Examining User Experience of Conversational Agents in Hedonic Digital Services – Antecedents and the Role of Psychological Ownership

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Conversational agents (CA) that interact with users in human language have become increasingly popular over the past years. This study explores antecedents of the user experience with CAs in hedonic digital services, utilizing the example of music streaming services. Moreover, this study investigates whether a positive CA user experience increases users' sense of psychological ownership towards the service, which in turn is supposed to positively influence users' intention to use the service's fee required premium version. Using structural equation modelling, the results indicate that perceived humanness and perceived personalization of the CA positively affect the user experience. The results also show that CAs can greatly benefit from higher humanness and personalization when users trust the hedonic digital service. Furthermore, psychological ownership has been identified as an underlying mechanism through which CA user experience leads to users' premium usage intention, indicating that CAs might be valuable for hedonic digital services.

1. Introduction

In the past decade, there has been a rapid proliferation of information systems and technologies, which fundamentally changed the way people experience hedonic goods such as music or movies (Belk 2013). Computers, especially portable devices, inaugurate new forms of hedonic good experiences, changing traditional behavior patterns, value perceptions or even complete industries (Bardhi and Eckhardt 2017). One example in this regard might be music streaming services such as Spotify or Apple Music, which give access to over 40 million songs regardless of time and location (Apple 2019; Spotify 2019). This dramatic increase of options to choose from provide users with a great variety of consuming hedonic goods but is also related to information overload and selection problems (Xiao and Benbasat 2007), hence, complicating customers' – music choice – decision-making. Whereas in traditional music stores, customers' uncertainty was usually encountered with trained sales staff who provided guidance and help, these interpersonal interactions do not exist in hedonic *digital* services in general and, in particular, in music streaming services. One possible solution to address this issue might be the implementation of conversational agents (CA) that enable users to interact with a system in human language (Nunamaker et al. 2011; Schuetzler et al. 2014). In doing so, users could engage in a human-like conversation with the service provider, alleviating the impersonal sense inherent to such services (Verhagen et al. 2014; Van Doorn et al. 2017).

Although the implementation of CAs seems promising, the innovative technology is often questioned by consu-

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mers (Araujo 2018) due to potential communication problems, unhuman-like behaviour, and/or concerns about data security (Kayak 2017). Therefore, it seems to be crucial to understand how users interact with and perceive the CA, and which attributes of the CA influence the user's experience (Schuetzler et al. 2018). Whereas previous research indicates that perceived humanness and perceived personalization are two vital factors when designing CAs (Araujo 2018; Go and Shyam Sundar 2019; Qiu and Benbasat 2009; Schuetzler et al. 2014; Verhagen et al. 2014; Wirtz et al. 2018), the associated repercussions do not seem to be straightforward (Schuetzler et al. 2014). Hence, Gnewuch et al. (2017) signified that "many challenges [...] in the understanding of what users are looking for when interacting with CAs and how to design them accordingly [remain]" (p. 1). Moreover, the inherent involvement of users, and their symbolic motives concerning hedonic goods (Clement et al. 2006) increase the complexity and relevance of CA design in this particular field but has not yet been entirely explored.

Against this background, following the request for more research in the customer service context (Gnewuch et al. 2017; Wirtz et al. 2018), the major aim of this research work is to examine the CA user experience in hedonic digital services (using the example of music streaming services) by investigating the impact of CA's humanness and personalization. Consequently, our first research question is:

How do perceived humanness and perceived personalization of a CA affect the user experience in hedonic digital services?

Although prior research has suggested benefits as well as possible downsides of humanness and personalization (Li and Unger 2012; Schuetzler et al. 2018; Van Doorn et al. 2017), moderating factors that strengthen or weaken these effects are nearly unexplored. As potential 'dark side' effects are largely related to users' concerns about privacy and security (Li and Unger 2012; Van Doorn et al. 2017), we argue that trust in the hedonic digital service plays a vital role for the impact of humanness and personalization. Accordingly, our second research question is:

How does trust in the hedonic digital service moderate the impact of users' perception about the CA on the user experience?

Previous research emphasized the relevance of gaining further knowledge about the implementation of CAs and its impact (Araujo 2018; Van Doorn et al. 2017). However, research is largely absent in this regard. In the context of hedonic digital services, providers often employ the freemium business model, where users can choose between a basic free version and a fee required premium version (Wagner et al. 2014). While hedonic digital services are able to generate great attention and user growth for their free versions, '*converting*' these into paying customers, and, consequently, enlarging their revenues, continues to be challenging. Nevertheless, this is crucial in order to be profitable (Koch and Benlian 2017; Wagner et al. 2014). Drawing on the theory of psychological ownership developed by Pierce et al. (2001, 2003), following recent research (i.e., Van Doorn et al. 2017), we argue that users' intention to use the paid premium version of the hedonic digital service might be a positive outcome of the CA user experience in this context. Consequently, our third research question is:

Can psychological ownership be identified as an underlying mediating mechanism of the positive impact of CA user experience on users' intention to pay for a hedonic digital service?

To address the mentioned research questions, an empirical model is proposed and tested with the use of structural equation modelling. In line, the research work is organized as follows: In the next section, the theoretical background of our conceptual framework is presented and research hypotheses are developed. Then, in the upcoming section, the methodology including data collection, stimulus development, and the measurement of the constructs, is displayed. The next section presents the empirical results, followed by a discussion of the research findings and an elaboration of the theoretical and managerial implications. Subsequently, limitations of the study are outlined and suggestions for future research are presented. The given research work ends with a short conclusion.

2. Theoretical Background and Hypotheses Development

2.1. Conversational Agents

CAs are software systems that interact with users in human language (Nunamaker et al. 2011; Schuetzler et al. 2014). The first form of a rudimentary CA "ELIZA", developed by Joseph Weizenbaum (1966), was introduced in the 1960s. With the advancements in artificial intelligence as well as based on technological improvements of natural language processing (NLP) and machine learning, CAs have continuously become more skillful and appear to be more human-like (Gnewuch et al. 2017). Nowadays, CAs can be found in various domains such as customer services, e-commerce, tourism, or healthcare (Gnewuch et al. 2017; Schuetzler et al. 2014). CAs are used to support customers' online transactions by providing them with additional information (Sivaramakrishnan et al. 2007), to support transactional activities on websites, to execute tasks such as sending airline tickets as well as giving personalized advices (Araujo 2018); in conclusion, CAs pursue the goal to improve the customer experience (Chung et al. 2019; Larivière et al. 2017).

In literature, different terms and conceptualizations are being used to refer to CAs. In general, CAs can be classi-

fied according to their communication mode, that is, text-based or speech-based (Gnewuch et al. 2017). Text-based CAs are often called chatbots (e.g., Araujo 2018; Chung et al. 2019; Hill et al. 2015; Johannsen et al. 2018; Wirtz et al. 2018), allowing users to interact by using text messages (Gnewuch et al. 2017). Speech-based CAs interact with the user via voice input (Gnewuch et al. 2017) and are also referred to as digital voice assistants (e.g., Wagner et al. 2019). Furthermore, CAs that have an embodied form, such as virtual 3D avatars (e.g., Nunamaker et al. 2011), referred to as embodied CAs (e.g., Case and Twyman 2015; Derrick and Ligon 2014). Since hedonic digital services such as music streaming services are mainly used via portable devices, text-based communication seems most appropriate. Therefore, this research work particularly focuses on text-based CAs, which are considered as a feature that can be implemented by a music streaming service in order to assist users in their music search.

Based on the social presence theory (Short et al. 1976) and the paradigm of computers as social actors (CASA) (Nass et al. 1994), suggesting that human-computer interactions are fundamentally social responses, previous research has demonstrated that a CA that understands the user and answers sensibly will increase user's feelings of social presence (Schuetzler et al. 2014). In turn, the user's feeling of social presence has been identified as an important factor for user perceptions and adoption decisions of CAs (Qiu and Benbasat 2009). A technology's social presence can be described as the user's perception of a personal, sociable, and sensitive contact (Gefen and Straub 2004), and is related to the user's perception about the *humanness* of a technology, referring to the extent to which users perceive a technology to be more human-like than technology-like (Lankton et al. 2015). Interestingly, a recent study demonstrated that users of a text-based CA are often uncertain whether the agent is human or artificial (Wünderlich and Paluch 2017). Besides, research has suggested that perceived *personalization* plays an essential role for the user's perception and, therefore, the success of the CA (Verhagen et al. 2014). Especially in case of CAs, which are used to give recommendations of hedonic media products such as music or movies, helping users to find suitable content that matches the user's individual taste, current emotion and feelings, personalization is supposed to be crucial (Lee and Choi 2017). According to Komiak and Benbasat (2006), personalization refers to the extent to which a user feels that the recommended content is appropriate to his or her personal needs.

2.2. User Experience

In literature there are several different definitions and conceptualizations of user experience. According to ISO 9241–210, user experience is defined as "a person's perceptions and responses that result from the use and/or anticipated use of a product, system or service" (clause 2.15). Following Rose et al. (2012), user experience consists of two components: a cognitive experiential state and an affective experiential state. The cognitive experiential state is defined as the component "connected with thinking or conscious mental processes" (Rose et al. 2012, p. 312). The essential core of the cognitive experiential state is the concept of "flow" (Novak et al. 2000), which can be described as a state in which individuals fully immersed in an activity and where "nothing else seems to matter" (Csikszentmihalyi 1990, p. 4). Flow has been further characterized by a "holistic sensation that people feel when they act with total involvement" (Csikszentmihalyi 1975, p. 36), which leads to a "positive, subjective experience" (Rose et al. 2012, p. 300). The concept of flow has been applied in various contexts and, in particular, in the contexts of information systems and human-computer interactions (e.g., Agarwal and Karahanna 2000; Bilgihan 2015; Bilgihan 2016; Choi et al. 2007; Hsu and Lu 2004; Koufaris 2002; Novak et al. 2000; Zhou 2012), where it has been shown to be a useful metric of user experience (Choi et al. 2007; Koufaris 2002) and to understand human-computer interaction (Trevino and Webster 1992). For example, Webster and Martocchio (1993) have examined how flow can be increased in computer-mediated communication and identified flow as an important construct for examining perceptions of users' interactions with computer-mediated communication technologies. Novak et al. (2000) developed and tested a theoretical model, investigating user experience – by only comprising the cognitive experiential state (i.e., flow) – of a website. In an online context, flow is specifically defined as "a cognitive state experienced during online navigation" (Novak et al. 2000, p. 24). Users of a website being in a state of flow are absorbed in their interaction with the website and totally concentrated on the usage itself (Gao and Bai 2014). Nevertheless, research suggested that human experience consists not only of a cognitive but also of an affective component (Bagozzi et al. 1999; Eroglu et al. 2001; Frow and Payne 2007; Komiak and Benbasat 2006). For example, Frow and Payne (2007) proposed that the experience involves both "rational, cognitive processing and emotional, affective processing" (Rose et al. 2011, p. 27). In an online context, Eroglu et al. (2001) suggested that the online retail store environment affects not only the customers' cognitive state but also the emotional, affective state. Bleier et al. (2019) echo this notion by proposing that the interaction between a customer and product web pages might be enjoyed and be perceived as fun. Accordingly, the experience goes beyond a functional (cognitive) dimension and also consists of an affective dimension. In line, Rose et al. (2011, 2012) developed and tested an extended user experience model including not only a cognitive experiential state but also an affective experiential state, which refers to "one's affective system through the generation of moods, feelings and emotions" (Rose et al. 2012, p. 312).

2.3. Psychological Ownership

Psychological ownership is defined as "the state in which individuals feel as though the target of ownership or a piece of that target is '*theirs*'" (Pierce et al. 2003, p. 86). The state of psychological ownership consists of a cognitive and affective core. More precisely, according to Pierce et al. (2003), psychological ownership "reflects an individual's awareness, thoughts, and beliefs regarding the target of ownership", "coupled with an emotional or affective sensation" (p. 86). Psychological ownership can occur despite the absence of legal ownership (Pierce et al. 2003). People can develop feelings of ownership not only for material but also for non-material objects (Baer and Brown 2012) and, in particular, towards digital service technologies they use (Fritze et al. 2018; Kirk et al. 2015; Mifsud et al. 2015; Van Doorn et al. 2017). Especially in the context of hedonic digital services, which might exceed the purely functional dimensions and where users have a mental attachment to, feelings of ownership can emerge (Fritze et al. 2018). In line, Sinclair and Tinson (2017) demonstrated that users of a music streaming service experience psychological ownership towards the digital service.

Three inherent human needs facilitate a sense of psychological ownership in service environments: (*i*) a need to create and communicate an identity (i.e., *self-identity*), (*ii*) a need to gain control over the environment (i.e., *efficacy and effectance*), and (*iii*) a need for a sense of belongingness to the target service (i.e., *having a place*) (Pierce et al. 2003; Van Doorn et al. 2017). The need for *self-identity* is associated with *attractiveness* (Jussila et al. 2015), which can be affected by service personnel-related components (Keh et al. 2013), such as social robots (Van Doorn et al. 2017). The need for *efficacy and effectance* is related to *manipulability* (Jussila et al. 2015), which can be increased by high degrees of customization, allowing users to adjust the service and its offerings according to their individual preferences (Van Doorn et al. 2017). And finally, the need for *having a place* is associated with *receptiveness* (Jussila et al. 2015), which can be influenced by the responsiveness and helpfulness of the service provider (Dabholkar et al. 1996; Van Doorn et al. 2017). Therefore, Van Doorn et al. (2017) propose that introducing high levels of automated social presence (ASP) in services, referring to "the extent to which machines (e.g., robots) make consumers feel that they are in the company of another social entity" (p. 44), address the above-mentioned needs, facilitating the emergence of psychological ownership.

In the same vein, we argue that the implementation of CAs in hedonic digital services addresses the three mentioned human needs and thus increases the users' sense of psychological ownership: (*i*) CAs enable human-like conversations with the service, addressing service *attractiveness*, and consequently the human need for *self-identity*, (*ii*) CAs provide the service user the opportunity to proactively specify their individual preferences, which addresses service *manipulability*, and therefore the need for *efficacy and effectance*, and (*iii*) CAs enhance the responsiveness and helpfulness of the service, addressing service *receptiveness*, and consequently the need for *having a place*.

2.4. Hypotheses Development

Wirtz et al. (2018) propose that, in general, customers' acceptance of CA depends on perceived humanness. Wagner et al. (2019) show that human-like characteristics positively influence the likeability of speech-based CAs. Araujo (2018) provides evidence that a text-based CA would benefit from higher humanness. Lee and Choi (2017) suggest that a human-like CA with a face and humanized communication qualities can increase social presence, which in turn results in a satisfying user experience. In line with this, Kowalski et al. (2013) posit that a human-like CA improves user's experience of using the CA. Hence, it is hypothesized:

H1: Perceived humanness is positively related to cognitive (a) and affective (b) experiential state.

Komiak and Benbasat (2006) provide evidence that personalization positively affects the adoption of recommendation agents (which merely ask users to define their individual preferences based on particular product attributes, and, therefore, does not allow a human-like interaction). Fan and Poole (2006) emphasize that personalization is essential for a fulfilling user experience, while Verhagen et al. (2014) prove that personalization strongly affects user's satisfaction with CAs. More precisely, in the context of hedonic digital services, research by Lee and Choi (2017) propose that CAs for movie recommendations, which communicate effectively with users and recommend content that matches the users' preferences, can enhance user experience. Consequently, we propose the following hypotheses:

H2: Perceived personalization is positively related to cognitive (a) and affective (b) experiential state.

Next to the positive experiences related to humanization and personalization of the CA, there might be some 'dark side' effects. A recent study by Schuetzler et al. (2018) demonstrated that a very humanoid CA can negatively impact user's personal information disclosure behavior, which is in line with Puzakova et al. (2013)'s findings in the context of anthropomorphized recommendation agents. Furthermore, recent research showed that personalized recommendation systems raise users' concerns about information privacy (Kim and Kim 2018; Li and Unger 2012). Dinev and Hart (2006) identified trust as an important factor that can overrule privacy risk perceptions in the decision to provide personal information in an onli-

ne setting. Trust, defined as the "willingness to rely on an exchange partner in whom one has confidence" (Moorman et al. 1993, p. 82), can decrease users' privacy concerns, resulting in higher willingness to provide personal information in order to obtain personalized online services (Li and Unger 2012). In an online context, Corritore et al. (2003) defined trust for users interacting with transactional or informational websites as "an attitude of confident expectation in an online situation of risk that one's vulnerabilities will not be exploited" (p. 740). Bleier and Eisenbeiss (2015) found that for more trusted online retailers, ad personalization is perceived more useful compared to low trust online retailers. The authors further revealed that for more trusted online retailers personalized ads do not provoke reactance and privacy concerns, which is the case when the retailer is less trusted. Based on these arguments, it is proposed that CAs benefit more from higher humanness and personalization when users trust the hedonic digital service. Hence, we hypothesize:

H3: The positive effect of perceived humanness on cognitive (a) and affective (b) experiential state will be stronger for users with high (vs. low) trust in the hedonic digital service.

H4: The positive effect of perceived personalization on cognitive (a) and affective (b) experiential state will be stronger for users with high (vs. low) trust in the hedonic digital service.

Recent research proposes that high levels of automated social presence (e.g., by using robots) might lead to positive service outcomes through users' sense of psychological ownership (Van Dorn et al. 2017). According to Pierce et al. (2003), having an engaging experience in the target area is a core element that fosters psychological ownership. Moon et al. (2013) suggested that an immersive experience is crucial for the emergence of a sense of ownership. In a recent study, Yoo et al. (2018) provided first evidence that experiencing flow (i.e., cognitive experiential state) positively impacts psychological ownership. As psychological ownership has been described as a "cognitive-affective state" (Pierce et al. 2003, p. 84), it is assumed that not only the cognitive experiential state but also the affective experiential state positively influences users' psychological ownership towards the hedonic digital service.

Moreover, a recent study showed that psychological ownership increases customers' value-in-use perceptions and therefore relational outcomes in a service context (Kleinaltenkamp et al. 2018). Previous research also suggested that psychological ownership positively affects purchase behavior because individuals show less concerns about prices (Jussila et al. 2015). In line, Asatryan and Oh (2008) demonstrated that customers with feelings of ownership for a service are willing to pay more for the service. In the context of hedonic digital services, a qualitative study by Sinclair and Tinson (2017) has shown that psychological ownership increases users' loyalty towards a music streaming service. Reb and Conolly (2007) suggested that the endowment effect – that is, individuals tend to value goods they own higher than identical goods that they do not own (Kahneman et al. 1990; Thaler 1980) – is primarily driven by subjective ownership feelings rather than by legal ownership. Therefore, it seems reasonable to assume that users perceiving the hedonic digital service as '*theirs*' are more likely to use the fee required premium version. Thus, we hypothesize:

H5: Cognitive (a) and affective (b) experiential state are positively related to psychological ownership towards the hedonic digital service.

H6: Psychological ownership towards the hedonic digital service is positively related to users' intention to use the service's paid premium version.

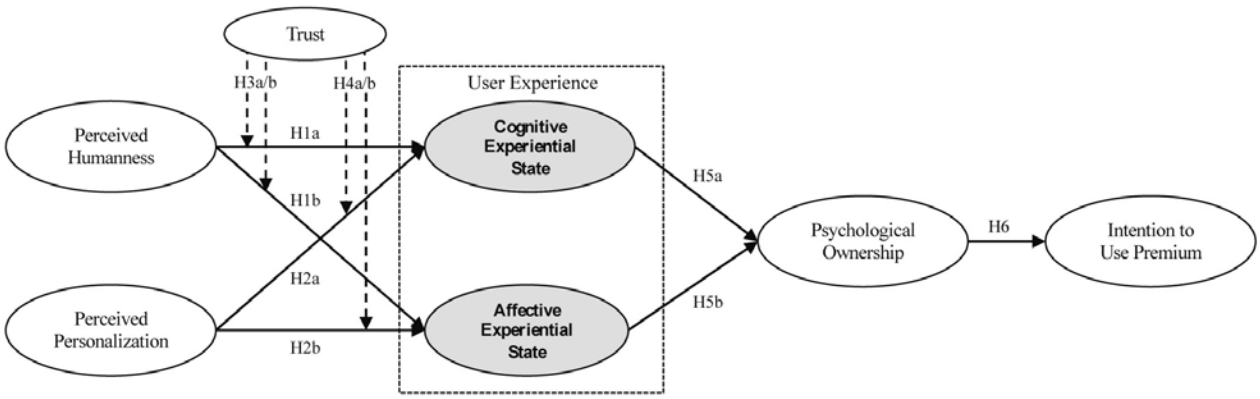
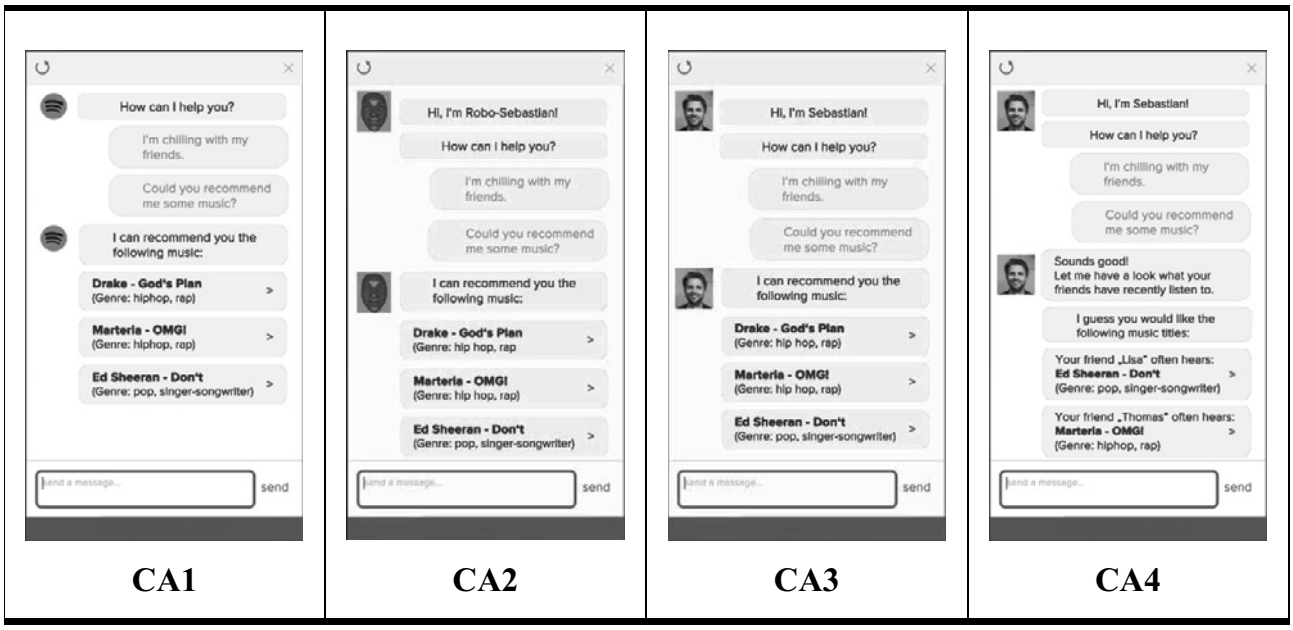


Fig. 1: Conceptual model



Notes: Stimulus materials (extracted from the videos) were translated into English for illustrative purposes. The actual material was presented in German.

Fig. 2: Stimulus materials (extracted from the video sequences)

3. Method

3.1. Data Collection

To collect our data, a German online research panel was used. The final sample consist of 514 complete responses. Gender was equally distributed (49.8 percent female). The sample was on average 35.73 (*SD* = 9.60) year of age, ranging from 16 to 58 years.

At the beginning of the survey, one out of four video sequences was randomly presented to the participants (CA1: *n* = 129, CA2: *n* = 132, CA3: *n* = 126, CA4: *n* = 127), simulating user interaction with a specific type of a CA in a music streaming service setting. More precisely, based on CAs that are actually utilized by companies, we created four different CAs in order to increase the variance in terms of participants' perceptions of the CAs. Thereby, CAs can differ according to their "*cues*", that is, *agent-related cues*, referring to the user's evaluation of the agent, and *communication-related cues*, which refer to how users evaluate the communication quality (Wünderlich and Paluch 2017). The most common agent-related cues that have been identified in already used CAs are "visual cues", such as a human profile picture as well as "identity cues", such as a human name. Furthermore, CAs often try to mimic human-like conversations, these cues are known as "conversational cues" (Go and Shyam Sundar 2019). In addition, a typing indicator is often used, allowing users to see when a CA is replying (Gnewuch et al. 2018). Some CAs also provide users with information of whether the user's message has been seen by the CA. Accordingly, it should be evident that the four created versions of the CAs differ in several cues (see *Fig. 2*; for the videos, please see https://bit.ly/2C1tZBB).

More precisely, CA1 had no human profile picture, no typing indicator, and the user did not receive an information whether his or her message has been "seen" by the CA. In contrast, CA2 provided a neutral robotic profile picture, generated with a 4D face grammar platform (Yu et al. 2012) as well as a graphical typing indicator (i.e., three animated dots). CA3 and CA4 included all of the mentioned cues, while CA4 further differentiate from the other CAs in its conversation style. To ensure external validity (Niemand et al. 2015), we designed the CAs based on the original interface of the music streaming service Spotify, the global market leader with 207 million active users worldwide (Spotify 2019). For all participants, the video sequences (37–43 sec.) started each with the original interface of Spotify, integrating an additional button, the "Streaming Chat". After the pointer clicked on the "Streaming Chat" button, the CA was opened and a conversation between a virtual user and the CA – as it is utilized in other digital services – started. During the conversation, the user asked the CA to recommend some music. The songs suggested by the CA were randomized.

3.2. Measures

The constructs were measured on seven-point Likert-scales (7 = "strongly agree", 1 = "strongly disagree") or assessed by applying semantic differential scales. In line with recent research (i.e., Novak et al. 2000; Rose et al. 2012), cognitive experiential state was operationalized using a descriptive statement of flow followed by three

items taken from Novak et al. (2000) where respondents had to rate the extent to which they have experienced flow. Affective experiential state was measured using four items adapted from Rose et al. (2012). Perceived humanness was assessed as a single-item construct. Inspired by Lankton et al. (2015) as well as Wünderlich and Paluch (2017), participants were asked to evaluate the humanness of the CA (7 = "very human", 1 = "very artificial"). The use of single-item measures has often been discussed because of potential reliability and validity issues. However, research demonstrated that single-item measures can be highly reliable and valid (e.g., Bergkvist and Rossiter 2007; Fuchs and Diamantopoulos 2009). Perceived personalization was measured with three items from Xu et al. (2011). The construct psychological ownership was measured using three items from Peck and Shu (2009). The operationalization of intention to use the premium version was based on and adapted from Venkatesh et al. (2003)'s scale, which was also been used by Dörr et al. (2013) in the specific context of music streaming services. Trust was operationalized using two items adapted from Chumpitaz Caceres and Paparoidamis (2007). The measurement items for all constructs are provided in *Tab. 1*.

Constructs and items	Standardized loadings	Cronbach's alpha	Composite reliability	AVE
Perceived Humanness[1]		-	-	-
very human – very artificial	-			
Perceived Personalization[2]		.947	.948	.858
The CA…				
…can provide me with relevant music recommendations.	.929			
…can provide me with music recommendations tailored to my preferences.	.943			
…can provide me with personalized music recommendations.	.906			
Cognitive Experiential State[2]		.953	.953	.871
I think that I experience flow when I use the CA as a function of this music streaming service.	.921			
In general, I often experience "flow" when I use this CA as a function of this music streaming service.	.934			
I think, most of the time when using the CA I feel that I am in flow.	.945			
Affective Experiential State[1]		.906	.909	.713
happy – unhappy	.842			
contented – melancholic	.840			
pleased – annoyed	.887			
relaxed – stimulated	.807			
Psychological Ownership[2]		.900	.912	.777
I feel like this is MY music streaming service.	.727			
I feel a high degree of personal ownership of the music streaming service.	.961			
I feel like I own this music streaming service.	.938			
Intention to Use Premium[2]		.960	.960	.924
It is likely that I would use the music streaming service's paid premium version.	.969			
I predict that I would use the music streaming service's paid premium version.	.953			
Trust[2]		.796	.798	.664
The music streaming service really takes care of my needs as a user.	.845			
I trust completely the music streaming service.	.784			

Notes: [1]Measured on semantic differential scales; [2]measured on seven-point Likert-scales (7 = "strongly agree" to 1 = "strongly disagree"); AVE = average variance extracted.

Tab. 1: Constructs and corresponding items, loadings and reliability scores

Constructs	1	2	3	4	5	6	7
1 Perceived Humanness	-						
2 Perceived Personalization	.454	**.926**					
3 Cognitive Experiential State	.492	.421	**.933**				
4 Affective Experiential State	.586	.596	.628	**.844**			
5 Psychological Ownership	.399	.383	.631	.479	**.881**		
6 Intention to Use Premium	.233	.476	.473	.403	.637	**.961**	
7 Trust	.521	.706	.654	.718	.667	.595	**.815**

Notes: The square roots of the AVE for each construct are presented in bold.

Tab. 2: Correlations and test of discriminant validity

Except for the measurement of our constructs of interest, we included several control variables. Since psychological ownership is related to involvement (Van Dyne and Pierce 2004), and research demonstrated that consumers being highly involved in a product category are more willing to pay for a product in that category (Steenkamp et al. 2010), we controlled for music involvement, which was operationalized with two items taken from Styvén (2010) ("I have a strong music interest", "Music is an important part of my life"). Further, it was controlled for music streaming usage and Spotify usage by asking participants if they own an account at a music streaming service, and in particular a Spotify account.

4. Results

4.1. Measurement Model

In order to test reliability and validity of the constructs we employed confirmatory factor analysis (CFA) in AMOS. The results in *Tab. 1* showed that all multi-item constructs had Cronbach's alpha scores above 0.7 (Nunnally 1978) and composite reliabilities greater than 0.6. (Bagozzi and Yi 1988), indicating sufficient reliability. The average variance extracted (AVE) values exceeded the required threshold of 0.5 (Fornell and Larcker 1981) and all standardized factor loadings were above 0.7 (Hair et al. 1998). Thus, convergent validity was confirmed. Furthermore, discriminant validity of the multi-item constructs was assessed using the criterion proposed by Fornell and Larcker (1981). As shown in *Tab. 2*, the square root of AVE for each construct was higher than all correlations with other constructs, displaying discriminant validity of the multi-item constructs. Regarding the single-item 'perceived humanness', we followed the guidelines by Malhotra et al. (2012). Correlations with the other related constructs were high and significant ($p \leq .001$), while the correlation with a theoretically unrelated construct (i.e., attitude toward the colour blue) was low and non-significant ($r = .076$, $p > .05$), suggesting convergent and discriminant validity. Overall, the confirmatory factor model showed an acceptable fit ($\chi^2 = 466.234$, $df = 115$; CFI = .961; RMSEA = .077).

To test for a potential common method bias (Korsgaard and Roberson 1995), we applied Harman's one factor test within a CFA setting (Podsakoff et al. 2003). The fit of this model was significantly worse compared to the measurement model with all constructs of our conceptual framework ($\Delta\chi^2 = 3779.618$, $\Delta df = 20$, $p \leq .001$). Further, we used the marker variable technique (Lindell and Whitney 2001). As suggested by Simmering et al. (2015), the construct 'attitude toward the colour blue' measured with three items ("I prefer blue to other colours", "I like the colour blue", "I like blue clothes"; factor loadings ranging from 0.747 to 0.838; Cronbach's alpha = 0.819; composite reliability = 0.827; AVE = 0.615) served as a theoretically unrelated marker variable. Using the third-lowest correlation with the marker variable ($r = .07$) as the more conservative approach (Malhotra et al. 2006), we adjusted the correlation matrix for common method variance. All correlations remained significant. We therefore conclude that common method bias is unlikely to be a concern in our study.

4.2. Structural Model

The proposed hypotheses were tested using structural equation modelling with maximum likelihood estimation in AMOS. Besides the constructs of interest, the model also included control variables (i.e., music involvement, music streaming usage, Spotify usage). The goodness-of-fit statistics provided an acceptable fit ($\chi^2 = 587.331$, $df = 146$, CFI = .952; RMSEA = .077). The results (see *Tab. 3*) showed that perceived humanness was positively related to cognitive experiential state ($\beta = .384$, $p \leq .001$) and affective experiential state ($\beta = .380$, $p \leq .001$), supporting *H1a* and *H1b*. Furthermore, the results indicate a positive relationship between perceived personalization and both cognitive experiential state ($\beta = .248$, $p \leq .001$) and affective experiential state ($\beta = .446$, $p \leq .001$), supporting *H2a* and *H2b*. In addition, cognitive experiential state ($\beta = .536$, $p \leq .001$) and affective experiential state ($\beta = .174$, $p \leq .001$) were positively related to psychological ownership, which in turn was strongly related to users' intention to use the premium version of the music streaming service ($\beta = .584$, $p \leq .001$). Consequently, *H5a*, *H5b*, and *H6* were support-

ed. Bootstrapping analysis using 5,000 samples (Hayes 2013) confirmed that psychological ownership mediates the relationship between cognitive experiential state and intention to use premium ($a \times b$ = .382, 95 % CI [.303, .469], $p \leq .001$) as well as affective experiential state and intention to use premium ($a \times b$ = .202, 95 % CI [.091, .327], $p \leq .001$). Before psychological ownership was inserted into the model, cognitive experiential state (β = .317, $p \leq .001$) and affective experiential state (β = .213, $p \leq .001$) were positively related to intention to use premium. After psychological ownership was inserted into the model, cognitive experiential state's positive effect became non-significant (β = .059, p = .179), indicating full mediation, and affective experiential state's effect reduced (β = .130, $p \leq .001$), indicating partial mediation. Overall, the model explained 30.3 percent of the variance in cognitive experiential state, 49.4 percent of the variance in affective experiential state, 41.7 percent of the variance in psychological ownership, and 51.1 percent of the variance in premium usage intention.

To investigate the moderating effect of trust on the impact of perceived humanness (*H3a/b*) and perceived personalization (*H4a/b*) on both user experience constructs, we applied multi-group analysis (Byrne 2001). As an appropriate method in case of relationships among latent constructs (El-Manstrly 2016; Homburg and Giering 2001), multi-group analysis has been extensively used in marketing as well as service management literature (e.g., Bello et al. 2010; El-Manstrly 2016; Huang and Chen 2016; Hwang 2016; Ngo et al. 2016). Accordingly, a median split (median$_{trust}$ = 4.00) was conducted to separate the data set into two groups for the moderator variable (*low trust*: n = 275, M = 2.951; SD = 1.034; *high trust*: n = 239, M = 5.368; SD = 0.741). To test for specific moderating effects, the change in Chi-square between a restricted model, which constrains the relevant path, and an unrestricted model, which allows parameters to vary freely between the two groups, was compared. As shown in *Tab. 4*, the positive relationship between perceived humanness and cognitive experiential state was significantly stronger ($\Delta\chi^2_{(1)}$ = 11.352, $p \leq .001$) for users with high trust (β = .471, $p \leq .001$) compared to users with low trust in the service (β = .185, $p \leq .01$), supporting *H3a*. The results further revealed that trust in the service moderates the relationship between perceived humanness and affective experiential state ($\Delta\chi^2_{(1)}$ = 5.022, $p \leq .05$). The positive relationship was stronger for user with high trust in the service (β = .441, $p \leq .001$) than for users with low trust (β = .259, $p \leq .001$). Thus, *H3b* was also supported. In *H4a*, it was assumed that the positive relationship between perceived personalization and cognitive experiential state is positively moderated by users' trust in the service. This hypothesis could not be supported ($\Delta\chi^2_{(1)}$ = .272, $p > .05$). However, the results indicated that trust in the service moderates the relationship between perceived personalization and affective experiential state ($\Delta\chi^2_{(1)}$ = 7.7, $p \leq .01$). The positive relationship was stronger in the case of higher trust in the service (β = .439, $p \leq .001$) than in the case of lower low trust (β = .368, $p \leq .001$), supporting *H4b*.

Path	Path coefficient	Result
Hypotheses		
H1a. Perceived Humanness → Cognitive Experiential State	.384***	supported
H1b. Perceived Humanness → Affective Experiential State	.380***	supported
H2a. Perceived Personalization → Cognitive Experiential State	.248***	supported
H2b. Perceived Personalization → Affective Experiential State	.446***	supported
H5a. Cognitive Experiential State → Psychological Ownership	.536***	supported
H5b. Affective Experiential State → Psychological Ownership	.174***	supported
H6. Psychological Ownership → Intention to Use Premium	.584***	supported
Control variables		
Music Streaming Usage → Cognitive Experiential State	-.067$^{n.s.}$	-
Music Streaming Usage → Affective Experiential State	-.059$^{n.s.}$	-
Music Streaming Usage → Psychological ownership	.132**	-
Music Streaming Usage → Intention to Use Premium	.108**	-
Spotify Usage → Cognitive Experiential State	-.008$^{n.s.}$	-
Spotify Usage → Affective Experiential State	-.027$^{n.s.}$	-
Spotify Usage → Psychological Ownership	-.002$^{n.s.}$	-
Spotify Usage → Intention to Use Premium	.216***	-
Music Involvement → Psychological Ownership	-.003$^{n.s.}$	-
Music Involvement → Intention to Use Premium	.099**	-

Notes: *** $p \leq .001$, ** $p \leq .01$, n.s. non-significant.

Tab. 3: Results of the structural equation modelling (direct effects)

Hypothesis	Path	Path coefficient		$\Delta\chi^2$ ($\Delta df = 1$)	Result
		Low trust (n = 275)	High trust (n = 239)		
H3a	Perceived Humanness → Cognitive Experiential State	.185**	.471***	11.352***	supported
H3b	Perceived Humanness → Affective Experiential State	.259***	.441***	5.022*	supported
H4a	Perceived Personalization → Cognitive Experiential State	.170*	.144*	.272$^{n.s.}$	not supported
H4b	Perceived Personalization → Affective Experiential State	.368***	.439***	7.700**	supported

Notes: *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$, n.s. non-significant.

Tab. 4: Results of the multi-group analysis (moderating effects)

5. Discussion and Implications

The aim of the present study was to examine the user experience of CAs in hedonic digital services. More precisely, using the example of music streaming services, we investigated antecedents of the user experience – consisting of both a cognitive and an affective experiential state – with CAs. Moreover, it was investigated whether psychological ownership towards the service might be an underlying mechanism through which a positive CA user experience increases users' intention to use the service's fee required premium version.

With regard to the antecedents, the results indicate that perceived humanness and perceived personalization of the CA positively affect cognitive experiential state and affective experiential state (*H1a/b* and *H2a/b*), which is consistent with previous research devoted to other forms of CAs indicating a positive influence of CA's human-likeness (Lee and Choi 2017; Verhagen et al. 2014; Wagner et al. 2019) and personalization (Lee and Choi 2017; Verhagen et al. 2014) on users' evaluation. In terms of CA's human-likeness, the results somewhat support the assumption of Wirtz et al. (2018) suggesting that user acceptance of CAs depends on perceived humanness. The given results are also in line with recent research findings by Wagner et al. (2019), who demonstrated that human-like characteristics have a positive effect on the likeability of speech-based CAs. Further, the results are consistent with Araujo (2018)'s findings, indicating that text-based CAs would benefit from higher humanness. Consequently, from a practical perspective, when implementing text-based CAs in hedonic digital services, providers should focus on CA's humanness. For this, human-like cues might be helpful tools. For example, recent research by Gnewuch et al. (2018) has shown that for novice users, a graphical typing indicator (i.e., three animated dots) positively affects social presence (which is related to the user's perception about the humanness of a technology (Lankton et al. 2015)) of text-based CAs. Other human-like cues, or more precisely, communication-related cues mimicking human communication styles (e.g., hello and good bye) (Araujo 2018; Wünderlich and Paluch 2017), and agent-related cues, such as a human-associated name (identity cues) or a human profile picture (visual cues) (Go and Shyam Sundar 2019; Wünderlich and Paluch 2017) might also be useful to increase CA's humanness. Furthermore, the CA should have the quality to recommend content that fits best to the users' preferences as well as the articulated and specified needs, hence, communicating effectively with the user (Lee and Choi 2017). For this, it seems to be important that the CA asks a few specific questions to receive information about the user (e.g., user's musical taste, actual situation, or current feelings). This information could be combined with other personal data that the service has previously gathered (e.g., usage patterns, demographics) in order to provide accurate recommendations. However, it should be evident, that systems providing personalized recommendations might raise users' concerns about information privacy (Kim and Kim 2018; Li and Unger 2012).

In addition, the given empirical findings suggest that CAs can greatly benefit from higher humanness and personalization when users trust the hedonic digital service. More precisely, results show that the positive effect of perceived humanness on both cognitive and affective experiential state is stronger for users with high trust in the hedonic digital service compared to users with low trust (*H3a/b*). Further, results reveal that the positive effect of perceived personalization on affective experiential state is stronger for users who highly trust the service in comparison to users with low trust (*H4b*). In contrast, trust in the service was not found to significantly moderate the impact of perceived personalization on cognitive experiential state (*H4a*). However, the given findings highlight that service providers should consider trust in their service as a crucial factor, when implementing humanized and personalized CAs. Providers of hedonic digital services are therefore advised to develop marketing strategies aimed at building trust with users. For this, providers should improve the transparency of the service, providing clear communica-

tion of the service's terms and conditions (Schumann et al. 2010; Venkatesh et al. 2016), and how media recommendations are generated (Zhang and Curley 2018). Furthermore, service providers should prominently present its privacy policy that informs users how the provider will use the (by the user) provided data, ensuring both, the user's privacy and the data security of the service (Brown and Rose 2004; Ha 2004). While doing so, service providers make users feel confident that their collected personal data is safe and that it will be used according to ethical standards (Brown and Rose 2004). In addition, since previous research demonstrated that consumers trust a well-known and familiar brand more (e.g., Ha 2004; Lowry et al. 2008), it seems to be beneficial to invest in marketing strategies in order to enhance the brand image and/or brand awareness of the service.

The empirical analysis further supports the assumption that both, cognitive experiential state (*H5a*) and affective experiential state (*H5b*), positively influence psychological ownership towards the hedonic digital service – a mental state in which users perceive the service as '*theirs*' (Pierce et al. 2003) –, which in turn increases users' intention to use the service's paid premium version (*H6*). By identifying psychological ownership as an underlying, mediating mechanism through which CA user experience leads to users' premium usage intention, we support and provide evidence of Van Dorn et al. (2017)'s theoretical proposition that a sense of ownership mediates the relationship between automated social presence (ASP) increased by robots and positive service outcomes in a service context. Our results are also in line with recent research work by Yoo et al. (2018), which indicates that interactive channels foster feelings of ownership, resulting in positive outcomes. Furthermore, the research findings are consistent with previous research devoted to psychological ownership in a service context, indicating positive behavioral outcomes that occur by ownership feelings (Asatryan and Oh 2008; Kleinaltenkamp et al. 2018; Sinclair and Tinson 2017). Based on these findings, we conclude that the introduction of text-based CAs – which have nearly zero incremental costs (Wirtz et al. 2018) – seems promising for hedonic digital services in order to alleviate the impersonal sense inherent to digital services (Verhagen et al. 2014), to provide a sophisticated system for recommending content, and to increase premium conversion rates, which is of great managerial relevance for freemium providers, such as music streaming services (Wagner et al. 2014).

From a theoretical perspective, the present study contributes to the service marketing literature in four ways. First, this research work is, to the best of our knowledge, the first study that empirically examines antecedents of the user experience with text-based CAs and its outcomes in hedonic digital services. In doing so, the study enriches the still limited research investigating text-based CAs from a marketing and/or consumer research perspective (Araujo 2018; Chung et al. 2019; Go and Shyam Sundar 2019). Second, by identifying cognitive experiential state and affective experiential state as distinct but highly correlated constructs, we contribute to recent research who provided initial evidence that online user experience consists of these two components (Rose et al. 2012). Third, we provide evidence of the mediating role of psychological ownership – which hasn't yet empirically tested in the context of CAs – in the relationship between CA user experience and users' intention to use the paid premium version of the hedonic digital services. We thereby contribute to Van Dorn et al. (2017)'s theoretical proposition that high levels of automated social presence (ASP), e.g. by using robots, lead to positive service outcomes through user's sense of psychological ownership. Further, we extend the scarce empirical research having applied the concept of psychological ownership in a service context (Asatryan and Oh 2008; Kleinaltenkamp et al. 2018), especially in digital service settings (Sinclair and Tinson 2017). Fourth, we identified users' intention to use the paid premium version of the hedonic digital service as a positive outcome of CA user experience, hence, contributing to limited empirical evidence of favourable customer outcomes of the implementation of CAs (Araujo 2018), and to existing literature focussing on premium conversion rates and users' premium usage intention of hedonic digital services applying the freemium business model (e.g., Dörr et al. 2013; Oestreicher-Singer and Zalmanson 2013; Wagner et al. 2014).

6. Limitations and Future Research

As is the case for all research, the present research work has some limitations, which can provide avenues for future research. First, each participant was shown a video sequence simulating user interaction with a realistic – based on an existing hedonic digital service – CA. It would, however, be valuable if participants can explicitly interact with an existing CA in order to maximize the validity of our results. Second, the results are based on an online survey and the data are analysed using structural equation modelling. As it is difficult to investigate the user's perception and experience purely by means of a survey, it would be worthwhile to make use of neuroscientific methods, such as functional magnetic resonance imaging (fMRI) (e.g., Dimoka 2010; Riedl et al. 2014) or functional near-infrared spectroscopy (e.g., Krampe et al. 2018a, 2018b), to also investigate users' unconscious cognitive processes. Furthermore, a 2 (humanness high vs. low) × 2 (personalization high vs. low) between-subject design might be of value in order to deepen the understanding of how the CA user experience benefits from higher humanness and personalization. In this regard, it would be also

beneficial to examine which specific cues (communication-related and agent-related cues) are decisive to increase the users' perception of humanness and/or which human-like cues positively affect the user experience. Third, we examined the user experience of CAs in hedonic digital services using the example of music streaming services. The generalizability of the results for other hedonic digital services should be considered with caution. It may therefore be valuable to replicate our findings in the context of other hedonic digital services such as video streaming services or ebook streaming services. Moreover, it might be beneficial for future research to investigate how the results change in the context of utilitarian digital services, which are considered as functional and useful (Fritze et al. 2018). Finally, we only examined perceived humanization and perceived personalization as influencing factors on the user experience with CAs. In order to increase the understanding of CA user experience, future studies might explore other potential antecedents, such as perceived social interactivity (Wirtz et al. 2018), perceived intelligence or perceived anthropomorphism (Moussawi and Koufaris 2019).

7. Conclusion

This study examined the user experience of CAs in hedonic digital services utilizing the example of music streaming services. Using structural equation modelling, the given research findings indicate that perceived humanness and perceived personalization of the CA positively affect the user experience, comprising a cognitive experiential state and an affective experiential state. The results also show that CAs can greatly benefit from higher humanness and personalization when users trust the hedonic digital service. Furthermore, psychological ownership was identified as an underlying mechanism through which CA user experience leads to users' intention to use the service's paid premium version, indicating that CAs might be valuable for hedonic digital services.

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Keywords

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