Voicing Brands: Users' choice of recommended brands in voice commerce and e-commerce

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Abstract

In recent years, traditional e-commerce has been complemented by voice commerce where interaction between the user and the information system takes place by means of a voice assistant (VA) instead of written text-based conversation. The audible interaction results in an altered consumer behavior during the customer journey which can impact final product and brand choice. The study at hand acknowledges the higher perceived difficulty of interacting in voice commerce. Against this background, we investigate in what way a VA's brand recommendation impacts a consumer's purchase decision in voice-based interaction compared to text-based interaction and how this decision is moderated by prior brand preferences. The results obtained from an online survey with a quasi-experimental design show that a brand recommendation alone does not increase likelihood of brand choice, however a recommended brand is more likely chosen in a voice-based interaction than a text-based one. A priori brand preferences moderate the impact of the voice-based recommendation in case of the recommended brand. The findings imply that voice commerce can strengthen but not replace existing brand preferences in the purchase decision-making process.

Keywords: Voice assistant, voice commerce, e-commerce, brand preference, recomendation

1. Introduction

Human interaction with information systems is not limited anymore to typing alone. Numerous technological devices either include or are dedicated to voice-based interactions and thus establish conversational agents, often implemented as a voice assistant (VA) or voice-activated personal assistant (Branham and Mukkath Roy, 2019). Most often used in connection to a mobile device, but also operated as a dedicated device (Guy, 2018), these VAs are becoming integrated into our daily lives and serve multiple purposes, such as simple search queries, keeping track of to-do lists, reminding users of upcoming events and meetings, and, if given permission, shopping on the users' behalf (Feng, Fawaz, and Shin, 2017). The way that VAs disrupt consumer-device interactions and consumer-brand communications calls for academic research since it can largely alter consumer behavior in an e-commerce context (Mari, 2019). The effects of the growing acceptance of voice search on a brand's rankings in search engines are being considered in related research, proposing to companies and brands to adapt their search engine optimization and search engine advertising strategies in order to respond to a changing consumer behavior (Rehkopf, 2019). In their very nature, VAs are more natural for humans to communicate with, since they utilize the spoken word, present a faster and hands-free (Branham and Mukkath Roy, 2019) way of searching the Internet. VAs may even almost become equated to real humans due to their real-time adaptation to the way people speak to them (Kietzmann, Paschen, and Treen, 2018).

When being applied for product search, VAs can establish a direct consumer-brand touchpoint which companies can leverage in order to increase awareness, loyalty and likeability of a brand among present and potential customers alike (Mari, Mandelli, and Algesheimer, 2020; Moriuchi, 2019). By doing so, different brands can shape brand preferences which in turn determine the commercial success of the brand (Lowry, Vance, Moody, Beckman, and Read, 2008). When looking towards voice commerce and the application of VAs, there are still research gaps in how brand preference is exhibited when consumers are attempting to make a purchase decision while interacting with a VA. A specific characteristic of shopping via voice commerce is that the purchase decision is not entirely with the user, but being influenced by the choice of the VA which presents brands based on search algorithms, user ratings and previous purchases. Hence, VAs exert a gate-keeping function in relation to the brands, as the purchase decision, by which consumers indicate brand loyalty (Tsai, Chang, and Ho, 2015), will often be left up to the VA (Kaplan, 2018). Even if brand preference is to persist, when shopping via voice, consumers are presented with a situation where they are no longer able to peruse many singular brands, compare their prices and packaging directly, but with an imaginary "shelf", from which it is more difficult to make a purchase decision from. Such a product recommendation consists only of the VA reading out the brands and product descriptions, which in turn causes even more reliance on the VAs recommendations in regard to possible purchase options.

The cognitive load is higher for consumers when they are presented with a voice commerce setting compared with written text. This leads the consumers to be more likely to choose the VA's recommendation (Munz and Morwitz, 2019). In voice commerce, the consumer has to remember the proposed brand choices and then choose the preferred brand based on what has been stored in the short-term memory. In contrast, in a visual presentation (e.g., text-based), any memorization is barely required as the proposed brands are displayed simultaneously. As a result, voice-based recommendations lead to a heightened cognitive load as memory, presentation bias, and the VA's potentially biased product recommendation all affect the choice of the consumer.

The study at hand aims at investigating how the consumer journey stage of purchase within voice commerce compares to e-commerce with a visual, text-based brand proposition. The study builds on the work by Munz and Morwitz (2019) by investigating the role of brand preference in addition to the pure effects of making a purchase via a VA or via written text, as would be the case in classical e-commerce. In particular, we aim to add to the existing body of research regarding voice commerce by determining whether VA recommendations within a voice commerce setting might not be as readily accepted when a brand preference is established, therefore constituting that brand preference to a given product can combat the users' tendency to follow VA's recommendations. Hence, we address the following research question: How does the purchase recommendation of a voice assistant impact a consumer's purchase decision and what role do a priori brand preferences play in this decision process?

After a review of related work on VAs and voice commerce in the following section, the research framework with the hypothesis development is presented in the subsequent section. Section four outlines the research design of an online survey among 209 participants that has been employed to test the research framework. Section five presents the results which are discussed in terms of research and managerial implications in section six.

2. Literature Review

2.1 Voice Assistants
A VA is a voice-activated technology that utilizes software agents, i.e., speech recognition software systems, based on artificial intelligence, that conduct communication with users in a natural language (Jiang, Jeng, and He, 2013). This way, VAs allow the interaction between humans and computers by

talking with them (Hoy, 2018). Patterns and nuances of human speech can be continuously adapted and improved through natural language processing (Kietzmann et al., 2018). The similarity of VAs with real, human counterparts establishes a substantial advantage that resulted in a high degree of adoption (Han and Yang, 2018).

Human-computer interaction with VAs is characterized by several key features that distinguish it from interaction by other means. First, speaking and listening is an easier way of communication than writing or reading. It is also a faster way of asking for information, as an average person can speak 150-160 words per minute, but can only type around 41 words (Rehkopf, 2019). The cognitive load in communication with a VA is equivalent to the one in a conversation with a human (Strayer, Cooper, Turrill, Coleman, and Hopman, 2017). The simplicity of a conversation with a VA, compared to visual information exchange, is further enhanced by a hands-free access (Branham and Mukkath Roy, 2019). This allows for multitasking activities with voice queries on the go or while other activities are carried out, such as cooking (Guy, 2018). Another key feature of VAs is people's tendency to humanize such systems, due to the notion of media equation, which states that humans apply the same rules and sentiments that govern human-to-human interaction onto interactions between a person and a machine, resulting in a parasocial relationship, i.e. a relationship between the user and the VA which is perceived as being like a two-way human-to-human interaction (Liew and Tan, 2018; Whang and Im, 2021). Human-likeness is being attributed when a machine resembles a human, either in a visual or audible way (Robert, 2017). The tendency to humanize VAs also heightens users' satisfaction with performance, feeding into their readiness to interact with these machines further (Branham and Mukkath Roy, 2019). On the other hand, there are factors which can make users reluctant to use VAs as they can disclose personal information in the process. Privacy concerns, security problems, and resulting trust issues have been identified as adoption and usage inhibitors (Bawack, Wamba, and Carillo, 2021). Expectations on the performance which are higher than their actual capability can leave users disappointed and reluctant to interact with them further (Pradhan, Mehta, and Findlater, 2018). A diminishing level of trust towards VAs and resulting adoption has also been observed in case of a failure to understand a given question or command (Branham and Mukkath Roy, 2019).

2.2 E-Commerce, Voice Commerce, and Voice Search
In a shopping context, VAs can play a significant role in the stage of product search and evaluation of alternatives. When shopping in a physical store, consumers are presented with a shelf full of choices from which to pick the product they want to buy. This experience is affected by a consumer's consideration set, meaning that they are more likely to draw from a set of brands they already know well and have developed a particular preference for (Yoo, Park, and Kim, 2018). Shopping in a physical store allows consumers to compare prices easily, therefore determining which brands to include within their immediate consideration set, with the products standing next to each other and the prices being listed just below them. In e-commerce, many of the aforementioned factors become obsolete. Despite often comprehensive product descriptions and images, a consumer cannot know what the item really is like until it is delivered. In this regard, product descriptions are an important factor for product recognition and serve as one of the main touchpoints between brand and consumer (Mou, Zhu, and Benyoucef, 2020).

The consumer experience changes yet again in the situation of voice commerce as consumers show more trust in the VA and allow it to make the purchase instead of directly choosing a brand or product themselves. Product descriptions might affect voice commerce differently than e-commerce as the product description is read out to the consumer instead of the consumer reading it themselves (Mou et al., 2020). The choice between two products is more difficult for a consumer when presented in an auditory manner as opposed to when it is presented in the learned form of written text (Munz and Morwitz, 2019). Voice comparisons require a larger cognitive load for the user because they require a person's memory to be used more actively. The consumer has to remember all suggested products and

then make the pick as opposed to the choices presented via text, where barely any memory is required as the two kinds of information are presented simultaneously (Munz and Morwitz, 2019).

Hence, VAs have a limited set of options to work with, as they cannot present a user with an entire page filled with all kinds of possible answers or options for a given search query. The way VAs determine which brand to purchase for a consumer is referred to as "incidental loyalty". It implies that consumers tend to shift away from specific brands by allowing the VA to choose the brand instead (Kaplan, 2018). Therefore, the algorithm that "dictates" a VA's recommendation is not only affected by a classical type of search engine ranking, whereupon the most relevant or most advertised result shows up first but is also governed by past purchases or even the operating system to which the VA belongs.

To bypass a VA's incidental loyalty, brands can invest in search engine optimization in order to become ranked higher or even on top of the VA recommendations. One constant hurdle to this attempt is VA's bias towards their makers (e.g., Amazon) since the underlying algorithm is determined to recommend private labels or other favored products more strongly than others, which may result in largely foregoing the organic ranking of a given item (Mari, 2019).

When a brand and its product are stripped to being merely a sentence read by a robotic voice, it is key that the customer recognizes the brand by name and reputation, sees the product in front of their eyes even in absence of the physical packaging, and enforces their brand preference over the assistant's bias towards their own ecosystem, search rankings, and competitor brands, thus emphasizing the importance of brand knowledge and brand loyalty. Marketers therefore need to adapt to the alterations to a brand's touchpoints with the consumer that are being caused by the rise of voice search.

3. Hypotheses Development

In an empirical study, Munz and Morwitz (2019) found that voice commerce purchase decision tasks are perceived more difficult as they require more information processing capacities and memory. This would imply that not only does voice commerce create a higher cognitive load for the participants, but that the participants are also aware of the difficulty of decision making that comes with such an interaction with a VA. Hence, we seek to replicate this notion in the present study and hypothesize:

H1: Users rate the voice condition as more difficult to navigate than users within the written condition.

Since voice commerce is a result of voice search, by which search queries are posed in the form of spoken words and directed towards a given VA (Van Bommel, Edelman, and Ungerman, 2014), it applies the principles of search engines and thus, the user tendencies exhibited in classical search contexts are expected to also hold true in voice search. In text-based searches, the vast majority of users only considers results on a search engine's first page after a keyword search (Nagpal and Petersen, 2021), hence, the order of recommendations matters largely. In voice search, this tendency should be further underlined by the findings of Munz and Morwitz (2019), by which users choose to purchase the first option recommended to them by a VA. Therefore, we hypothesize for the written and voice setting:

H2: Users are more likely to choose a recommended purchase option over a non-recommended one.

Given the cognitive load of voice search, which is caused by the interaction with a VA, consumers are expected to be more likely to accept the VA's recommendation over a second proposed option (Munz and Morwitz, 2019). It is therefore expected that participants of the present research will choose the recommended option more frequently in the voice condition than in the written condition.

H3: Users are more likely to choose a VA's product recommendation in the voice-based setting than in the written setting.

Marketing research has pointed at the relevance of brand preference in consumer behavior. Brand preferences constitute the basis for consumer purchase decisions (Tolba, 2011; Tsai et al., 2015) and result from consumer's prior interactions and experiences with a given brand and the perceived quality of a given brand and its products and services (Tolba, 2011). Due to the difficulty of decision making that is posed by voice commerce and the absence of familiar stimuli like product images or written product descriptions (Lemon and Verhoef, 2016), we contend that brand preference will exhibit a noteworthy influence on the user's choice in a voice-based and text-based setting. Perceived human-likeness turned out to mediate the impact of a voice setting on acceptance of a recommended product due to evoking a parasocial relationship (Whang and Im, 2021). We postulate that the impact of the recommendation in both settings will be moderated by the user's brand preference insofar as the impact of recommendation will be stronger in presence of a prior brand preference of the recommended brand.

H4: Users' likelihood of accepting a VA's product recommendation over a non-recommended one is larger in presence of a prior brand preference for the recommended product.

4. Research Methodology

4.1 Research Design

For the hypothesis tests, an online survey with a quasi-experimental design has been conducted. The research design consisted of two experimental conditions. Experimental group A was allocated the written condition, in which participants were asked to make a purchase in a text-based e-commerce setting. Experimental group B participated in the voice-based setting, in which the purchase was made by listening to an audio clip of a VA reading out the product descriptions, partly replicating the survey design by Munz and Morwitz (2019). To minimize bias, product descriptions and ratings that have been presented in the experimental conditions, were real and taken directly from Amazon.de and Amazon.co.uk. An alteration was made to the price indication in order to remove the influence of price on the final purchase decision.

Both conditions presented the participants with a set of scales aimed to measure brand preferences within a low-involvement consumer goods product category, i.e., sunscreen. It is a seasonal product with prices ranging from five to ten euros for one regular package. There are several known brands available. The seasonality of the product category allows for assuming a medium degree of brand preference since the product is not used throughout the whole year. Brand preferences were measured in order to determine an underlying preference for the brands named within the questionnaire prior to the experimental treatment (i.e., presentation of the text-based or voice-based recommendation).

The dependent variable has been measured with a 7-point Likert scale in which the likelihood of choice of the preferred brand over a second brand which was presented by the text or voice stimulus as an alternative (however not recommended) was indicated. Brand preference has been measured by using the scale by Paharia and Swaminathan (2019) which draws on purchase intention. For the purpose of this study and in line with previous research (Laurent, Kapferer, and Roussel, 1995) it is assumed that the most preferred brand is the one most likely to be bought. Finally, the study has measured the perceived difficulty of the voice commerce-related purchase decision making (Munz and Morwitz, 2019) by using a scale adapted from Anand and Sternthal (1990).

4.2 Sample

A total of 260 questionnaires have been collected by recruiting the sample on the Amazon Mechanical Turk (MTurk) platform in the German-speaking area. This respondent recruitment strategy is increasingly used and established in social science and behavioral research (Moriuchi, 2019; Whang and Im, 2021). The participants have been randomly allocated to the experimental conditions by utilizing the respective settings in the online survey tool, Qualtrics. Out of the collected questionnaires, 51 answers had to be omitted from the data due to incompletion. The final data consisted of 114 responses for experimental condition A (text) and 95 responses for condition B (voice). Table 1 shows the sample description. The demographic data from the two experimental groups was compared using Pearson's Chi-Square. The two groups did not statistically differ in regard to gender (χ^2 = 4.105, p = .250), age (χ^2 = 3.590, p = .464), and occupation (χ^2 = 6.956, p = .138). A statistical difference was found in education (χ^2 = 20.018, p = .001), yet was chosen to not be an obstacle for a comparison of samples.

5. Results

To test the hypotheses, t-tests were conducted to test H1 and H2, followed by a multiple regression analysis to test H3 and H4.

H1 (users rate the voice condition as more difficult to navigate than users within the written condition) was tested by running an independent samples t-test with perceived difficulty as the dependent variable and the experimental condition as the independent variable. The data was unsplit for the purpose of investigating the perceived difficulty overall, with the only difference sought being the two conditions. The results stand in support for H1 with M = 5.86 for the text condition and M = 5.0 for the voice condition (95% CI [.504, 0.50], t(415) = -5.235, p < .001). The mean for the text condition lies closer to the value 7, indicating that the text condition was rated as simpler than the voice condition, supporting the findings by Munz and Morwitz (2019).

		Text	Voice			Text	Voice
Gender	Female	59%	61%	**Age**	18-24	29%	25%
	Male	40%	36%		25-34	55%	57%
	Other	1%	3%		35-44	6%	10%
					45-54	5%	3%
					55-64	4%	4%
Education	Less than high school diploma	23%	3%	**Occupation**	Full-time	57%	57%
	High school diploma	42%	12%		Part-time	16%	8%
	Bachelor's degree	32%	43%		Unemployed	4%	4%
	Master's degree	1%	40%		Student	19%	25%
	PhD	2%	2%		Other	4%	5%

Table 1: Sample Description

For H2 (users are more likely to choose a recommended purchase option over a non-recommended one), a one-sample t-test was run to test whether the purchase decision mean significantly differed from the value 4.0, representing the middle of the 7-point Likert scale used to measure the purchase decision and thus the absence of a tendency towards the recommended (> 4 on the scale) or the alternative product (< 4 on the scale). The mean purchase decision score (M = 3.55, SD = 2.30) within the text condition was shown to differ from the test value of 4.0, with a mean difference of .44, 95% CI [.02; .87], t(113) = -2.08, p = .040. For the voice condition, the mean purchase decision score (M = 3.60, SD = 1,81) was also shown to significantly differ from 4.0, with a mean difference of .41, 95% CI [.04; .78], t(93) = -2.21, p = .030. Despite the significant results, H2 cannot be supported because the means lie closer to 1, the alternative option. Therefore, participants were not more likely to choose the recommended purchase option, but the alternative brand.

To test H3 and H4, a multiple regression analysis with 10,000 bootstrap samples has been run which includes the brand preferences (measured as a priori purchase intent) of the recommended and alternative brands, the experimental condition (measured as a dummy variable coding text-based as 1 and voice-based as 0) for testing H3, and the interaction terms of condition*brand preference recommended brand and condition*brand preference alternative brand for testing H4. Table 2 shows the regression models, displaying the direct effects of brand preferences on choice in Model 1, adding the condition in Model 2, and the interaction terms in Model 3. In all models, no autocorrelation and multicollinearity could be identified.

As the results show, all models have explanatory power whereby Model 3 shows the highest adjusted R^2 (.118, p < .001). The a-priori brand preferences exert a significant impact on the brand choice after the exposure to the text-based or voice-based recommendation. The negative B values for the brand preference alternative are consistent since the brand choice was measured on one scale where the choice of the alternative is the opposite of the choice of the recommended brand. The condition alone does not exert any significant impact and reduces the explanatory power of Model 2.

The addition of the interaction terms yields a significant negative B value for the condition (p < .05) implying that the voice-based condition results in a higher likelihood to choose the recommended brand, compared to the text-based condition. This effect, however, is small, as it turned significant only in the bootstrapping procedure and the CI spans across zero. Hence, concerning H3 (users are more likely to choose a VA's product recommendation in the voice-based setting than in the written setting), we can cautiously support the hypothesis.

In the test of H4 (users' likelihood of accepting a VA's product recommendation over a non-recommended one is larger in presence of a prior brand preference for the recommended product), a significant effect can only be found for the moderating impact of brand preference for the recommended product (p < .1), but not for brand preference for the alternative product. Hence, we can partly support H4 and conclude that the presence of a priori preference for the recommended brand increases the impact of the recommendation on the final choice. The addition of the moderators enhances the explanatory power and turns the direct effect of the condition significant.

6. Discussion

The findings show that users do make different experiences in a voice commerce setting, compared to classical text-based interaction. That users perceive voice commerce as more difficult to deal with has implications for the general acceptance of voice search and VAs in voice commerce. If simplicity of use is a prerequisite for acceptance, as stated by the UTAUT (Venkatesh, Morris, Davis, and Davis, 2003), the diffusion of voice commerce is being challenged as the existing text and image combinations

in e-commerce are more familiar and present more stimuli for the consumers to base their purchase decision on (Lemon and Verhoef, 2016). Further, this finding implies that the communication with a VA is not in fact just as easy as conversing with another human being (Strayer et al., 2017). Further, the support of H3 suggests that the voice-based conversation induces users to follow the recommendation to a larger extent than a text-based one. However, the significance tests suggest that this finding has to be interpreted with caution and more research is necessary to achieve more robust evidence of this impact.

	Model 1 [95% CI]	Model 2 [95% CI]	Model 3 [95% CI]
Intercept	2.777*** [1.845; 3.700]	2.756*** [1.723; 3.713]	3.821*** [2.435; 4.952]
Brand preference recommendation	.411*** [.247; .573]	.412*** [.249; .580]	.243* [.035; .465]
Brand preference alternative	-.320*** [-.472; -.159]	-.321*** [-.478; -.156]	-.363** [-.572; -.137]
Condition (text vs. voice)		.035 [-.483; .574]	-1.799* [-3.440; .056]
Brand preference recommendation*Condition			.296⁺ [-.025; .610]
Brand preference alternative*Condition			.070 [-.256; .379]
Adjusted R^2	.113***	.109***	.118***
Durbin-Watson	2.441	2.441	2.462
Tolerance (excl. interaction terms)	.871	.869-.998	.383-.386
VIF (excl. interaction terms)	1.148	1.002-1.151	2.526-2.608
⁺ p<.1, * p<.05, ** p<.01, ** p<.001 Note: p values and CI are based on bootstrapping procedure with 10,000 bootstrap samples			

Table 2: Regression analyses

Concerning the influence of the use of voice in a product search context, the rejection of H2 contrasts with the notion of Munz and Morwitz (2019) as the recommended brand is not significantly more often chosen than the alternative. The results can be indicative of the tendencies of advertising avoidance (Li, 2019). If customers perceive a recommendation as a paid or advertised search result, they may show less trust in it than in an organic result (Berman and Katona, 2013), which would be a contrasting effect to the cognitive load found by Munz and Morwitz (2019) that induces customers to choose the recommended option in voice search. The strong and significant impact of a priori brand preferences shows that the literature on the key role of brand preferences does hold true in a voice commerce setting, too. Brand preferences establish a brand equity in the consumer which encompasses all positive or negative notions that the marketing efforts of the named brands had created (Lowry et al., 2008). Brand preference is an emotionally driven and opinionated phenomenon (Tolba, 2011), which results in the finding that recommendations, irrespective of the condition, are less impactful than the underlying brand preference of the consumer. These underlying brand preferences then may also affect general tendencies within search engine usage and imply that it is not only advertising avoidance which deters users from choosing the first suggested option (Berman and Katona, 2013; Li, 2019), but it is also a

subjective favoritism towards a certain brand or product that keeps users on their search path until the preferred outcome of a query is found.

From a managerial perspective, the findings suggest that it needs to be acknowledged that users perceive a text-based search differently than a voice-based one. The higher cognitive load may both stimulate the choice of a recommended brand, but may also trigger customers to stick to their original brand preference, hence "overhearing" a different recommendation. The moderating impact of brand preference further shows that brand preference can strengthen the tendency of voice search to follow a recommendation, if the respective brand is being preferred by the user. Hence, brand manufacturers as well as search engines or online shops that employ voice search (such as Amazon with the VA Alexa) should not overestimate the effect of voice search. In contrast, voice search appears to support a strong existing brand preference, but cannot be employed to replace it.

7. Conclusion

The study at hand sheds some light on user behavior in the context of voice search. In particular, it confirms the existence of a direct and moderated impact of existing brand preferences. The choice of a brand that is recommended by a search engine is marginally further impacted by the underlying format whereby a voice setting increases the tendency to choose the recommended product. In line with previous research (Munz and Morwitz, 2019), the study could further confirm the higher cognitive load of processing the results of a voice-based search, compared to a text-based one.

Like any research, this study has several limitations. First, it is based on a sample that is small in size and lacking generalizability. Although the socio-demographic variables which were used as control variables did not show any significant impact, there is a bias risk due to lacking representativeness of the sample. Further, the research context was limited to one product category in which consumers may display specific attitudes. More research that involves different product categories is needed.

Research on impacts of voice commerce on consumer behavior is still at its infancy. Several extant studies point at specific interrelations between voice commerce and brand engagement as well as loyalty (McLean, Osei-Frimpong, and Barhorst, 2021). Further research is needed on relevant contextual factors such as product involvement which is strongly interrelated with brand preferences (Arora, Prashar, Parsad, and Vijay, 2019) and social contexts. Since voice commerce is a growing component in the evolving research field of customer journeys in an omni-channel environment (Lemon and Verhoef, 2016), VAs as a key touchpoint need to be better understood as a part of the customer journey. In this context, further technical and HCI-related specifics of VAs and, in a broader sense, conversational agents in a purchasing situation need to be investigated in a commercial and product recommendation setting (Puntoni, Reczek, Giesler, and Botti, 2021).

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