the chatbot is capable to answer questions on a wide range of topics. Finally, the screenshot on the right shows the chatbot introduction of a theme park. The header contains both an avatar and a name of an object

(‘pen quill’). The first welcome message contains a disclosure ‘digital assistant’. Interestingly, the second message contains proactive information about the extended opening hours until September 6, with a call to action to make a reservation by clicking on the hyperlink. Different from other introductions is that the chatbot’s name and avatar are located above the messages instead of next to them. Response buttons, a text field as well as FAQs, give users ample possibilities to respond.

## 5 Conclusion and Discussion

The aim of this study was to determine (1) to what extent social cues in customer service chatbot introductions can be analyzed reliably, and (2) to what extent the social cues identified in our framework occur in the introductions of customer service chatbots.

We identified five main categories of social cues that can occur in chatbot introductions, see Table 3. The first main category concerns identity cues through which the chatbot’s artificial identity is masked or marked. Three subcategories are identified: a chatbot disclosure, the avatar type, and the name type. The second main category consists of competence cues through which the chatbot’s weaknesses are communicated. Moreover, conversational cues are identified which concern the chatbot’s conversational etiquette, such as the presence of a greeting, a self-introduction, and explicitly giving the turn to the customer after the chatbot’s welcome messages. The fourth main category involves communication cues through which the chatbot indicates its functionalities. Three subcategories are identified: an explanation of the chatbot’s purpose, an explanation about how to interact with it, and the possibility of being redirected to a human agent. The last main category entails proactive information, such as the presence of a privacy-disclaimer and information about offers, corona measures, or other topics.

**Table 3.** Updated framework of social cues in chatbot introductions

Identity cues	Competence cues	Conversational cues	Communication cues	Proactive cues
Disclosure	Statement stressing weakness	Greeting	Explanation purpose	Privacy disclaimer
Avatar type		Self-introduction	Explanation interaction	Proactive information
Name type		Turn-taking	Handover	

In order to validate our framework, we conducted a content analysis of 88 introductions of Dutch customer service chatbots. For each part of the chatbot introduction (i.e., header, welcome messages, and response options), the presence and/or type of social cues was annotated. A subset of the sample was double coded. The results of the inter-coder reliability analysis showed that the agreement was sufficient for the identity cues in the chatbot’s header (i.e., disclosure, avatar, and name). Also, most scores of the social

cues in the welcome messages were satisfactory. Only the reliability of the subcategory ‘greeting’ was low, due to category prevalence [38]. It was difficult to obtain a sufficient reliability score because in most chatbot introductions a greeting was present. Lastly, the intercoder agreement of the response cues were acceptable to satisfactory. An explanation for the relatively low agreement score for the response options is that in some cases the buttons were less noticeable as they were integrated in the chatbot’s message, whereas in other cases, the text field was less noticeable due to the many buttons.

Our framework turned out to be a reliable identification instrument for social cues in chatbot introductions. However, we feel improvements can be made. For example, we noticed that the self-introduction often contained a name as well as a disclosure. Regarding the chatbot’s disclosure, only the label ‘chatbot’ was annotated, but other labels were used as well, such as ‘virtual assistant’, ‘smart assistant’ and ‘digital agent’. These labels should also be incorporated in the framework as the explicitness of the disclosure influences customers’ expectations [7]. Furthermore, the framework can be extended by annotating whether competence cues are present, and if so, whether this cue stresses the chatbot’s competence or incompetence, since competence cues could enhance users’ perceptions of trust [32]. Lastly, the adoption of informal language could be added to the main category identity cues, since elements like emoji and interjections mimic human-human interactions [25] that could mask the chatbot’s identity.

Regarding the usage of social cues in chatbot introductions it was found that the most prevalent social cue in the header of chatbot introductions is a humanlike avatar. Also, a humanlike name was often present in the header. Compared to these anthropomorphic identity cues, the chatbot’s disclosure was less frequent in headers. Thus, organizations seem to combine social cues which both mask and mark the artificial identity of the chatbot. Regarding the social cues in welcome messages, our findings show that a humanlike avatar as well as the three conversation cues are frequently used. This could indicate that organizations try to give customers the impression they are communicating with a humanlike interlocutor rather than an artificial entity, and that they aim to welcome customers warmly. In contrast, while competence cues have received quite some attention in previous research [21, 22, 32], we noticed that incompetence cues occurred in chatbot introductions. Taking the findings of Khadpe et al. [21] and Kull et al. [22] into account, it is beneficial for organizations to focus on cues that stimulate expectations of warmth rather than competence.

Given the fact that chatbots are not always able to provide adequate responses to customers’ requests due to poor intent recognition [13, 23], it is remarkable that organizations often offer customers the possibility to formulate their questions in a text field without character restrictions. This response option invites customers to formulate their messages in their own words resulting in an increased risk of failed intent recognition and subsequently miscommunication. Only in some cases, the open text field contained a character limit to force customers to send short messages with only keywords. In a similar vein, it is remarkable that communication cues hardly appear in chatbot introductions, while they could steer the customer’s expectations and behavior towards the chatbot [5, 16, 19].

The current study’s framework is tested on a relatively small sample of chatbot introductions belonging to Dutch organizations. In order to validate its reliability and

to enhance the generalizability of our findings, a content analysis should be conducted on a larger sample that also contains customer service chatbots in other countries and languages. Moreover, a follow-up study would allow us to take factors into account that could impact the presence of social cues in chatbot introductions, such as the platform type of the chatbot (i.e., a public website versus WhatsApp), and organization type (profit versus non-profit). Furthermore, it is valuable to investigate how and why conversational designers deliberately adopt social cues in their chatbot designs. Their considerations can be compared with customers' perceptions and expectations of social cues in chatbot introductions. Lastly, the framework allows experimental research in which different chatbot introductions are manipulated and compared in a more systematic way. As multiple social cues are present in chatbot introductions, future research should examine whether certain combinations of social cues have a stronger impact on customers' expectations than other combinations. For example, the chatbot's perceived competence might not only be determined by a statement of its competence, but also an explanation on how customers should interact and which response options they can use. This way, chatbot introductions that steer users' expectations beforehand could bridge the gap between organizations that aim to successfully deploy chatbots in their customer service, and customers who are hesitant to use the chatbot.

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