

The Perfect Match: Nonhuman-Type Avatar-Online Store Fit and Intention to Purchase

Completed Research

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Abstract

Avatars are often used in online stores to compensate for the absence of sales agents or spokespersons. Studies show that the effectiveness of the utilization of avatars in online stores depends on characteristics of avatars and on the context in which they are deployed. Unfortunately, most studies investigating the effectiveness of online store avatars have focused only on human-type avatars. Our study extends preliminary research and investigates how perceptions of avatar fit differ between different types of nonhuman avatars in the context of different online store types and how these perceptions influence purchase intention. Results from a between-subjects experiment with 149 participants show that the evaluation of fit between nonhuman-type avatar and online store depends on the type of offering in that store. Furthermore, perception of avatar fit positively impacts online store visitors' purchase intention, and this effect is mediated by an increased perception of online store quality.

Keywords

Avatars, Virtual Agents, Avatar Fit, E-Commerce, Online Stores.

Introduction

The relevance of using avatars in e-commerce settings is on the rise (Nowak and Fox 2018). Avatars are personified graphic representations in virtual environments (Holzwarth et al. 2006) and are often used in online stores to compensate for the absence of sales agents or spokespersons (Gammoh et al. 2018). IS and communication research have investigated and identified several consequences of avatar utilization in e-commerce as well as boundary conditions for the effectiveness of avatar utilization. Researchers widely agree that the utilization of website avatars comes with multiple benefits, as avatars impart a degree of perceived sociality to e-commerce and thus enhance the overall experience of online stores (Nowak and Fox 2018).

In line with the high relevance of avatars in the extant research, the question arises of how to appropriately utilize different types of avatars. Studies show that the effectiveness of avatars in online stores depends on the characteristics of avatars and on the context in which they are deployed (Nowak and Fox 2018). For example, avatars are more persuasive when their appearance, gender, or apparel matches the characteristics of the products or online stores to which they are related (e.g., Beldad et al. 2016; Liew and Tan 2018; Parmar et al. 2018). Unfortunately, most studies investigating the effectiveness of online store avatars have focused only on human-type avatars (Gammoh et al. 2018; Verhagen et al. 2014).

Studies comparing different types of avatars (e.g., human-type vs. object-type vs. animal-type etc.) indicate that individuals tend to evaluate avatars, which represent naturally animate entities, more favorably, because humans build emotional connections more easily to graphic representations of animate

entities than to those of inanimate objects (Mull et al. 2015; Nowak and Rauh 2005). Nevertheless, those studies have not considered contingency factors that may influence the effectiveness of nonhuman-type avatars. The neglect of nonhuman types of avatars in empirical studies is diametric to the many opportunities to transfer intended images and attributes for products and online stores through the appropriate design of nonhuman entities (Keeling et al. 2010; Messer et al. 2019; Stafford et al. 2002). Moreover, when it comes to developing nonhuman spokespersons such as avatars for brands and retailers, carefully using the appropriate type is especially important, because such fictional spokespersons can elicit extraordinary buzz about the brands they represent (Glenn 2013).

Our study therefore extends preliminary findings on the perceptions of different avatar types. More specifically, we investigate how perceptions of avatar fit differ between two different types of nonhuman avatars in the context of two different online store types and how these perceptions influence purchase intention. Consequently, we conducted a between-subjects experimental study with 149 undergraduate and graduate students who were exposed to online stores with different types of nonhuman avatars and offering types. Results obtained through moderated mediation analysis show that the evaluation of fit between avatar and online store depends on the type of offering in that store. Furthermore, perception of avatar fit positively impacts online store visitors' purchase intention, and this effect is mediated by an increased perception of online store quality. Our findings provide important implications for the selection of the nonhuman-type avatars in online stores, as poorly fitting configurations of avatar type and type of offering can reduce quality perceptions and, in turn, purchase intentions.

The structure of our paper is as follows: The next section of this paper summarizes the extant research on avatar effectiveness, theorizes the relevance of avatar fit, and proposes the research model. Next, the experimental study to examine our research hypotheses is described, and the results from the data analysis are reported. Finally, the discussion section highlights the contributions of our research and discusses avenues for further research.

Conceptual Background and Research Model

Website Avatars

In general, research on the utilization of avatars in e-commerce agrees that the deployment of avatars increases sociality in e-commerce settings, compensating for the lack of sales persons in virtual environments (e.g., Liew et al. 2017; Qiu and Benbasat 2009; Wang and Fodness 2010). Several studies confirm the positive consequences of endowing online stores with avatars as online sales agents or product spokespersons (Nowak and Fox 2018; Yee et al. 2007). According to social response theory, which states that humans have a tendency to treat technology as social actors, especially when endowed with social cues (Johnson et al. 2006), empirical findings show that avatars increase website visitors' perceptions of sociality (Wang and Fodness 2010). Due to increased website sociality, websites using avatars elicit positive emotional responses from visitors, including perceptions of emotional appeal or trust (e.g., Etemad-Sajadi 2016; Chattaraman et al. 2014; Qiu and Benbasat 2009; Liew et al. 2017). Furthermore, evidently these perceptions of social presence and the resulting affective responses by website visitors simply occur with the mere presence of website avatars, and these effects are not necessarily larger when avatars are animated to interact with website visitors in a natural manner (Yee et al. 2007).

Due to infusing social presence and eliciting positive affective responses, the use of online store avatars increases the overall online shopping experience (e.g., Keeling et al. 2010; Wang et al. 2016). Furthermore, studies show that the use of avatars in online stores produces favorable evaluations of the brands and products presented therein (e.g., Holzwarth et al. 2006; McGoldrick et al. 2008). Moreover, websites using avatars are perceived as more satisfying (Wood et al. 2005) and lead to higher purchase intentions (e.g., Holzwarth et al. 2006; Moon et al. 2013).

Avatars can be classified as realistic representations of humans, naturalistic human-like representations of agents, or as cartoonish and abstract representations of agents (Salem and Earle 2000; Gammoh et al. 2018). Most studies investigating the effects of avatars on websites focus on realistic or naturalistic human-type avatars (e.g., Gammoh et al. 2018; Holzwarth et al. 2006; Verhagen et al. 2014; Wöfl and Feste 2018). The relevance of human-type avatars in academic research is consistent with findings from

studies on avatar types that suggest that human-type avatars elicit the most positive responses from humans. More specifically, it was found that individuals tend to evaluate human-type avatars as more attractive, credible, and trustworthy and thus favor human-type avatars over abstract nonhuman-type avatars (Jin and Bolebruch 2009; Mull et al. 2015; Nowak and Rauh 2005). The extent of the human-like appearance of an avatar is directly linked to its favorable evaluations (e.g., Nowak et al., 2009; Stein and Ohler 2018; Westerman et al. 2015).

Humans tend to build a stronger bond with avatars representing animate beings at a basic biological level (Nowak and Fox 2018), which results in an evaluation of the online environment's sociality, represented by the avatar (Nass and Moon 2000; Nowak 2015). The extent to which humans develop emotional connections to nonhuman agents such as avatars depends on the degree to which those agents are perceived as animate and are endowed with mental abilities (Nowak and Fox 2018). This reasoning is supported by empirical findings which show that, on average, avatars representing naturally animate entities such as animals or humans receive more positive evaluations than do naturally less animate avatars such as humanoids or everyday objects (Mull et al. 2015; Nowak and Rauh 2005).

These evaluations of different types of avatars have been investigated without specific consideration of the context of avatar utilization, although abstract nonhuman characters provide many opportunities to transfer intended image and attributes of products, brands, and retailers to their target audience (Keeling et al. 2010; Stafford et al. 2002). Thus, we extend those findings and examine the fit of more abstract nonhuman-type avatars with the context of utilization, depending on different online store types.

Relevance of Avatar Fit

Research has long dealt with the relevance of fit of product endorsers (e.g., Kamins 1990; Kamins and Gupta 1994; Till and Busler 1998). Those studies provide compelling evidence that endorsers of brands and products are most effective when the characteristics of the endorser match the endorsed brand or product. This matchup hypothesis is also applicable in the e-commerce context and states that a correct matchup between online environment and endorsed products influences customer attitudes and purchase intentions (e.g., Keeling and McGoldrick 2008; Wood and Solomon 2008).

So far, empirical research that focused on the fit of avatar type with the context of avatar utilization has used only human-type avatars and investigated avatar design features related to appearance (Holzwarth et al. 2006; Lee et al. 2015; Liew and Tan 2018; Parmar et al. 2018), communication style (e.g., Keeling et al. 2010), or gender (Beldad et al. 2016). Results from those studies indicate that avatar-context fit is decisive for avatars to be effective. For example, the study from Beldad et al. (2016) showed that the congruence between avatar gender and product gender (e.g. female avatar providing advice about a feminine product) positively influences customer perceptions of information credibility, avatar and website trustworthiness, and purchase intention. Regarding the nature of the information provided by the avatar, research shows that a task-oriented communication style is more effective for search goods while a socially oriented communication style is most effective for credence goods (Keeling et al. 2010). Furthermore, avatar appearances designed to transfer expertise are more effective (Parmar et al. 2018), especially for customers with high product involvement, while attractive avatars are more effective for customers with low product involvement (Holzwarth et al. 2006). Avatars introduced as specialized to the context elicit stronger information credibility, website trust, and purchase intention (Liew and Tan 2018). These findings on the fit of characteristics of human-type avatars suggest that, in general, avatars are more effective when their specific characteristics match their context of utilization. Based on these findings, we propose a research model that examines the fit of different types of nonhuman avatars with different types of products offered in an online store website.

Research Model

To examine the relevance of fit of nonhuman avatar types with their context of utilization, we propose a research model that investigates the combination of avatar type with product type offered on an online store website and how this interaction relates to purchase intention. Therefore, we investigate whether the perceived fit differs between two nonhuman-type avatars (i.e., pet-type avatar and robot-type avatar) for two different types of online store offerings (consumer electronics vs. wellness tourism). In accordance with the matchup hypothesis (e.g., Wood and Solomon 2008), we assume that the perceived fit of

nonhuman-type avatars depends on the combination of avatar type and online store type. More specifically, we assume that perceived avatar fit is higher for robot-type avatars used in online stores selling consumer electronics than in online stores offering wellness tourism. Moreover, perceived avatar fit for pet-type avatars should be higher for online stores offering wellness tourism than in online stores offering consumer electronics. As both consumer electronics and robots relate to the realm of technology, a match should be perceived between those types of avatars and products. Contrarily, as pets and wellness treatments share an emotion-oriented dimension and relate to humans' physical and emotional well-being (e.g., Bender et al. 2002; Chandler et al. 2015), a perceived fit should arise between those types of avatars and online stores. Thus, our first hypothesis reads as follows:

Hypothesis 1: The perceived fit of nonhuman-type avatars depends on the combination of avatar type and online store type such that perceived fit is higher for robot-type avatars (vs. pet-type avatars) in online stores offering consumer electronics than in online stores offering wellness tourism.

Website visitors take multiple aspects of websites into account to form overall impressions about website quality (e.g., Everard and Galletta 2005). Such an aspect could include perceived avatar fit. Thus, we assume that the perceived fit of the website avatar can serve website visitors as an informational cue that helps them in evaluating overall website quality. As prior research has shown, evaluations of websites are more positive when the avatar fits the characteristics of the website (e.g., Beldad et al. 2016; Liew and Tan 2018). Based on those findings, we formulate the second hypothesis of our research model:

Hypothesis 2: Perceived avatar fit positively impacts perceptions of website quality.

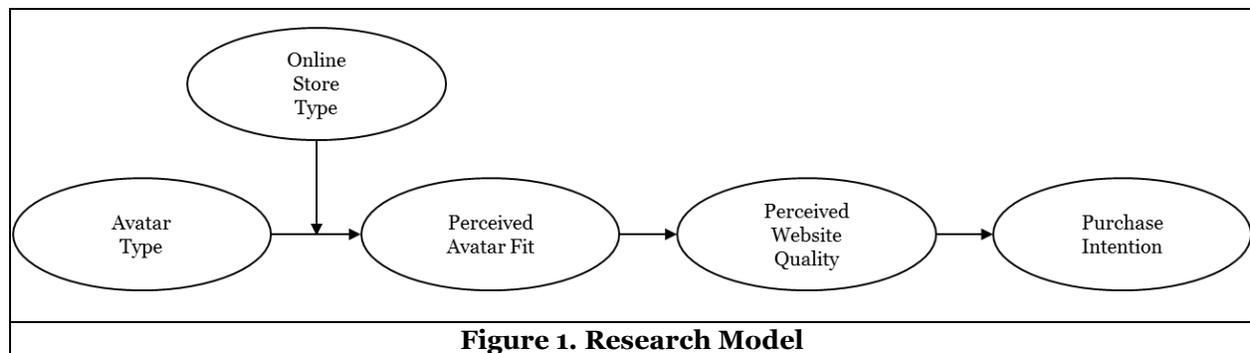
Finally, several studies highlight the relevance of perceived website quality for purchase intention in online stores (e.g., Everard and Galletta 2005; Jarvenpaa et al. 2000; Chen et al. 2010). As many customers perceive several risks in online shopping (Jarvenpaa et al. 2000), website quality enables the reduction of perceived risks, eventually heightening purchase intention in online stores (Oliveira et al. 2017). Following this line of research, we posit our third hypothesis:

Hypothesis 3: Perceived website quality positively affects purchase intention.

Summarizing our research model, we hypothesize that the type of nonhuman avatars exerts an influence on purchase intention in online stores when the avatar type matches the type of online store related to the offerings in the online store. The appropriate combination of online store type and avatar type should result in increased perceived avatar fit, which can serve as a cue for evaluating overall website quality. Finally, perceived website quality is a key factor of purchase intention in online stores. Our final hypothesis summarizes this causal chain:

Hypothesis 4: The interaction between avatar type and online store type influences purchase intention in online stores. This influence is mediated by perceptions of the avatar fit and by perceived website quality.

Figure 1 depicts a graphical illustration of our research model.



Empirical Study

Design and Participants

To investigate the relevance of avatar fit for website evaluation and purchase intention, we set up a 2x2-factorial (avatar type: pet-type vs. robot-type; online store type: consumer electronics vs. wellness tourism) between-subjects experimental study with undergraduate and graduate students from Germany. 149 participants took part in the experiment. Approximately of 58% of participants were female. The mean age of the sample was 25.6 years (SD = 6.8). Participants were randomly exposed to one of the four experimental conditions, so that age and gender are equally distributed across all four conditions.

Stimulus and Procedure

To investigate our research hypotheses, we created two fictional online stores that discriminate on the basis of the products sold by the stores. One online store, selling wellness tourism, shows the offering of a wellness week, while another online store, selling consumer electronics, shows the offering of a smart TV. We choose the wellness week and the smart TV as provided products on the websites because they allow identical price levels (i.e., €499) so that price level is no confounding variable in our analysis. The overall layout of the online stores was identical and oriented towards the regular style of online stores. On each of the two websites, we placed an avatar (either pet-type or robot-type) at the lower right corner as a presenter of the product price. To meaningfully integrate the avatar into the overall appearance of the online store, we embedded the avatar as a presenter of the price tag. Except for presenting the price tag for the offered product, the avatar did not further interact with website visitor. We consciously decided upon a non-interactive avatar to isolate on the consequences of the type of avatar.

The participants were invited to the online-experiment via university-related online social networks and asked to participate in a study about the perception of online stores. As an introduction, an imaginary frame was created by requesting them to view the experimental website carefully and to put themselves in the position of browsing for the product presented. In order to focus the investigation on the graphical display of avatars, no further interaction between the participants and the websites took part. In the following, participants answered questions about their impressions of the online store, the avatar, and their intention to purchase. Figure 2 shows the experimental websites.

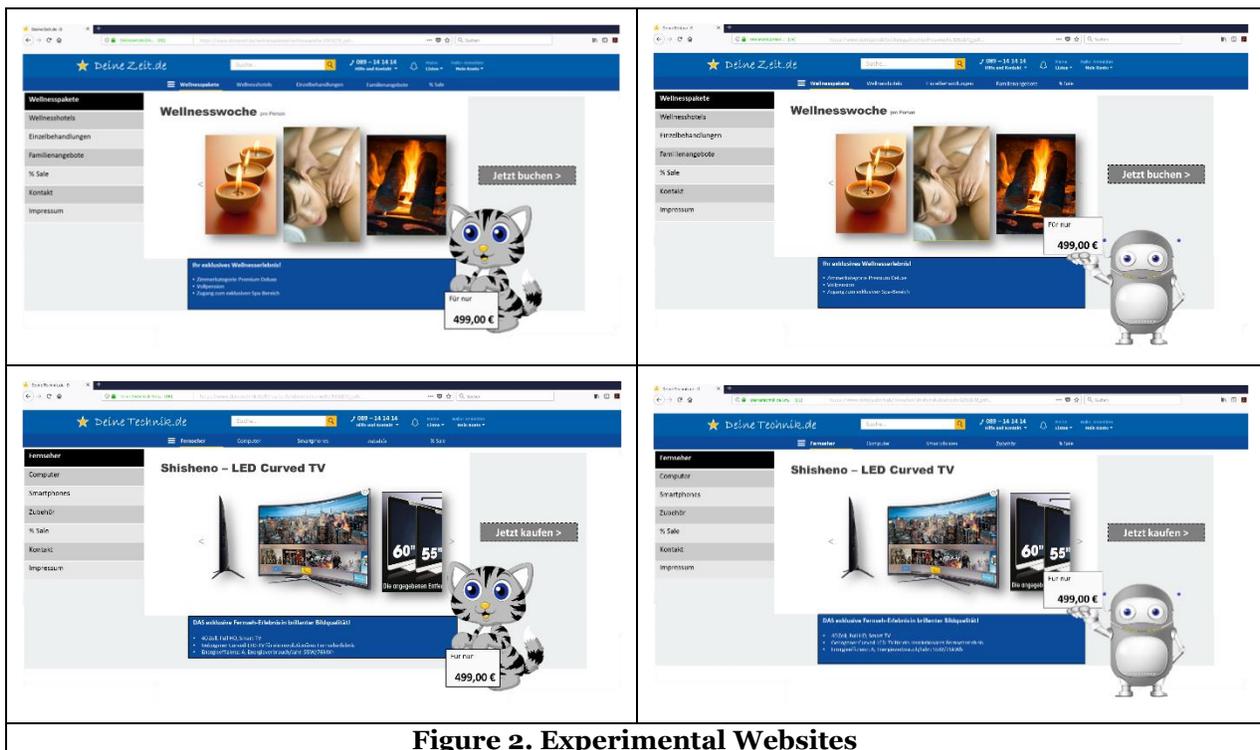


Figure 2. Experimental Websites

Construct Measures

We used existing measurement instruments that have been developed and validated in previous scientific studies to measure the constructs of interest. We adapted two items developed by Kim and John (2008) to capture website visitors' perceived fit of the shown website avatar. We used an established scale of four items developed by Yoo and Donthu (2001) that has been used in prior studies (e.g., Everard and Galletta 2005) to measure website visitors' perception of website quality. Finally, we used three items proposed by Everard and Galletta (2005) to measure visitors' intention to purchase from the website. All items were presented on seven-point Likert-type agreement scales.

We assessed the reliability and validity of the measurement instruments by analyzing the construct measures via confirmatory factor analysis (CFA) using SPSS Amos 25 and by assessing the overall model fit as well as criteria for the internal structure of the measurement model (e.g., Bagozzi and Yi 1988). Results from CFA showed satisfactory overall model fit, as multiple indices met the suggested thresholds ($\chi^2/df = 1.47$; CFI = 0.99; TLI = 0.99; RMSEA = 0.06; SRMR = 0.03). Furthermore, we calculated additional parameters to evaluate validity and reliability of the construct measures. The results of these analyses confirmed the convergent validity and reliability of the measurement instruments. The average variance extracted (AVE) of the construct measures ranges between 0.72 and 0.90 and thus exceeds the proposed threshold of 0.50 (Bagozzi and Yi 1988). Composite reliability (CR) values range between 0.91 and 0.96 and are thus beyond the threshold of 0.6 (Bagozzi and Yi 1988). Cronbach's alpha (α) for each construct measurement exceeds the commonly accepted threshold of 0.7 (Nunnally 1978). Furthermore, the highest squared correlation between any pair of construct measure is 0.56 and thus below each AVE of any construct, indicating discriminant validity (Fornell and Larcker 1981). Finally, the lowest factor loading of any item is 0.74, pointing to very good indicators for measuring the constructs of interest. Overall, the results obtained through CFA indicate satisfying quality of the measurement model. Table 1 provides the indicators used in our study and summarizes the reliability and validity criteria of those construct measures.

Table 1. Information on Construct Measures
Avatar Fit (AVE=0.90; CR=0.95; α=0.94)
7-point Likert-type agreement scale ranging from 1 = "completely disagree" to 7 = "completely agree" – The avatar fits to the offered product. – The avatar is consistent with the offered product.
Perceived Website Quality (AVE=0.72; CR=0.91; α=0.90)
7-point Likert-type agreement scale ranging from 1 = "completely disagree" to 7 = "completely agree" – This website is of high quality. – The likely quality of this website is high. – This website must be of very good quality. – This website appears to be of very poor quality. (reverse coded)
Purchase Intention (AVE=0.90; CR=0.96; α=0.96)
7-point Likert-type agreement scale ranging from 1 = "completely disagree" to 7 = "completely agree" If I would like to buy this product, ... – ... I would consider purchasing it from this online store. – ... I would purchase it from this online store. – ... I would expect to buy it from this online store.
Notes: α = Cronbach's α ; CR = composite reliability; AVE = average variance extracted

Results

We analyzed the data from the experimental study using regression analysis. Technically, our research model represents a moderated mediation model because we are interested in the effect of avatar type on purchase intention from the website, mediated by perceived avatar fit and website quality and whether this causal chain is moderated by online store type. We used the macro PROCESS v3.1 for SPSS as

provided by Hayes (2018), which allows for comprehensive analysis of conditional process models. Prior to the regression analysis, we combined all multi-item constructs into average scores.

We used Hayes' (2018) model 83 for the analysis. Avatar type was entered as a binary independent variable (1 = robot-type avatar), and online store type was entered as a binary moderator (1 = consumer electronics). Furthermore, we entered perceived avatar fit as the first-stage mediator and perceived website quality as the second-stage mediator. Intention to purchase from that online store was the dependent variable of the analysis. In order to draw statistical inferences about the indirect effects of our model, we followed a bootstrapping approach as suggested by Preacher and Hayes (2008), drew 5,000 bootstrap samples, and calculated 95% bias-corrected confidence intervals (CI). Additionally, we probed the direct effect of avatar type on perceived avatar fit and the indirect effect on purchase intention for both online store types (Hayes 2015).

Our first hypothesis predicts that the relationship between avatar type and perceived avatar fit is moderated by online store type such that a robot-type avatar is perceived as more fitting for online stores offering consumer electronics than is a pet-type avatar. Furthermore, we expect that a pet-type avatar is perceived as more fitting for online stores offering wellness tourism than is a robot-type avatar. Results from the moderated mediation analysis show no significant main effects of avatar type or online store type on perceived avatar fit (both $p > 0.1$), but they do show a significant positive interaction effect between avatar type and online store type ($b = 1.87, p < 0.01$). An inspection of the conditional effects of avatar type on avatar fit in both online store conditions reveals that avatar type has no significant effect on avatar fit in the wellness online store condition ($b = -0.39, p = 0.29$), but the robot-type avatar is significantly stronger perceived as fitting in the consumer electronics online store condition ($b = 1.48, p < 0.01$). Thus, these results confirm our first hypothesis, at least partly.

The second hypothesis predicts that perceived avatar fit is an important determinant of perceived website quality. Results from the regression analysis support this assumption, as we found a significant positive effect of perceived avatar fit on perceived website quality ($b = 0.29, p < 0.01$). Drawing on prior studies, our third hypothesis predicts that perceived website quality positively affects intention to purchase from that website. Again, the results obtained from the data analysis support this assumption, demonstrating a positive strong and significant effect of website quality on purchase intention ($b = 0.79, p < 0.01$).

Finally, we hypothesize that avatar type influences purchase intention through perceived avatar fit and perceived website quality and that this effect is dependent on online store type. Therefore, we probed the indirect effect of avatar type on purchase intention mediated by avatar fit and website quality for both online store types, drawing on 5,000 bootstrapping samples (e.g., Hayes 2015). The results show that there is no significant indirect effect in the wellness online store condition ($b = -0.09; CI [-0.29; 0.05]$). A significant indirect effect of avatar type on purchase intention can be observed in the consumer electronics condition, mediated by avatar fit and website quality ($b = 0.34; CI [0.12; 0.62]$), such that there is a higher purchase intention for the robot-type avatar than for the pet-type avatar. Overall, these results partly confirm our research model.

Discussion

The findings from our research provide important contributions to the academic research. First, our results contribute to a deeper understanding of the effects of the utilization of different nonhuman-type avatars. Our results are in line with recent research showing that online store avatars are most effective when specialized with regard to the online store (Liew and Tan 2018). Furthermore, our study goes beyond the findings of the investigation of human-type avatars. We show that also in the application of nonhuman-type avatars, the utilization of nonhuman-type avatars is most effective when the avatar type matches the type of offering in the online store and is thus specialized to the context of application. Moreover, as prior research has focused mainly on the usage of human-type avatars, our findings explore the effects and boundary conditions of the utilization of nonhuman-type avatars. In doing so, our results build on initial studies on the evaluation of different avatar types (Mull et al. 2015; Nowak and Rauh 2005) and propose an important contingency factor – that is, the type of offerings in an online store. This study thus extends existing knowledge on the consequences of different avatar types and delineates in greater detail the effects of nonhuman-type avatars depending on the context of application. Furthermore, beyond extant knowledge on the perception of different types of avatars, our results contribute to the

research by showing how avatar types relate to purchase intention in online stores and how this relationship is mediated by perceived avatar fit and website quality. Thus, we complement studies showing that avatars are evaluated regarding attractiveness (e.g., Mull et al. 2015; Nowak and Rauh 2005; Qiu and Benbasat 2009), credibility (e.g., Holzwarth et al. 2008; Liew et al. 2017; Mull et al. 2015), and professionalism or expertise (e.g., Lee et al. 2015; Liew and Tan 2018; Parmar et al. 2018); further, we propose the perception of avatar fit as another important mechanism that enhances avatar effectiveness.

The results obtained through our research also provide interesting insights for website operators and online retailers. The findings suggest that it can benefit online retailers to utilize avatars linked to the type of offering in the online store, as these avatars increase perceptions of fit and subsequently evaluations of website quality. Thus, practitioners are well-advised to select avatar types that fit the overarching theme of their online stores. For example, foxes might fit with stores selling books and education, while jaguars may be a better choice for online sports retailers. For avatars to be perceived as fitting to the retailer, their selection and design should be inspired by the products the avatars are to represent.

Despite the substantial contributions made by our research, there is nonetheless a need for further research, as our study faces certain limitations. First, our study considers only a limited number of nonhuman avatar types and online store types. Therefore, further studies are needed to validate our findings in different settings with additional types of avatars and online stores. Such research could provide additional insights concerning which avatar types are most effective for different online store types. Furthermore, as our research focused on examining non-interactive avatars, further research could examine interaction effects between nonhuman avatar types and the different roles that can be fulfilled by avatars (McGoldrick et al. 2008). Perhaps the fit of an avatar is perceived differently depending on whether the avatar provides product information or leads a visitor through a payment process, for example. Moreover, our study utilized a very basic design of online stores. Additional research is undoubtedly needed to generalize our findings and explore the interplay between different avatar types and online store types with regard to additional common features of online stores such as, for example, the retailer brand, cost information, customer support, or display of cost information. Finally, and importantly, further studies should explore the interplay between nonhuman avatar types and additional design features of those. As recent studies indicate, even subtle cues such as face ratios can significantly impact the perception of nonhuman characters (e.g., Messer et al. 2019; Wöfl and Feste 2018). Such research fuels the assumption that the consequences of avatar design occur not only due to major design categories but also due to minor design facets of which their creators are often not aware. Thus, future research endeavors should illuminate the interplay between major design categories such as avatar types and more subtle design dimensions to provide a more detailed picture of the consequences of avatar design and implementation.

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