

Virtual Customer Service Agents: Using Social Presence and Personalization to Shape Online Service Encounters*

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By performing tasks traditionally fulfilled by service personnel and having a humanlike appearance, virtual customer service agents bring classical service elements to the web, which may positively influence customer satisfaction through eliciting social responses and feelings of personalization. This paper sheds light on these dynamics by proposing and testing a model drawing upon the theories of implicit personality, social response, emotional contagion, and social interaction. The model proposes friendliness, expertise, and smile as determinants of social presence, personalization, and online service encounter satisfaction. An empirical study confirms the cross-channel applicability of friendliness and expertise as determinants of social presence and personalization. Overall, the study underlines that integration between technology and personal aspects may lead to more social online service encounters.

Key words: virtual customer service agent, social presence, personalization, online service encounter, friendliness, expertise, smile.

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Introduction

Online service encounters are critical to a customer's image of service providers and therefore central to determining the success of the firm (Grönroos, 2000). Service providers gradually have shaped these moments of dyadic online interaction to the advantages of the Internet. Through tools like frequently asked questions, live chats, customer communities, and social media, service providers effectively and efficiently supply customers with sought-for information or solutions to problems. Most of these tools, however, only to some extent incorporate two characteristics that traditionally have been labeled key in delivering successful service encounters: feelings of social presence and a sense of personalization

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(Bitner, Booms, & Tetreault, 1990; Suprenant & Solomon, 1987). *Social presence* compasses the feeling of personal, sociable, and sensitive human contact conveyed through and within a medium (Yoo & Alavi, 2001), while sense of *personalization* refers to the extent to which a customer feels the content offered is appropriate, based on personal information and tailor-made to one's needs (Lee & Park, 2009). Both elements represent two fundamental building blocks of service encounters as service encounters are by and large of social nature (Bitner, 1990), and rely heavily on interpersonal contact (Shostack, 1985).

Due to the distant and computer-mediated nature of the Internet, feelings of social presence and a sense of personalized approach have been quite hard to convey online. Empowered by developments in self-service technology, the rise of *virtual customer service agents* (VCSAs) seems to provide new perspective on this issue. VCSAs are computer-generated characters that are able to interact with customers and simulate behavior of human company representatives through artificial intelligence (Cassel, Sullivan, Prevost, & Churchill, 2000). Building on social response theory (Nass & Moon, 2000), scholars have put forward that VCSAs can fulfill the role of service representatives and substitute tasks historically performed by human service personnel (Meuter, Ostrom, Roundtree, & Bitner, 2000). Therefore, VCSAs seem an exemplary tool to address the lack of interpersonal interaction recognized in online settings and to elicit feelings of social presence and senses of personalization, thereby responding to the call for integration between technology and personal aspects of online service delivery (Berry, 1999).

Despite the suggestion that VCSAs are able to represent elements previously unfeasible in online service encounters, research has not yet addressed the question how and to what extent classical service agent characteristics can be employed to shape and improve online service encounters. This is remarkable. The few empirical VCSA studies available incorporated characteristics related to humanlike embodiment (Qiu & Benbasat, 2009) and humanlike communication content (Köhler, Rohm, De Ruyter, & Wetzels, 2011; Qiu & Benbasat, 2009), leaving the issue how to mirror key service characteristics in online service settings unaddressed. As there is growing evidence that customers demand for traditional elements of face-to-face interaction in online service settings (e.g., Verhagen & Van Dolen, 2009), providing an answer to this question is critical and will therefore be the overall goal of this paper. To thoroughly address the 'how' part of the research question, our inquiry will relate classical service agent characteristics to social presence and personalization, the two elements that historically have shown to be at the heart of the service encounter (Bitner et al., 1990; Suprenant & Solomon, 1987).

We focus our inquiry on three classical service agent characteristics: *friendliness*, *expertise*, and *smiling*. Being polite, responsive, helpful, and understanding is claimed a paramount property of service delivery (Price, Arnould, & Deibler, 1995), as is possessing the required skills and being knowledgeable about the service (Parasuraman, Zeithaml, & Berry, 1985). Yet, despite, or perhaps due to, their general and widely applicable nature, friendliness and expertise are only occasionally employed as predictive variables and research on their role in online service encounters is limited (Witkowski & Thibodeau, 1999). Moreover, literature on the importance of serving customers with "an American smile" is redundant (e.g., Hennig-Thurau, Groth, Paul, & Gremler, 2006), but little research is conducted on whether smiling service representatives elicit the same responses when the interaction is technology-mediated and with a computer-generated character.

Integrating our line of reasoning thus far, this paper intends to make three contributions. First, we empirically investigate the role of VCSAs to shape more social and personalized online service encounters. Empirical studies on VCSAs are scarce and openly demanded for (Köhler et al., 2011), and a focus on the ability of VCSAs to provide service encounters with a human touch deals with conventional wisdom that social and personal approaches are critical to customer service delivery (Bitner, Brown, & Meuter, 2000). Second, within this inquiry we address the direct influence of VCSA characteristics on online customer service evaluations and are among the first to extrapolate whether employing cues deemed important in traditional service encounter literature, i.e. being friendly and knowledgeable and

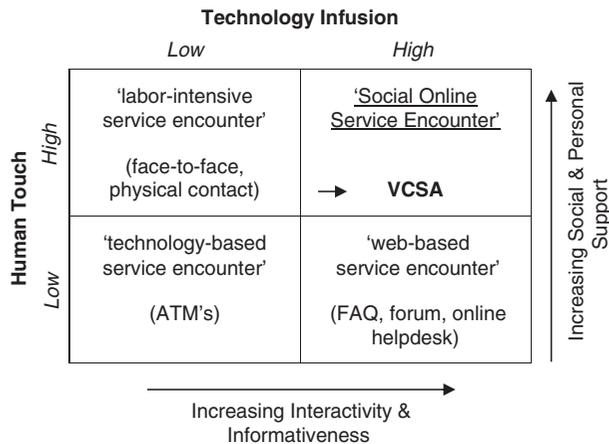


Figure 1 Human Touch vs. Technology Infusion in Service Encounters

providing service with a smile, are also vital to the success of online service encounters. This enables us to evaluate the cross-channel applicability of traditional customer service thought and provide further directions to the academic field of online customer service. Third, from a managerial perspective, insight in how to best represent a VCSA is gained. Not only does this increase service company's conceptual knowledge of VCSAs, it also reduces their effort, time, and cost to design, implement, and maintain such an agent as well as to shape the service process.

The proceedings of this paper are organized as follows. In the second section we draw a conceptualization of online service encounters and discuss how VCSAs prove an exemplar IT artifact to structure more social and personal online service encounters. In section three we present our research model and elaborate on the hypotheses. The fourth section explains our research design; the fifth section presents the results of our study. In the last section, we discuss our findings and contributions, and suggest avenues for further research.

Conceptual Background

The infusion of technology is dramatically changing the nature of service encounters (Bitner et al., 2000). The shift from physical, face-to-face contact towards online service encounters implies a substantial change of the nature of these encounters. Visualized in Figure 1, current online service encounters relate little to the traditional typology of "high-touch, low-tech" (Bitner et al., 2000), but akin more to a "low-touch, high-tech" conceptualization. The transition from high- to low-touch and low- to high-technology works for service providers in two ways. On the one hand, service providers benefit from the greater interactivity and informativeness when servicing customers online. On the other hand, social and personal contact is relatively hard to fill in online and seem to be key weaknesses when creating online service encounter experiences.

Notwithstanding, it has been theorized that technological artifacts can be employed in such a way that they do function as social actors. More specifically, researchers identified the design of IT artifacts to impact users' perceptions of socialness by conveying feelings of social presence and sense of personalization (Wang, Baker, Wagner, & Wakefield, 2007). Especially these two elements are most likely to be evoked by VCSAs as they possess the ability to interact socially and interpersonally, show personality, and behave human-like (Qiu & Benbasat, 2009). Consequently, VCSAs are assumed to

be an adequate vehicle to transpose online service encounters to a higher level, melting elements of both 'high tech' and 'high touch' to form a new type of service encounter: the 'social online service encounter' (see Figure 1). The next sections elaborate on the role of social presence and personalization within this conceptualization.

Transposing Social Presence via IT artifacts

Research has identified that the design of information systems influences the extent to which an IT artifact conveys feelings of sociable and sensitive human contact. For example: Adding human images (Cyr, Head, Larios, & Pan, 2009) and personalized greetings (Gefen & Straub, 2003) to an IT artifact have all been shown to positively influence perceptions of social presence. Common to all IT cues addressed in these studies is the fact that anthropomorphic characteristics can be assigned to the IT artifact. Humanlike VCSAs are likely to elicit high feelings of social presence as well. By simulating human behavior and having the ability to visually represent human representatives VCSAs cue human characteristics, which in turn may elicit social responses and can also convey feelings of warmth (Nass & Moon, 2000). We therefore contest that a VCSA can be deployed as IT artifact to address the lack of social presence currently recognized in online service encounters.

Creating Personalization via IT artifacts

A wide range of personalization tools have been examined, ranging from fairly straightforward methods, like addressing the customer by name (Reiter & Rubin, 1999), to more technologically advanced applications, like offering products and services matched to customer preferences (Ho, Davern, & Tam, 2008) or employing recommendation agents (Komiak & Benbasat, 2006). Firms apply these personalization tools to gather and harvest information about customers to better identify, fit, and satisfy their specific needs in order to build personal customer relationships. Employing a humanlike representation induces the customer's feelings that one is interacting with an employee on a one-on-one base, for example through role-taking (Suprenant & Solomon, 1987), and as a result magnifies what is communicated by the agent. Driven by their humanlike experience, VCSAs may signal they understand and represent the customer's personal needs (Komiak & Benbasat, 2006). In this light, VCSAs combine the technological fundamentals of personalization with a human touch and therefore seem to be an applicable IT tool to elicit feelings of personalization in the online service encounter.

Research Model and Hypotheses

To study the influence of VCSA characteristics on online service encounters, the research model in Figure 2 is proposed.

A critical outcome measure of face-to-face, self-service, and online service encounters is service encounter satisfaction (Bitner et al., 2000). Service encounter satisfaction has been suggested as a proxy for "the customer's emotive post-consumption evaluation of the service performance" (Caruana, 2002, p. 816), which makes it plausible to posit service encounter satisfaction as key dependent variable in our model. Furthermore, given that social presence and personalization have been labeled as key dimensions of service performances (Bitner et al., 1990; Suprenant & Solomon, 1987), both elements are assumed to determine service encounter satisfaction as well. Mirroring our goal to examine how VCSA technology can transpose classical service agent characteristics to online service encounter settings, the three agent characteristics expertise, friendliness, and smile complete the basic model structure. Finally, to see how the basic structure of our model interacts with previous findings in the research field, communication style and anthropomorphism complete the model as moderators. In the remainder of this section we elaborate on the research constructs and their assumed theoretical interrelationships.

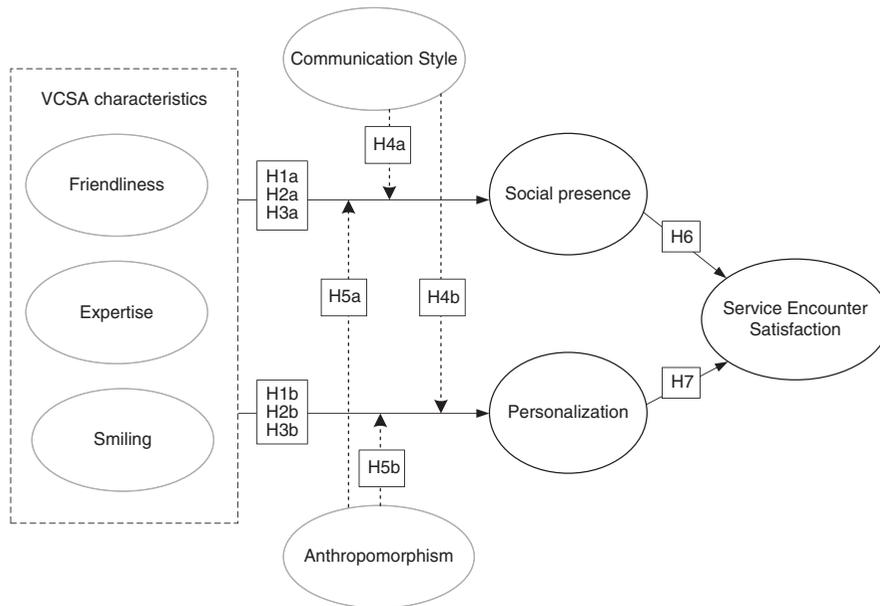


Figure 2 Conceptual Model

Friendliness

Friendliness is defined as the perception of being polite, responsive, giving extra attention, and creating mutual understanding (Price et al., 1995). It is likely that a friendly service agent evokes feelings of personal, sociable, and sensitive human contact, i.e., social presence, within the customer. The logic for this elicitation comes from implicit personality theory (Anderson, 1995), which assumes that perceptions of personality traits enacted by a person carry over in the expectations we have about other personality traits of that person. Adding to this reasoning, researchers have identified that in order to be judged humanlike, and thus elicit social presence, building friendly and interpersonal relationships is vital (Keeling, McGoldrick, & Beatty, 2010). Accumulating evidence is provided by Baylor & Kim (2005) who showed that friendliness is an important determinant of social presence.

Moreover, and again supported by implicit personality theory, agents that are responsive to customer needs and create a feeling of mutual understanding are likely to increase the feeling that the content they offer is appropriate, based on personal information and tailor-made to their needs, i.e., personalization. Indeed, service providers being warm and friendly are found to build a closer relationship with the customer (Li, 2009) and offer a more personally rewarding shopping experience (Mittal & Lassar, 1996). In line with this we hypothesize:

H1: VCSA's friendliness has a positive effect on customer's (a) feelings of social presence and (b) perceived personalization during the service encounter.

Expertise

Expertise has often been noted as an attribute of the service employee (Crosby, Evans, & Cowles, 1990). It goes to the core of what is expected of the service employee during the interaction, and defines the

extent to which the individual provider can affect the outcome of the interaction through his or her skills. Customers seek to obtain advice and information of the employee that requires an expertise they lack. Baylor & Kim (2005) found that expert agents are able to elicit feelings of human warmth, and therefore feelings of social presence. Following social response theory, which states that people respond to computer systems treating them as social actors (Reeves & Nass, 1996), these findings can be explained by arguing that knowledgeable agents signal behavior normally associated with humans. This behavior provides customers a basis for identification with the agent and induces social schema's within the customer (Jiang, Klein, & Vedder, 2000).

Furthermore, it has been argued that service providers perceived as possessing the required skills and being competent to fulfill the service delivery are also identified as being more personalized as customers expect the agent to employ their personal information to the best of their knowledge and serve them appropriately (Parasuraman et al., 1985). Therefore, we propose:

H2: VCSA's expertise has a positive effect on customer's (a) feelings of social presence and (b) perceived personalization during the service encounter.

Smiling

Primitive emotional contagion theory provides an explanation of how behaviors like smiling are transformed from service employees to customers (Barger & Grandey, 2006; Hennig-Thurau et al., 2006). The theory proposes that individuals have a tendency to unconsciously synchronize with another person's behavior and that within this process emotional states converge. The relationship between primitive emotional contagion theory and social presence has indirectly been reported in previous research as it is suggested that factors such as smiling increase the level of intimacy in the interaction (Gunawardena & Zittle, 1997). Also, customers reporting to have a better mood through mimicking the agent's positive emotional display, are likely to experience more personal, sociable, and sensitive human contact in the service encounter (Brave & Nass, 2002). Moreover, showing positive appeal (e.g., smiling) induces a willingness to interact with customers, adjust their service and invest in the personal relationship (Rafaeli & Sutton, 1990) resulting in a more personalized encounter. Therefore, we hypothesize:

H3: VCSA's smiling has a positive effect on customer's (a) feelings of social presence and (b) perceived personalization during the service encounter.

Moderating Effect of Communication Style

Prior research showed that communication style moderates the effect of online service agent perceptions on relationship outcomes (e.g., Van Dolen, Dabholkar, & De Ruyter, 2007). In terms of communication, two distinct styles have been found: social and task orientation. Aimed at establishing interpersonal relationships with customers, socially oriented communication satisfies customer's emotional needs and personalizes the interaction (Crosby et al., 1990). On the other hand, a task-oriented communication style is aimed at task efficiency, goal-driven and minimizes cost, effort, and time allocated to the interaction (Dion & Notarantonio, 1992).

Drawing upon social interaction theory (Ben-Zira, 1980), it can be argued that when customers are involved in service encounters where they have less knowledge and solutions than the service provider, as is the case when requesting after-sales customer service, evaluation of the service is at least partly based on the affective component of the provider's communication. As socially oriented agents

foster a stronger psychological connection with the customer, are more “social-emotional in nature” (Froehle, 2006, p. 11), and share a greater feeling of human contact with the customer (Yoo & Alavi, 2001), their communication style may generate a tendency of affective-based processing. The effect of friendliness, expertise, and smiling on social presence and personalization is proposed to be magnified by social communication as greater emphasis is put on the feeling of solving a problem together, being more responsiveness to personal needs and enhancing social contagion (Czepiel, 1990). Therefore, the following moderating effects are hypothesized:

H4: The effects of the VCSA’s friendliness, expertise, and smiling on (a) feelings of social presence and (b) perceived personalization will be stronger when the VCSA is socially- (vs. task-) oriented.

Moderating Effect of Anthropomorphism

Lee (2010) suggests that investigating the moderating role of anthropomorphism yields more understanding of people’s tendency to apply social attributes to artificial agents. That is, in line with social response theory (Nass & Moon, 2000), the relative effect of the agent’s characteristics on its ability to foster a personal relationship will be stronger when the agent is anthropomorphized. Indeed, a meta-analysis indicates that humanlike agents with ‘higher realism’ elicit more positive social interaction, especially when subjective evaluations are employed (Yee, Bailenson, & Rickertsen, 2007). Thus, by employing observable human characteristics the agent cues capabilities of humanlike interpersonal communication and this increases the feeling of social and personal interaction, magnifying the effects hypothesized earlier. Therefore, we propose:

H5: The effects of the VCSA’s friendliness, expertise, and smiling on (a) feelings of social presence and (b) perceived personalization will be stronger when the VCSA is humanlike (vs. cartoonlike).

Service Encounter Satisfaction

Researchers have repeatedly emphasized the critical role of social and personal contact as elements of service encounters (e.g., Czepiel, 1990). Social presence has not been related to customer satisfaction yet. However, social presence is positively related to customer outcomes such as trust (Gefen & Straub, 2003) and e-loyalty (Cyr, Hassanein, Head, & Ivanov, 2007). Therefore, it seems plausible that social presence is positively related to service encounter satisfaction. Thus, we argue:

H6: The feelings of social presence elicited by the VCSA has a positive effect on service encounter satisfaction.

It is well known that personalization affects customers’ service encounter satisfaction (e.g., Ho et al., 2008; Suprenant & Solomon, 1987). In fact, Zeithaml et al. (2002) argue that seeking “understanding, courtesy, and other aspects of personal attention” (p. 367) are especially important determinants of service evaluation when customer service is requested. Therefore, we hypothesize:

H7: The sense of personalization elicited by the VCSA has a positive effect on service encounter satisfaction.

Table 1 Experimental Design

		Anthropomorphism	
		Humanlike	Cartoonlike
Communication Style	Social	Smiling (N= 35)	Smiling (N= 36)
		Neutral (N= 45)	Neutral (N= 39)
	Task	Smiling (N= 38)	Smiling (N= 33)
		Neutral (N= 39)	Neutral (N= 31)

Method

To test our hypotheses, an experimental survey was conducted representing a setting in which participants interacted with a VCSA. The research design included manipulations for *smiling* (smiling vs. neutral), *communication style* (socially- vs. task-oriented), and *anthropomorphism* (human vs. cartoon) (see Table 1).

Participants were 296 students enrolled from undergraduate courses from a business administration program. The students received partial class credit for their participation and were given the opportunity to win one of the five 25 euro gift vouchers that were raffled amongst the participants. Participants were randomly assigned to the treatments. To control for gender effects congruent agents were assigned, so a male participant was assigned to a male agent, whereas a female agent was assigned to a female participant.

Experimental Task

Participants were supposed to imagine oneself to be customers of a fictional mobile phone service operator called “Telco.” The objective of the experimental task was to interact with a VCSA in order to find out whether it was possible to save money through switching to another mobile cellular subscription. Participants were confronted with the fact that their actual call and text message behavior exceeded the limits of their current phone plan and that switching to another plan could save money. To enhance authenticity, a fictive copy of last month’s invoice was included in the task instructions. This invoice presented the participant’s current monthly subscription (‘Calling 200’) and listed how many minutes and text messages were used. Important reasons to choose for this task are: 1) its customer service focus, 2) it represents a relevant situation for mobile phone users, 3) a large proportion of the participant population is familiar with selecting mobile phone subscriptions, and finally 4) participants do not need specialized knowledge to execute the task.

Experimental procedures

A dedicated workflow application and predefined interaction script guided participants through all the steps of the experimental survey. Participants contacted the VCSA by activating a link included in the digital instructions. The VCSA was fully controlled by software that determined how to respond to the input provided by the participants by making use of a knowledge database that was driven by the interaction script. The agent was presented in a dedicated pop-up screen to allow participants to simultaneously view their invoice and interact with the agent.

The interaction was started by the agent asking what service could be provided. Participants responded by typing their answer in a dedicated chat box positioned next to the agent. The VCSA



Figure 3 Human-Neutral (m), Cartoon-Neutral (f), Cartoon-Smiling (m), Human-Smiling (f)

subsequently asked several questions about the participant's call and text message behavior (e.g., "How many minutes did you call," "How many text messages did you sent?") until the final, optimal advice (switch to another phone plan, namely 'Calling 300') was given to the participant.

After the conversation with the VCSA the workflow application automatically opened an online questionnaire. The whole experimental survey was supervised and directed by two instructors. The experimental task took about 15 minutes to execute.

Experimental Design

To induce perceptions of friendliness and expertise the virtual agent was programmed to communicate using natural sentences, act humanlike, and be able to answer all relevant questions. Smiling was manipulated by presenting a *neutral* versus *smiling* version of the agent. Based on Ekman's (1994) suggestions, attention was paid to incorporate a genuine smile (e.g., the 'Duchene' smile), as authentic smiles are argued to evoke more positive emotional reactions than nonsincere smiles. Anthropomorphism was manipulated using either a human or a cartoonlike image of the VCSA. For the humanlike treatment photos were selected from an online photo database. To select equally attractive photos for the male and female VCSA the search criteria applied mainly focused on identical body attributes, such as eye color, tone of skin, body position, and hair color across the male and female, and smiling versus nonsmiling agent. After the final selection, the photos were sent to a professional cartoonist who transformed them into their cartoonlike equivalents. Figure 3 shows four of the eight images used.

Communication style was manipulated by either using a *socially oriented* or *task-oriented* communication protocol. Development of this manipulation was based on the operationalization of Van Dolen et al. (2007). Socially oriented agents aimed to be personal and supportive, rewarding participants verbally and showing empathy and understanding. On the other hand, the task-oriented style focused on attaining goals, talking purposeful and structuring the conversation. All manipulations were pre-tested.¹

Measures

All measures in the postexperiment questionnaire were measured on a 7-point Likert scale and selected from established validated measurement instruments. The items were adopted to fit the context of our research. Table 2 shows the measures.

Table 2 Convergent validity and reliability statistics (N = 296)

Construct	Items	α	Composite Reliability	AVE
Friendliness (Jayawardhena, Souchon, Farrell, & Glanville, 2007; Van Dolen et al., 2007)	FRI-1: Familiar with my situation	0.71	0.84	0.63
	FRI-2: Building a friendly relationship with me			
	FRI-3: Cooperative and friendly			
Expertise (Holzwarth, Janiszewski, & Neumann, 2006)	EXP-1: Trained	0.86	0.92	0.78
	EXP-2: Experienced			
	EXP-3: Knowledgeable			
Social Presence (Yoo & Alavi, 2001)	SP-1: I felt a sense of human contact with the virtual agent	0.94	0.95	0.80
	SP-2: I felt a sense of personalness with the virtual agent			
	SP-3: I felt a sense of sociability with the virtual agent			
	SP-4: I felt a sense of human warmth with the virtual agent			
	SP-5: I felt a sense of human sensitivity with the virtual agent			
Personalization (Komiak & Benbasat, 2006)	PER-1: The virtual agent understood my needs	0.87	0.92	0.80
	PER-2: The virtual agent knew what I want			
	PER-3: The virtual agent took my needs as its own preferences			
Service Encounter Satisfaction (Barger & Grandey, 2006)	How satisfied are you with:	0.83	0.90	0.75
	SAT-1: The virtual agent's advice?			
	SAT-2: The way the virtual agent treated you?			
	SAT-3: The overall interaction with the virtual agent?			

Note: Smiling, Communication Style, & Anthropomorphism were included as dummy variables. All variables were measured on 1–7 Likert-scales.

Data Analysis and Results

Partial least squares (PLS) modeling was used for the analysis. PLS was chosen for its ability to cope with small sample sizes. This allowed us to test the moderating effects via multiple group analysis, an approach recommended in situations where the moderating variables are discrete in nature (Eberl, 2010).

Measurement Model

We utilized the software package Smart PLS (Ringle, Wende, & Will, 2005) to compute Cronbach's alpha, composite reliability, Average Variance Extracted (AVE), and factor loadings (Table 2). All

Table 3 Results of PLS Analysis for all different subsets (N = 296)

	Total (N = 296)	Communication Style		Anthropomorphism	
		Task (N = 141)	Social (N = 155)	Cartoon (N = 139)	Human (N = 157)
<i>Personalization</i>					
Friendliness	.42**	.35**	.58**	.39**	.45**
Expertise	.30**	.33**	.21**	.30**	.30**
Smiling	.01	-.02	.01	.06	-.04
R ²	.40	.34	.53	.37	.44
<i>Social Presence</i>					
Friendliness	.56**	.54**	.50**	.61**	.51**
Expertise	.12*	.04	.23**	.08	.16
Smiling	-.02	.01	-.04	-.02	-.02
R ²	.40	.31	.44	.43	.37
<i>Service Encounter Satisfaction</i>					
Personalization	.57**	.52**	.58**	.61**	.52**
Social Presence	.23**	.21**	.27**	.21**	.27**
R ²	.50	.40	.59	.51	.50

Note: Dependent variables are in *italic*.

**p*-value < .05,

***p*-value < .01

Cronbach's alphas and composite reliabilities were above the suggested cut-off value of 0.70, indicating that the measures were reliable. Convergent validity was investigated by study of the AVE's and factor loadings. AVE's should be greater than 50% and factor loadings should exceed 0.5 to become practically significant. Both criteria were met, thus convergent validity was assured. Discriminant validity was investigated through factor- and cross-loadings and a comparison of the correlations among constructs with the AVE's (Ping, 2004). All items loaded highly on their own latent variables (minimum loading is 0.72), but not very high on other constructs, indicating discriminant validity. Moreover, none of the items loaded higher on other constructs than on its assigned latent variable. Further proof of discriminant validity was shown by the fact that none of the between construct correlations exceeded the individual construct's AVE's.²

Structural Model

To test the main effects of virtual agent characteristics on personalization and social presence and its corresponding influence on service encounter satisfaction, PLS (bootstrapping, 500 subsamples) was applied to estimate the statistical significance of each path coefficient and the R² values. The results (Table 3) show that the agent characteristics explained 40% of the social presence and 40% of the personalization variance³. Together, social presence and personalization explained an impressive 50% of the variance in service encounter satisfaction.

Agent's friendliness had a very strong impact on personalization ($\beta = .42, p < .01$) and social presence ($\beta = .56, p < .01$), accepting hypotheses 1a and 1b. Expertise shown by the agent had a rather strong effect on personalization ($\beta = .30, p < .01$) and a moderate effect on social presence ($\beta = .12, p < .05$), thus accepting hypotheses 2a and 2b. Smiling did neither contribute to personalization

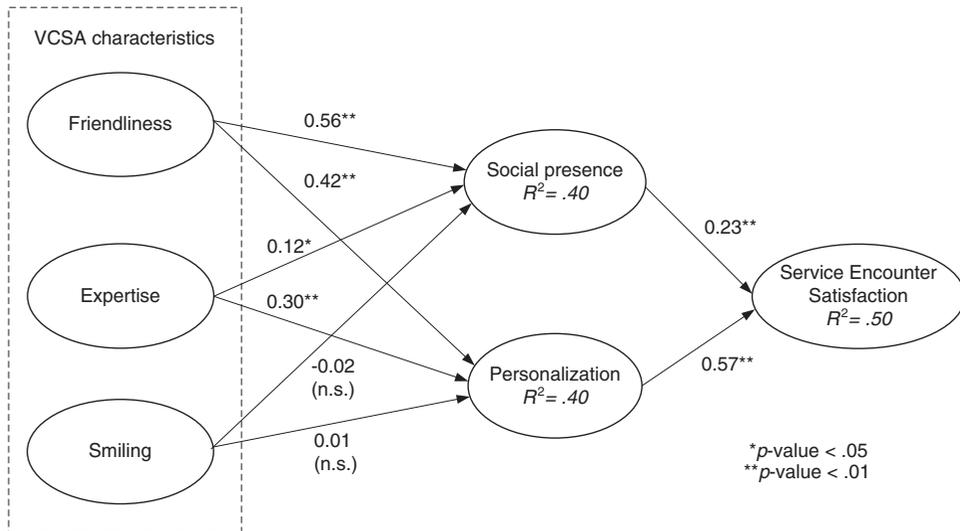


Figure 4 PLS main structural model (N = 296)

nor to social presence, rejecting hypotheses 3a and 3b. Finally, personalization ($\beta = .57, p < .01$) and social presence ($\beta = .23, p < .01$) were strong predictors of service encounter satisfaction, accepting hypotheses 6 and 7. Figure 4 summarizes our main findings.

To assess the moderating effects of communication style and anthropomorphism multiple group analysis was applied (Eberl, 2010). The conceptual model was estimated four times using split-samples of the dataset (cartoon N=139; human N=157; task N=141; social N=155). Table 3 shows the results. The differences in the beta values between the groups (cartoon vs. human; task vs. social) were then tested for significance with pairwise t-tests. The results indicated that the effect of friendliness on personalization was significantly stronger for socially than for task-oriented agents ($\beta_{\text{social}} = .35$ vs. $\beta_{\text{task}} = .58; p < .05$) and that the effect of expertise on social presence was significantly stronger for socially than for task-oriented agents ($\beta_{\text{social}} = .23$ vs. $\beta_{\text{task}} = .004; p < .05$). Given that communication style did not moderate any of the other hypothesized effects, hypotheses 4a and 4b could only be accepted partially. Regarding the assumed moderating effect of anthropomorphism, no significant differences in friendliness, expertise and smiling between the cartoon versus human group were found. This led to the rejection of hypotheses 5a and 5b.

Discussion

This study shows that VCSAs are able to provide online service encounters with both social and personal support. As expected, evaluation of an agent's friendliness and expertise elicits social presence and personalization and in turn, social presence and personalization have a strong effect on service encounter satisfaction. Moreover, we found evidence that the effect of friendliness on personalization, and expertise on social presence is stronger for VCSAs with a socially oriented (vs. task-oriented) communication style.

Contrary to our expectations, smiling did not increase senses of social presence and personalization. An explanation for this result may lie in the fact that the agent smiled without applying stimulus-response mechanisms. That behavior may less likely induce emotional contagion, that is, it is imperative that the agent's smile is evoked by the customers input. Most likely, due to the limitations

of the current generation of VCSA software, the agent's emotional reactions could not be aligned with the customer in a more realistic way, prohibiting the proposed effect of emotional contagion.

Interestingly, we found a nonsignificant moderating effect of anthropomorphism on the influence of agent characteristics on personalization and social presence. An explanation could be that a change in physical appearance does not elicit more social responses. Indeed, Lee (2010) suggests that the increase in anthropomorphism from cartoonlike to human agents might be too small to find variance in perceptions of social presence. Adding more fundamental human characteristics to the human-computer interaction, like use of language, interactivity, and conversing using social roles, were shown to evoke more social responses (Nass & Moon, 2000). While the VCSAs in the humanlike manipulation of the current study were perceived more humanlike than the cartoonlike agents, it could be that both types of agents were perceived to resemble humans anyway, and as such evoked social responses, thus only leading to a marginal increase in the socialness perception of the interaction.

Contributions to Research

Our study contributes to ongoing research in four ways. First and foremost, our results provide support for the conceptualization of VCSAs as providers of 'social online service encounters.' By infusing current technology-rich, web-based online service encounters with an element of human touch, VCSAs enrich online service encounters with elements considered critical to service delivery in traditional literature (Bitner, 1990; 2000). We also found strong effects of social presence and personalization on service encounter satisfaction. This result lends support to the view that social and personal support, elements argued to be key in offline service encounters, are vital to the evaluation of online service encounters as well. Second, further proof of the applicability of Bitner's (1990) service conceptualization is put forward by our finding that the agent's perceived friendliness and expertise are fundamental to form social and personal online service encounters. In this way, more evidence is provided that friendliness and expertise are indeed paramount properties of service delivery, also in the online era. Third, this study is, to the best of our knowledge, one of the first to incorporate social presence as a determinant of service encounter satisfaction. While social presence has been found to be influential on outcome measures such as trust (Cyr et al., 2007) and enjoyment (Qiu & Benbasat, 2009), this study shows the applicability of social presence as determinant of customers' satisfaction, increasing understanding and complementing the number of determinants of service encounter satisfaction. Finally, researchers have increasingly embodied social presence theory in their studies as more attention is paid to the notion that affective processing is as important as cognitive processing for the adoption and usage of IT artifacts (e.g., Johnson, Marakas, & Palmer, 2006). This research aligns with this view and reconfirms Al-Natour and Benbasat's (2009) premise that IT artifacts are to be perceived as social actors and places social presence theory at heart of this conceptualization. In this way, both the literature on interactive user-artifacts relationships and social presence theory are developed.

Contributions to Practice

From a practical point of view, this study has three implications. First, we make a strong case for the adoption of VCSAs to provide customer service. Having the ability to represent the previously unfeasible elements of social and personal contact, providers of both web-based service encounters and labor-intensive service encounters can improve their online service provision by employing a VCSA. Second, in order to gain the social benefits associated with virtual agent adoption, it is vital that customers perceive the agent as friendly and knowledgeable. Extensive thought and resources should thus be allocated to designing what the agent should look like, and with what style it should communicate. Third, in the design of the VCSAs communication style, this research provides evidence that developers

should focus on building a VCSA that communicates socially instead of task-oriented. Service providers have been struggling with the financial implications associated with embracing personal and socially oriented communication as serving customers affectively with human personnel implies that more time, care, and thus funding should be allocated to service encounters. Overall, VCSAs prove to be a solution to incorporate the social orientation into (online) service encounters.

Limitations and Future Research

Our research is subject to a number of limitations. First, the laboratory environment in which the research was conducted assures internal validity, but also affects the generalizability of the study as the VCSA was presented in an artificial environment. Second, mobile phone plans are a relatively low-risk but highly relevant product category. Future research should cover a wider range of tasks, for example investigate whether VCSAs can fulfill the role of customer service agent in case of more risky products, such as mortgages or insurances. Third, the student sample may have reduced the external validity of the study. Future research is warranted to incorporate more heterogeneous samples to cross-validate this study's findings.

Future research on VCSAs may advance in numerous ways. First, to provide theoretical foundations for the employment of VCSAs, we encourage researchers to experiment with more technically advanced agents that will appear in the near future. By adding and combining elements such as motion, natural speech, lip synchronization, and 3D representation to virtual agent design, new insights into the value of mimicking humanlike service personnel online is gained. Second, more in-depth research on the role of emotions in VCSA settings is encouraged. While we did not find any effect of smiling, VCSAs may still express (positive) emotions that contribute to more positive customer evaluations of the service encounter. An interesting area of future research would be to examine whether affective real-time interactive facial expressions, and more emotional communication styles would influence the socialness and personalization perception of the agent.

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Notes

- 1 Due to page limitations, details about the pre-testing and an overview of the average scores of the research constructs among the treatments are available from the authors upon request.
- 2 All scores of the convergent and discriminant validity testing are available from the authors upon request.
- 3 Multiple regression analyses were also run to test for multicollinearity. As all VIF scores were below the recommended cutoff value of 10, multicollinearity was unlikely to be an issue.

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