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Consumers' Use of Augmented Reality Apps: Prevalence, User Characteristics, and Gratifications

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ABSTRACT

This study provides a better understanding of consumers' use of augmented reality (AR) apps by examining the (1) prevalence, (2) user characteristics, (3) gratifications, and (4) preference for AR, and (5) differences between a range of AR app types. To examine these aspects of consumer use, a survey ($N = 1,978$) was administered among a representative consumer sample, with participants ranging from 18 to 65 years old. This study provides an update on adoption of AR apps and an overview of the individual characteristics and gratifications that can enhance or limit (continued) use of AR apps. Findings may guide future AR research and give practitioners insights to employ AR apps that are of added value to consumers.

Augmented reality (AR) enables contextually relevant advertising experiences by overlaying digital content onto the consumer's physical surroundings in real time (de Ruyter et al. 2020). Therefore, advertisers recognize AR as a unique and novel way to interact with consumers (de Ruyter et al. 2020). Academic research has provided valuable insights into the effects of AR apps on app and brand responses and its underlying processes (e.g., Hilken et al. 2017; Smink et al. 2019). However, previous studies mostly focused on one specific type of AR app, used nonrepresentative samples, or did not consider actual AR app users, so insights on consumers' use of AR apps are very fragmented (for an overview, see Suh and Prophet 2018). Limited research is available that compares the usage of, experience with, and preference in using AR between different AR app types, among actual users (and nonusers) of AR apps.

This article presents a study using an extensive, large-scale survey among a representative consumer sample. The current study contributes to existing AR research by providing a comprehensive overview,

examining the (1) prevalence, (2) user characteristics, (3) gratifications, and (4) preference for AR, and (5) differences between a range of AR app types. In doing so, this study can guide future AR research and give practitioners insights on the state of the art on the adoption of AR apps, which individual characteristics are relevant to consider in relation to AR app use, whether different AR app types are experienced differently, and which AR app types add value to the consumer experience.

Research Background and Research Questions

AR App Classification

For our AR app classification, we focused on the use of mobile AR apps, as AR is now most often adopted by consumers through mobile devices (Dacko 2017). Previous mobile app studies usually differentiate between informative and entertaining apps (van Noort and van Reijmersdal 2019). Yet it is relevant to differentiate between more than solely the main motive to

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use an app, as apps can be experienced as both informative and entertaining (e.g., shopping apps; Smink et al. 2019) or also have a social function integrated into the app (e.g., social media apps). Therefore, it is relevant to differentiate apps not based on experiences but based on the functionalities and content of the app. We propose an AR app classification based on Zhao and Balagué's (2015) broader classification of branded apps and an empirical review of AR apps currently available in mobile app stores; we distinguished four app types: shopping, entertainment, information, and social media apps.

Shopping Apps

Shopping apps support consumers' purchase process and shopping experience by offering consumer personalization and product customization (Zhao and Balagué 2015). In these apps, AR enables users to visualize products. For example, *IKEA Place* enables users to place virtual furniture in their own living room.

Entertainment Apps

Entertainment apps offer the user interactive, entertaining content (van Noort and van Reijmersdal 2019). AR is used to project entertaining, virtual content or game elements in the user's surroundings. For example, the *Cosmopolitan* app makes the model on the magazine cover come to life, and the AR game *Pokémon Go* projects the game directly into the user's surroundings.

Information Apps

Information apps have a utilitarian function and provide information to their users (van Noort and van Reijmersdal 2019; Zhao and Balagué 2015). AR is used to give more information about locations or physical objects in the user's surroundings or to help carry out a task. Examples are the *Apple Measure* app, which uses AR to measure the size of physical objects, or the *Google Translate* AR function, which shows direct translation of text via the camera.

Social Media Apps

Social media apps allow users to create and exchange (user-generated) content (Zhao and Balagué 2015). Snapchat, Instagram, and Facebook have integrated AR functions in which users can take pictures or videos enriched with AR content and send it to or share it with other app users. While this category overlaps to some extent with other app types (e.g., entertainment apps), the difference is that these are social-centric apps, as the main aim is to send the AR-enriched content to other app users.

Prevalence and Frequency of AR App Use

To provide an overview of the mobile AR user landscape, we start with examining the prevalence (e.g., how many people use AR apps?) and frequency (e.g., how often do people use AR apps?) of AR app use among consumers. So far, only one academic study has focused on the prevalence of AR app use (Dacko 2017). However, this study was based on a relatively young and tech-savvy sample, and it examined only one type of AR app (shopping apps). Following the proposed AR app classification, we pose the following research question:

RQ1: What is (a) the prevalence and (b) the frequency of the use of (different types of) AR apps?

AR App User Characteristics

Studies building upon diffusion of innovations theory have shown that young, highly educated people, and men are more likely to adopt new technologies and therefore may influence adoption of AR apps as well (Atkin, Hunt, and Lin 2015; Rice and Pearce 2015). Furthermore, AR studies have shown that technology innovativeness (i.e., the extent to which people adopt, try, and experiment with new technologies) and privacy concerns in relation to mobile apps influence effectiveness and intended adoption of AR shopping apps (Hilken et al. 2018). Therefore, they may affect actual adoption of AR apps as well.

Further, the influence of individual characteristics on the use of AR apps may also differ per app type, as different apps serve different goals and may attract different audiences (Zhao and Balagué 2015).

RQ2: Which individual characteristics (age, gender, education, technology innovativeness, and privacy concerns) predict the use of (different types of) AR apps?

Gratifications of AR App Use

To understand why people use media technology, uses and gratifications (U&G) theory is commonly used as a framework to map users' needs and obtained gratifications (Katz, Blumler, and Gurevitch 1973). Gratifications obtained from media are sometimes also referred to in the literature as media experiences, defined as "the emotional, intuitive experiences or perceptions that people undergo when using a particular medium at a particular moment" (Voorveld et al. 2018, p. 40). The sum of these gratifications comprise the total engagement with the media technology (Voorveld et al. 2018) and are an important

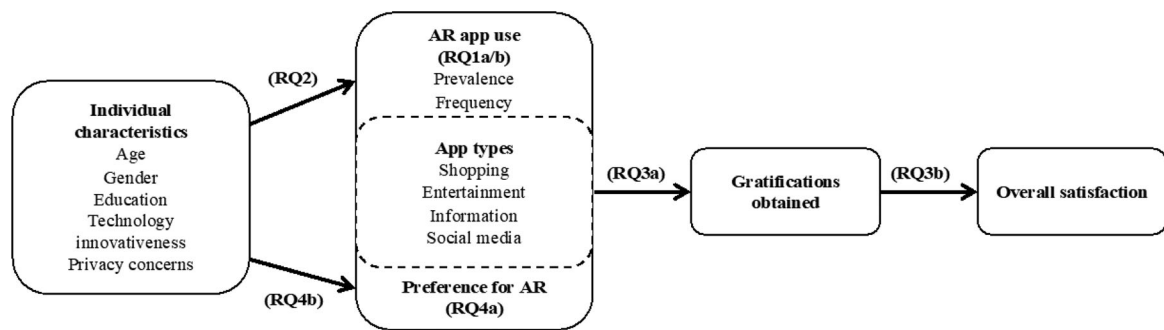


Figure 1. Visualization of research questions.

indicator of whether people will continue using a technology (Atkin, Hunt, and Lin 2015).

To understand why people use AR apps, this study assembled an extensive list of gratifications in relation to traditional and social media (Voorveld et al. 2018). The list of items and gratifications was adopted from Voorveld et al. (2018), as those gratifications had already been extensively examined in relation to both traditional and social media. Then, we expanded the list with AR-related gratifications, as the use of AR apps may also lead to new types of gratifications (e.g., desired enhancement of reality; Rauschnabel 2018). We composed a list of eleven dimensions of gratifications that can be characterized as being hedonic (enjoyment, stimulation, pastime, identification), utilitarian (practical use, topicality, efficiency), social (social interaction, empowerment), or technology-related gratifications (innovation, desired enhancement of reality).¹

Research has shown that old and new media have largely fulfilled the same preexisting human needs (i.e., cognitive, social integrative, tension release, affective, and personal integrative needs; Katz, Blumler, and Gurevitch 1973), with digital media having a larger focus on social and technology-related gratifications as opposed to traditional media (Sundar and Limperos 2013; Voorveld et al. 2018). These gratifications have been partly confirmed to play a role for the use of one specific AR app (e.g., AR game *Pokémon GO*; Rauschnabel, Rossmann, and Tom Dieck 2017). By combining U&G literature in relation to traditional and new media and AR, we aimed to analyze whether the use of AR apps leads to similar or new gratifications compared to other media, and whether differences exist between AR app types.

RQ3(a): Which gratifications are obtained from using (different types of) AR apps?

In addition, U&G literature suggests that the more (less) a medium satisfies users' needs, the higher (lower) the overall satisfaction with that medium (Sundar and Limperos 2013). Alnawas and Aburub (2016) also

found that benefits experienced through branded mobile apps (based on the U&G framework) could enhance consumer satisfaction. Moreover, high consumer satisfaction and positive app experiences have been linked to mobile app usability, continued usage intention, and positive brand responses (Baek and Yoo 2018; van Noort and van Reijmersdal 2019) and are therefore good indicators of continued use of AR apps. Therefore, we will consider the relation between gratifications and overall satisfaction with AR apps.

RQ3(b): Which gratifications predict overall satisfaction with AR apps?

Preference for AR

To gain additional insights on the added value of AR apps for consumers, this study examined preference for AR in the preadoption stages (among nonusers), and the postadoption stages (among AR app users). Because adoption of AR apps may still be limited, it is relevant to also consider preference for AR in these preadoption stages as it provides insights into whether and which nonusers are willing to adopt AR apps in the future. Moreover, examining preferences among AR app users provides insights into whether and which users will continue using AR apps.

RQ4(a): To what extent do users and nonusers have a preference for AR in (different types of) apps?

RQ4(b): Which individual characteristics predict preference for AR in users and nonusers?

A visualization of the research questions can be found in Figure 1.

Method

Respondents and Data Collection

An online survey was administered using an ESOMAR-certified online panel through research institute GfK among a probability sample

Table 1. Sample characteristics.

	Nonusers (N = 1,503)	AR App Users (N = 475)	Total Sample (N = 1,987)	Population
Sex				
Men	51.8%	53.9%	52.3%	50.1%
Women	48.2%	46.1%	47.7%	49.9%
Age	49.39 (12.13)	36.39 (11.12)	46.27 (13.13)	40.83
Education				
Low	21.3%	6.9%	17.8%	23.9%
Middle	46.0%	35.6%	43.5%	45.7%
High	32.7%	57.5%	38.7%	34.9%
Technology innovativeness	3.44 (1.16)	4.60 (1.23)	3.72 (1.28)	
Privacy concerns	5.18 (1.15)	4.88 (1.19)	5.11 (1.17)	n.a.

Note. Education level: low = no education/primary education/prevocational secondary education; middle = senior general secondary education, preuniversity education, senior secondary vocational education; high = higher vocational education and university education.

representative of the Dutch population of 18- to 65-year-olds. To determine the ratio of users and nonusers to select a sample size that would have a sufficient amount of AR app users, we first measured AR app use in a large screening sample ($N = 50,499$). Based on the screening sample, we sought a sample size of 2,000 respondents. In total, 2,030 respondents completed the final survey, of which 52 needed to be excluded because none of their listed apps concerned an AR app, leading to a final sample of 475 AR app users versus 1,503 nonusers ($N_{\text{total}} = 1,978$). Sample characteristics can be found in Table 1.

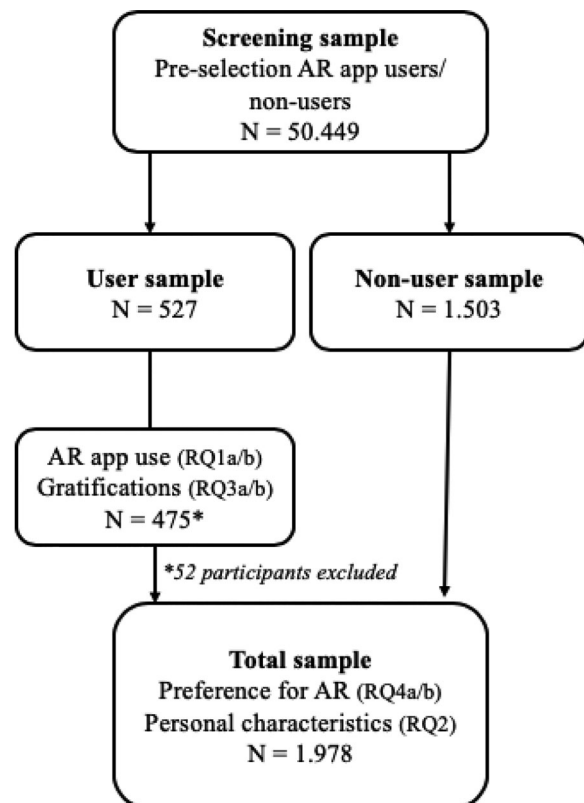
Procedure

Based on the AR app use screening question, participants were assigned to the survey for either users or nonusers (see Figure 2). In the user survey, an extensive method to measure AR app use was employed, asking respondents to list the AR apps they had used for each app type. For every AR app listed, frequency of use was measured. Next, one of the listed AR apps was randomly selected to measure the gratifications, and quota were used to ensure an equal distribution over app types. Then, we measured preference for AR and individual characteristics. In the nonuser survey, only preference for AR and individual characteristics were measured.

Measures

AR App Use

AR app use focuses on the use of mobile AR apps, as AR is most often adopted by consumers through mobile devices (Dacko 2017). This study includes both AR-only apps (i.e., the AR function is the main content of the app) and apps with multiple functions, including an AR function. For each app type, respondents received an explanation of the app along

**Figure 2.** Flowchart procedure.

with example pictures and were asked whether they had used a similar type of AR app. If yes, respondents were asked to list which AR apps they had used before. For each listed app, the app type was coded (shopping, entertainment, information, or social media app). Dichotomous variables were created indicating general AR app use and use per app type (0 = Nonuser, 1 = User).

Use Frequency

Use frequency was measured for the AR function within the listed AR apps, as some apps also provide functionalities other than AR. We provided

Table 2. Use frequency of augmented reality function.

	Shopping Apps (N = 138)	Entertainment Apps (N = 357)	Information Apps (N = 157)	Social Media Apps (N = 325)
1 time	21.7%	7.8%	11.5%	7.7%
2 to 3 times	39.9%	21.1%	33.1%	16.0%
4 to 5 times	23.2%	15.6%	21.0%	16.6%
6 to 10 times	1.1%	12.2%	14.6%	12.6%
More than 10 times	5.1%	43.3%	19.7%	47.1%

Note. In-app usage of the augmented reality function is based on the first-mentioned app within the app category.

respondents with an answer range (1 time, 2 to 3 times, 4 to 5 times, 6 to 10 times, and More than 10 times).

Gratifications

An extensive list of gratifications related to traditional media, social media, and AR was pretested in a convenience sample of AR app users ($N = 59$).¹ Items that were selected by less than 5% of the respondents were removed, and four items per gratification dimension were selected, resulting in 37 statements divided over 11 dimensions of gratifications. To measure the gratifications, respondents were asked to think about the last time they used the selected AR app and to what extent they agreed with the statements on a 7-point Likert scale. A principal component analysis with varimax rotation revealed four dimensions. The four dimensions overarch several dimensions from the original list of 11 dimensions. Moreover, the addition of the AR-related dimension (enhancement of reality) did not form one separate dimension. The four dimensions are (1) information, which measured the extent to which respondents experienced the apps as informative; (2) social empowerment, which measured the extent to which the app was experienced as socially empowering (e.g., the app enables users to socially interact with and/or impress others); (3) entertainment, which measured the extent to which the app was experienced as entertaining; and (4) innovation, which measured to what extent the app was experienced as innovative.¹

Overall Satisfaction

Overall satisfaction with the AR app was measured with three items on a semantic differential scale (“In general, my experience with the [AR app] was . . .”; *Bad/Good, Negative/Positive, Unpleasant/Pleasant*) adopted from Poushneh (2018) and adjusted to fit the context of this study ($\alpha = .84$, $EV = 2.69$, $R^2 = .67$).

Preference for AR

Preference for AR was measured using two scenarios per AR app type. Respondents were randomly assigned to one scenario per app type. Respondents

were asked to imagine a situation in which they had to choose between an AR and a non-AR app function. An example scenario was “Imagine you want to buy new sunglasses using your smartphone. You may choose between two ways to check out the sunglasses. Which of the two options has your (highest) preference?” The options were AR (e.g., “Using my camera to see the sunglasses on my own face”) and non-AR (e.g., “Looking at pictures of the sunglasses on a model”) on a scale from 1 (*Strong preference for the non-AR function*) to 7 (*Strong preference for the AR function*). We created a score of preference for AR per app type and an overall AR preference score based on the mean ($M = 3.77$, $SD = 1.16$).

Individual Characteristics

Technology innovativeness was measured on a 7-point Likert scale with four items (e.g., “I keep up with the latest technological developments”) adopted from Parasuraman (2000; $\alpha = .84$, $EV = 2.69$, $R^2 = .67$).

To measure privacy concerns, the Mobile Users’ Information Privacy Concerns scale was adopted from Xu et al. (2012). Nine items were used on 7-point Likert scales (e.g., “I am concerned that mobile apps are collecting too much information about me”). A factor analysis extracted one factor, containing all nine items ($EV = 6.97$, $R^2 = .77$). Therefore, we calculated one scale measuring privacy concerns ($\alpha = .96$).

Sex, age, and education were extracted from the panel company database.

Results

Research Question 1: Prevalence and Frequency of AR App Use

Regarding the prevalence of AR app use, from research question 1(a), 24% indicated having used an AR app before, versus 76% who never used an AR app. From the total sample, entertainment apps (18.9%) and social media apps (17.1%) had the highest percentage of usage, followed by information apps (8.1%) and shopping apps (7.2%).

Table 4. Gratifications and overall satisfaction of AR apps.

Gratification	App Type					F (4, 471)
	Shopping (N = 58)	Entertainment (N = 207)	Information (N = 69)	Social Media (N = 141)	All AR Apps (N = 475)	
Entertainment	4.62 ^a (1.04)	4.52 ^a (1.06)	4.13 ^b (1.12)	4.60 ^a (.93)	4.50 (1.04)	3.82**
Information	4.95 ^a (.98)	3.02 ^b (1.38)	4.98 ^a (1.14)	2.59 ^b (1.25)	3.41 (1.58)	90.11***
Social empowerment	3.31 (1.35)	3.25 (1.26)	3.12 (1.22)	3.19 (1.18)	3.22 (1.24)	0.30
Innovation	5.15 ^a (1.05)	4.72 ^a (1.34)	4.84 ^a (1.10)	4.03 ^b (1.17)	4.59 (1.28)	15.43***
Overall satisfaction	5.59 (1.24)	5.33 (1.23)	5.58 (1.13)	5.40 (1.07)	5.42 (1.17)	1.32 s

Note. AR = augmented reality. Standard deviation in parentheses. Different superscripts indicate significant differences between app types based on multivariate analysis of variance; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 5. Regression model relating gratifications to overall satisfaction.

Gratification	β (SE)
Entertainment	.54*** (.20)
Information	.13** (.04)
Social empowerment	-.22*** (.05)
Innovation	.22*** (.05)
R^2	.39
F	74.79***

Note. Standardized coefficients with standard error in parentheses; * $p < .05$; ** $p < .01$; *** $p < .001$.

Table 6. Preference for augmented reality.

Preference for AR	Nonusers (N = 1,503)	Users (N = 475)	F (1, 1976) (Between Subjects)
Shopping apps	4.43 ^a (1.74)	5.18 ^a (1.62)	69.36***
Entertainment apps	3.44 ^b (1.23)	3.77 ^b (1.40)	24.10***
Information apps	3.55 ^b (1.85)	4.03 ^c (1.99)	22.49***
Social media apps	3.19 ^c (1.77)	3.65 ^b (2.02)	22.84***
Overall preference	3.65 (1.14)	4.15 (1.18)	69.23***
F (within subjects)	469.31***	191.29***	

Note. Mean with standard deviation in parentheses. Means in the columns with different superscripts differ significantly at * $p < .05$, ** $p < .01$, *** $p < .001$.

differences between app types using two models, one for users and one for nonusers. For nonusers, preference for AR was highest in shopping apps (significantly higher than all other app types), followed by information and entertainment apps (significantly higher than social media apps), and lowest in social media apps. For users, preference for AR was also highest in shopping apps (significantly higher than all other app types), followed by information apps (significantly higher than entertainment and social media apps), and lowest in entertainment and social media apps.

To answer research question 4(b), we employed a regression model separately for users and nonusers (see Table 7). Across users and nonusers, the older and the more technologically innovative the individual, the higher the preference for AR. For nonusers, men had higher preference for AR, while people with higher privacy concerns had lower preference for AR. For users, women had higher preference for AR.

Table 7. Regression model explaining overall preference for augmented reality.

	Overall Preference for AR	
	Nonusers (N = 1,503)	Users (N = 475)
Gender (men)	.13* (.06)	-.24* (.12)
Age	.01** (.00)	.01** (.01)
Education level		
Low versus middle	.05 (.08)	.20 (.22)
Low versus high	-.10 (.09)	-.05 (.22)
Technology innovativeness	.08** (.03)	.14** (.05)
Privacy concerns	-.07** (.03)	-.00 (.05)
F	7.85***	3.97**
R^2	.03	.05

Note. Unstandardized coefficients with standard error in parentheses; * $p < .05$; ** $p < .01$; *** $p < .001$.

Discussion

By providing a comprehensive overview of prevalence, user characteristics, gratifications, and preference in relation to different types of AR apps, this study replicates and generalizes the results from previous research in this domain among a representative consumer sample of actual AR app users. This study adds to previous AR studies that mostly focused on one type of AR app, used nonrepresentative samples, or did not consider actual AR app users. In addition, this study shows relevant differences between AR app types that are important to consider in future research. Specifically, this study contributes to the current literature on AR and (branded) mobile apps in five ways.

First, this study presents the current state of the art on adoption of AR apps, showing that about one-quarter of a representative sample had used an AR app before. Moreover, in accordance with diffusion of innovations theory (Rogers 2003), our results show that AR app users were in general younger, more highly educated, less privacy concerned, and more technologically innovative than nonusers. According to the technology adoption stages (Rogers 2003), AR apps are entering the early majority of technology adoption, meaning that AR adoption is at the tipping point of moving from the early adopters to a wider

audience in which age, gender, and education become more representative for the general population. This signals that AR apps are not just a gimmick and are moving toward large-scale adoption, which justifies further research into the consequences of AR app use. Furthermore, it shows that it is important to consider wider study samples to refine our understanding of the extent to which individual characteristics influence how people perceive and experience AR apps.

Second, building on the U&G framework (Katz, Blumler, and Gurevitch 1973), we identified four overarching gratifications in relation to AR app use: entertainment, information, innovation, and social empowerment. Previous studies on AR and branded apps have considered similar entertainment- and information-focused constructs or processes (Hilken et al. 2017; Rauschnabel, Rossmann, and Tom Dieck 2017; Smink et al. 2019; van Noort and van Reijmersdal 2018). Our findings add to the notion that digital media do not necessarily fulfill new needs in comparison to traditional media (Sundar and Limperos 2013; Voorveld et al. 2018) but rather show that technology-related gratifications, as innovation, become more important in driving AR app use. Strikingly, while digital media have also been found to satisfy more social gratifications (Sundar and Limperos 2013; Voorveld et al. 2018), AR apps scored relatively low on social gratifications (social empowerment), which negatively influenced satisfaction with AR apps. Because social AR apps and social gratifications obtained from AR apps have received little attention in AR literature, future research could examine how AR apps can (more) effectively incorporate social AR functions that can enhance social empowerment and consequently satisfaction with AR apps.

Third, our findings demonstrate that important differences exist *between* AR app types and how they are experienced and that some gratifications may be more important predictors of future AR app use. Social media and entertainment AR apps were mainly experienced as entertaining, and information apps were mainly experienced as informative, while shopping apps were experienced as both entertaining and informative. This means that studies focusing on a specific AR app may not be generalizable to other AR apps, and it underscores the need for differentiating between app types in future AR research and the specific processes that underlie its effectiveness.

Fourth, by focusing on preference for AR in different app types in both users and nonusers, this study provides valuable insights into the apps that provide value for consumers. Interestingly, preference for AR

was highest in shopping and information apps, while usage of these apps is still relatively low. Shopping and information apps also scored high on gratification information (as opposed to social media and entertainment apps), which indicates that apps that also provide informative value may have a higher user preference as opposed to AR apps focusing mainly on entertainment. Because few AR studies have focused on consumer responses toward information apps, more research is needed to further disentangle whether informative AR apps add value for consumers and, if so, which types.

Fifth, this study contributes to research on (branded) mobile apps. Previous research on how branded mobile apps are experienced has usually distinguished entertainment from information apps (van Noort and van Reijmersdal 2019), mainly focusing on specific characteristics of mobile app types or focusing on the general usability of mobile apps (Baek and Yoo 2018; Zhao and Balagué 2015). This study shows that for some app types (shopping apps) users may have both informative and entertaining experiences that stimulate engagement with the app. Therefore, distinguishing between more than solely the experiential versus information dimensions in app types and experiences is important for developing a better understanding of app engagement and usability. Finally, AR as a characteristic of (branded) mobile apps may further increase consumer experiences and preference to use mobile apps.

In conclusion, this study is an important building block for future studies on AR and provides a baseline of AR app use in relation to its prevalence, user characteristics, gratifications, and preference to use AR, and how these aspects differ among app types. Future research could further expand on these findings by focusing on theoretical frameworks that are relevant to examine specific affordances of AR, such as context mapping (de Ruyter et al. 2020), social cognition theory in relation to the social dimensions of AR (Semin and Smith 2013), and differences in usability of AR apps (e.g., usability evaluation framework; Baek and Yoo 2018), and how these relate to advertising effects.

Practical Implications

The results of this study provide important practical implications for advertisers. Social media and entertainment apps provide interesting opportunities for advertisers to incorporate branded AR experiences, as our results showed that AR is most frequently used within these apps. Moreover, shopping and information apps provided high information value to

consumers and scored relatively high on preference for AR. Therefore, enabling consumers to visualize products or services, or providing information using AR, can enhance consumer experiences. Our study also provides relevant insights with regard to potential target groups of AR apps, as our results showed differences in the user characteristics of different app types. In addition, our results showed that older people have a higher preference to use AR and are therefore also relevant to consider as potential target groups. Finally, because our findings also showed that not all people have a preference to use AR and privacy concerns decreased preference for AR, it is advisable to also offer a non-AR solution.

Limitations

First, it should be noted that the app types from our AR app classification overlap to a certain extent. For example, social media apps were considered a separate category, while they increasingly provide a range of AR functions and content similar to other app types (e.g., entertainment and shopping apps). Second, apps also differed with regard to other characteristics that may have influenced the results of this study. For example, a distinction can be made between AR-only apps and apps in which the AR function is only one among a range of (non-AR) functions. While we tried to account for this by asking specifically about the use of the AR function, some responses regarding their gratifications may be related to the experience of the app in general as well.

Notes

1. The original and final list of items and dimensions to measure gratifications can be found in the online supplemental material.
2. Sample size differed for the user and nonuser sample. However, additional analyses correcting for differences in sample size (i.e., Welch's *t* test) resulted in similar results as those reported.

Disclosure Statement

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