




# Branded App Usability: Conceptualization, Measurement, and Prediction of Consumer Loyalty

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**Despite the importance of usability assessment, few studies have taken a consumer-centric approach to conceptualize and measure the underlying dimensions of branded app usability. Addressing this gap in the literature, we developed and validated a holistic measure of branded app usability based on consumer evaluations rather than the various technical issues previously addressed in mobile marketing studies. The results indicate that branded app usability, as a multidimensional construct, consists of 13 items in five factors: user-friendliness, personalization, speed, fun, and omnipresence. Theoretical and practical implications for measuring branded app usability are discussed.**

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Mobile devices have become an almost necessary gadget in recent years, providing consumers with entertainment as well as productivity through mobile applications (apps, hereafter). In the United States, smartphone penetration is approaching 80%, and mobile device usage accounts for 65% of all digital time (primarily mobile apps) (comScore 2016). The ongoing diffusion of mobile devices and the growth in mobile app usage have led marketers to recognize the potential of branded apps. Not surprisingly, marketers use mobile apps as a consumer–brand relationship platform, because consumer engagement with branded apps leads to more favorable attitude toward the sponsoring brand (Bellman et al. 2011; Hutton and Rodnick 2009). Accordingly, branded apps have become an important digital marketing platform, similar to websites and social media channels.

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However, alarming statistics indicate that 25% of installed apps are never used and 38% of installed apps are abandoned after the first use (Google 2015). In this context, marketers want to understand what makes consumers engage with and continually use branded apps.

Marketers strive to achieve high levels of consumer engagement in mobile apps to make branded information persuasive (Calder, Malthouse, and Schaedel 2009; Kim, Lin, and Sung 2013). The concept of usability, as a critical quality of mobile marketing success, has been discussed primarily in terms of consumer–device engagement (Hornbæk 2006) and measured largely based on technological attributes (e.g., response time and error rates associated with performance tasks) (Hoehle and Venkatesh 2015). However, few existing scales adequately measure branded app usability from the consumer point of view.

Consumer experiences with branded apps are a source of valuable benefits, laying the foundation for ongoing app usage and loyalty to the sponsoring brand. Thus, usability evaluations are increasingly important to marketers (Heo et al. 2009) because those evaluations estimate how effectively the interactive features of branded apps engage customers. Furthermore, usability testing is a way to measure consumer attitude toward and usage of a particular branded app. Because marketers strive to attract and retain potential customers, linking branded app usage to desired marketing effects will reveal how well particular mobile strategies are working. Accordingly, measuring consumer-centric usability is of critical interest to marketers who want to design effective branded apps and develop engaging content.

Recognizing the importance of branded apps as a digital marketing method, as well as a brand engagement platform, the current study had two objectives: (a) to develop and test the assessment tool to examine perceived levels of branded app usability and (b) to link perceived levels of branded app usability to important marketing outcomes. Therefore, we first reviewed the literature and identified where studies were limited in conceptualizing and operationalizing branded app

usability. Then we developed and validated the branded app usability scale through a three-stage process. Finally, we linked branded app usability to other marketing outcome variables (i.e., intention to continue using the app, referral likelihood, and brand loyalty) to test nomological validity. The findings of this study have practical implications for branded app engagement strategies and theoretical implications for future research.

## LITERATURE REVIEW

### Branded Apps

Branded apps refer to downloadable mobile software that “prominently displays a brand identity, often via the name of the app and the appearance of a brand logo or icon, throughout the user experience” (Bellman et al. 2011, p. 191). Branded apps serve various purposes, such as communicating brand value, managing customer relationships, increasing sales, supporting product innovation, and conducting marketing research (Zhao and Balagué 2015). Despite the fingertip-sized screen tools, practitioners have been advised to develop unique strategies through mobile features (e.g., location awareness, augmented reality, and multitouch gestures), social features (e.g., user-generated content rating, commenting, and sharing), and branding elements (e.g., brand name, logo, and mascot) to accomplish their marketing objectives.

As intermediaries between brands and consumers, branded apps play a pivotal role in increasing brand salience, or “the propensity of the brand to be thought of in buying situations” (Romaniuk and Sharp 2004, p. 334). Brand salience positively influences brand recall (Alba and Chattopadhyay 1986), purchase intention (Vieceli and Shaw 2010), and brand equity (Keller 2008); and it reflects the size and quality of a brand information network that consumers hold in their memories (Romaniuk and Sharp 2004; Vieceli and Shaw 2010). Thus, a branded app facilitates capturing consumer attention and stimulating thoughts about the focal brand stored in memory. Given that repeated exposure to advertising or brand usage results in higher salience (Alba and Chattopadhyay 1986), consumers are likely to perceive higher brand salience when a branded app constantly conveys prominent and accessible information about the brand (e.g., brand name, product/service attributes, benefits, and usage situations), later evoking favorable brand associations.

### Usability Evaluation Framework

Scholars have conceptualized usability in various ways: “ease of use and learning” (Nielsen 1999); “the capability in human functional terms to use easily and effectively” (Shackel 1991, p. 24); and “effectiveness, efficiency, and satisfaction with which specified users can achieve specified goals in a specified context” (International Organization for Standardization 1998). As

such, usability is fundamentally woven into the user experience of engagement (O’Brien and Toms 2008), which is particularly reflected by the quality of interaction or how closely the user feels connected to the way the usable product/brand is presented (Quesenbery 2003). In general, the concept of usability encompasses the interaction of users when performing particular tasks via information technology in a specific environment (Bennett 1984).

A considerable body of literature has examined usability in the context of mobile devices (e.g., Biel, Grill, and Gruhn 2010; Ji et al. 2006; Venkatesh and Ramesh 2006; Verissimo 2016). Drawing from the International Organization for Standardization (1998), Hoehle and Venkatesh (2015) defined mobile app usability as “the extent to which a mobile application can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use” (p. 437; see also Venkatesh and Ramesh 2006). This definition suggests that usability is a quality attribute of a mobile app and is primarily based on three factors: users, goals (or objectives), and context. Numerous studies have employed this conceptualization and measured mobile app usability using instruments designed for traditional websites (Venkatesh and Ramesh 2006), personal computers (Biel, Grill, and Gruhn 2010), interactive 3-D technology (Yoon, Laffey, and Oh 2008), or mobile operating systems (Adipat, Zhang, and Zhou 2011). For example, Lee and Benbasat (2004) used seven design elements for e-commerce websites (i.e., context, content, community, customization, communication, connection, and commerce) to evaluate mobile app usability, while Biel, Grill, and Gruhn (2010) used software architecture analysis for the same purpose.

Furthermore, previous studies have examined functionality-based attributes and technical aspects of mobile apps rather than consumer evaluations of branded app usability. These attributes include speedy search time and accuracy (Adipat, Zhang, and Zhou 2011); usefulness, enjoyment, and ease of use (Yang 2013); color, text, and menu icons (Sonderegger and Sauer 2010); and learnability, efficiency, memorability, errors, user satisfaction, effectiveness, simplicity, comprehensibility, and learning performance (Zhang and Adipat 2005). These studies have suggested that efficiency, effectiveness, and satisfaction might represent perceived branded app usability. However, associating those dimensions with branded app usability might frustrate marketing practitioners and researchers because it might lead to “interpretational confounding” (Hoehle and Venkatesh 2015).

At the same time, mobile software engineers have reinforced their own usability constraints when guiding branded app development. For example, the Apple iOS Human Interface Guidelines<sup>1</sup> state important iOS platform characteristics that should be considered during branded app development,

<sup>1</sup><https://developer.apple.com/ios/human-interface-guidelines/>.

and Apple reviews branded apps submitted for the App Store based on these characteristics. Similarly, Google has developed Android user interface guidelines<sup>2</sup> that list important characteristics (i.e., touch gestures; size and location of icons and buttons; contextual menus and their responsiveness; simplicity, size, and format of text; and certain aspects of messages) and explain how they should be considered when developing and testing Android apps. Although these guidelines emphasize important features in designing branded apps, they provide minimal help in evaluating actual usability (Nielsen 2011; Venkatesh and Ramesh 2006).

The current study adopted the conceptual framework of usability from Bevan (1995), according to whom quality of use—the extent to which a product satisfies stated and implied needs when used under stated conditions (p. 4)—offers a means of measuring the usability of a product. This conceptual lens offers a user-centric view of quality, which postulates that usability assessment is dependent not only on the perception of the user but also on the context in which the product is used. That is, quality of use results from “the interaction between the user and product while carrying out a task in a technical, physical, social, and organizational environment” (Bevan 1995, p. 6). However, like any product or computer software application, a branded app has no intrinsic usability (Bevan 2001) but has the capacity to be used in a particular context by a consumer who wants to achieve a particular goal. Nevertheless, many previous studies have conceptualized mobile app usability without considering the unique context of branded apps, including consumers’ hedonic experience (e.g., enjoyment, fun, pleasure) as well as the personalized and “anytime, anywhere” nature of mobile commerce.

According to Bevan (1995), the concept of usability highlights the ease with which a technological artifact can be used. However, consumers sometimes experience branded apps in distracting environments (e.g., busy locations, crowded spaces) (Zhang and Adipat 2005), and fingertip-sized buttons can frustrate effective data entry by reducing input speed and increasing errors. As important aspects of usability, user-friendliness (or ease of use) and response speed can be recognized as a combination of branded app features that encourages efficient and error-free consumer behavior without much time delay. However, both usability qualities are also subject to consumer evaluation because the way consumers perceive user-friendliness and response speed of a technological artifact depends on the level of cognitive activity required to work with it (Hu, Ma, and Chau 1999; Xie 2003). In other words, consumers will favorably evaluate a branded app that requires the least possible effort and time to accomplish their goals.

Within our consumer-centric view of branded app usability, personalization is the quality of matching individual consumer interests and expectations with brand-related content on a

mobile app. The digital nature of branded apps allows marketers to collect and analyze customer data quickly and at low cost and to provide unique opportunities that are directly relevant to each customer. For example, the Amazon app uses a personalized recommendation system based on previous purchase history and items viewed or added to shopping carts (e.g., “related to items you’ve viewed” and “inspired by your wish list”). As such, personalization has been documented as a key characteristic of usability in various contexts, such as websites (e.g., Oberoi, Patel, and Haon 2017) and mobile apps (Zhao and Balagué 2015).

As one of the context-dependent properties of usability, omnipresence is the quality of having access to brand-related content on a mobile app beyond any spatial and temporal constraints. This idea is similar to the concept of ubiquity, implying “not only that they are everywhere but also that they are, in a sense, ‘nowhere,’ for they become invisible as we no longer notice them” (Watson et al. 2002, p. 332). Ubiquity reflects a unique feature of mobile devices derived from continuity (i.e., “always on”), immediacy, portability, and searchability (Okazaki and Mendez 2013). Previous studies have pointed out that ubiquitous commerce enhances utility (Watson et al. 2002), leading to favorable mobile ad attitude (Okazaki, Molina, and Hirose 2012).

Finally, as a hedonic experience, fun (or enjoyment) refers to sensations from using branded apps that result in feelings of pleasure. Fun is also subject to consumer evaluation because it is intrinsic and only personally meaningful (Hirschman and Holbrook 1982). Empirical studies have shown that perceived fun is positively related to mobile shopping website and app usage (Lu and Su 2009; Lu, Liu, and Wei 2017). Thus, marketers continue to develop branded apps that incorporate enjoyable and entertaining features in their design, functionality, and content.

In summary, previous studies have used various definitions of mobile app usability and developed various instruments for evaluating it. As a result, mobile app usability has largely been assessed in piecemeal fashion. By using a more consumer-centric approach, the current study defines *branded app usability* as the extent to which a mobile app can be used to achieve a specified task in an effective manner during brand–consumer interactions. This conceptualization requires a holistic instrument that accounts for consumer perceptions of usability. Consequently, examining the underlying structure of branded app usability could help digital marketers effectively diagnose problems with their own branded apps and fine-tune the positive attributes of existing ones.

## SCALE DEVELOPMENT

### Stage 1: Item Generation and Scale Purification

The purpose of Stage 1 was to identify the dimensional structure of branded app usability. Following the procedure recommended by Churchill (1979), we first reviewed relevant

<sup>2</sup>[https://developer.android.com/guide/practices/ui\\_guidelines/index.html](https://developer.android.com/guide/practices/ui_guidelines/index.html).

studies about usability, with an emphasis on mobile devices (Coursaris and Kim 2011; Hoehle and Venkatesh 2015; Lindholm and Keinonen 2003) and computer software (Venkatesh and Ramesh 2006). Next, five focus group interviews ( $N = 32$ ) supplemented our literature review. Lella, Lipsman, and Martin (2015) found that 18- to 24-year-olds spent the most time using mobile apps (i.e., 90.6 hours per month on smartphones and 34.7 hours per month on tablets). Thus, we focused on that age group and recruited, for each interview, five to seven college students who frequently used branded apps. Participants were asked to describe their personal experience, perceptions, beliefs, emotions, and usage situations related to branded apps. Through a rigorous discussion to specify the construct domain, we generated an initial pool of 49 items.

Three academic experts (i.e., university professors teaching advertising and/or digital media) assessed the content validity of the initial 49 items. They were first presented with a written conceptual definition of branded app usability, then asked to rate each item individually on a 3-point semantic differential scale (*Not appropriate/Very appropriate*), and finally asked to judge how well each item represented an overall measure of branded app usability. Based on their assessments and recommendations, we eliminated 34 items that were ambiguous, double-barreled, or redundant. The final set contained 15 items.

### Stage 2: Exploratory Scale Assessment

A total of 191 undergraduate students (40.8% male, average age = 21.7 years) enrolled in advertising courses at a Midwestern university in the United States completed an online survey in exchange for extra course credit. Respondents were first asked to name a branded app they frequently used and then asked to indicate their level of agreement with 15 items using a 7-point Likert scale (1 = *Strongly disagree*, 7 = *Strongly agree*).

Given that usability is manifested through user experience (Bevan 1995), we had to ensure that our respondents were reasonably familiar with the branded app. User experience, as a vital component of usability, reflects the subjective history of human perception (Dube and Helkkula 2015). If the respondents had no prior experience with a branded app, then their responses would be unreliable and invalid due to a lack of accumulated perceptions via experience.

To detect the underlying factor structure of branded app usability, we conducted an exploratory factor analysis (EFA). The EFA results produced a five-factor solution based on the following criteria: eigenvalues ( $> 1$ ), variance explained by each factor component, scree plot, factor loading score for each factor ( $> .50$ ), and the meaningfulness of each dimension (Hair et al. 1998). Two items (“I feel satisfied with my relationship with the branded mobile app” and “While using the

branded mobile app, I could choose freely what I wanted to see”) were eliminated because they cross-loaded on other factors or had relatively low factor loadings.

Table 1 shows the pattern matrix from the principal components analysis (PCA) with oblique rotation for the data from Stage 2. Overall, the 13 items were well distributed to include various dimensions discussed in previous studies. The first factor, user-friendliness, included three items (“It is easy for me to learn the functions of the branded mobile app”; “Using the branded mobile app is clear and understandable”; “Overall, the branded mobile app is easy to use”). The second factor, personalization, consisted of three items (“The branded mobile app makes me feel that I am a unique customer”; “I believe that the branded mobile app is customized to my needs”; “The push notifications and promotions that the branded mobile app sends to me are tailored to my situation”). The third factor, speed, included three items (“The branded mobile app is very fast in responding to my feedback”; “The branded mobile app processes my input very quickly”; “I am able to obtain the information from the branded mobile app without any delay”). The fourth factor, fun, contained two items (“Using the branded mobile app makes me feel entertained”; “Using the branded mobile app makes me feel pleased”). The fifth factor, omnipresence, included two items (“Using the branded mobile app enables me to find information at any place”; “Using the branded mobile app fits any location, whenever I go”). Overall, the five-component solution explained 79.5% of the total variance.

### Stage 3: Scale Validation

The purpose of Stage 3 was to validate the branded app usability scale with a more heterogeneous consumer sample than the college student sample used in Stages 1 and 2. We also examined nomological validity of the new scale by linking branded app usability to three important marketing outcomes: intention to continue using the branded app, branded app referral intention, and brand loyalty.

Potential respondents were recruited from an online panel of U.S. smartphone users. The first survey invitation was sent by e-mail to all 4,835 active panel members who possessed a smartphone. Among them, 319 panel members completed the Qualtrics survey in Stage 3 in exchange for monetary rewards. Online panel samples are more demographically diverse (De Gregorio and Sung 2010) and have been frequently employed in previous research on mobile advertising (Okazaki, Li, and Hirose 2009). Among the respondents, 46.7% were female; the average age was 40.7 years; 65.5% were married; Anglo Americans comprised 74.6% of the sample, followed by African Americans (8.8%), Asian Americans (8.2%), and Hispanics (6%); 12.9% had a high school diploma, 24.8% had attended college/vocational school, 42.9% had received a bachelor’s degree, and 16.3% held a master’s/professional degree.

TABLE 1  
EFA Results ( $N = 191$ )

Items	User-Friendliness	Personalization	Speed	Fun	Omnipresence
It is easy for me to learn the functions of the branded mobile app.	<b>.94</b>	.08	.14	.09	.12
Using the branded mobile app is clear and understandable.	<b>.91</b>	.12	.14	.13	.17
Overall, the branded mobile app is easy to use.	<b>.91</b>	.02	.15	.06	.17
The branded mobile app makes me feel that I am a unique customer.	-.01	<b>.81</b>	.19	.10	.08
I believe that the branded mobile app is customized to my needs.	.16	<b>.78</b>	.14	.06	.23
The push notifications and promotions that the branded mobile app sends to me are tailored to my situation.	.04	<b>.76</b>	-.02	.11	-.06
The branded mobile app is very fast in responding to my feedback.	.07	.19	<b>.83</b>	.21	-.02
The branded mobile app processes my input very quickly.	.18	.08	<b>.80</b>	.10	.31
I am able to obtain the information from the branded mobile app without any delay.	.40	.05	<b>.60</b>	.09	.32
Using the branded mobile app makes me feel entertained.	.09	.15	.14	<b>.93</b>	.06
Using the branded mobile app makes me feel pleased.	.15	.12	.18	<b>.91</b>	.13
Using the branded mobile app enables me to find information at any place.	.12	.17	.23	.07	<b>.85</b>
Using the branded mobile app fits any location, whenever I go.	.44	.02	.14	.15	<b>.72</b>
Eigenvalue	4.98	1.98	1.34	1.20	.83
% of variance explained	38.34	15.21	10.34	9.26	6.40
Cumulative %	38.34	53.55	63.89	73.15	79.54

Note. All items were measured on a 7-point Likert scale (1 = *Strongly disagree*, 7 = *Strongly agree*); factor loadings that are .50 or larger are set in bold.

Respondents were first asked to name a branded app that they had regularly used; self-identified branded apps included Amazon, Google, Facebook, Starbucks, CNN, and Target. Respondents then indicated their level of agreement with each item on a 7-point Likert scale (1 = *Strongly disagree*, 7 = *Strongly agree*).

To validate the 13 items that emerged from EFA, we conducted confirmatory factor analysis (CFA) using the maximum likelihood estimation method with AMOS 22. The fit indices for the measurement model for CFA were as follows:  $\chi^2(55) = 205.2$  ( $p < .001$ ), comparative fit index (CFI) = .95, incremental fit index (IFI) = .95, Tucker-Lewis index (TLI) = .94, root mean square error of approximation (RMSEA) = .07, and standardized root mean square residual (SRMR) = .06. Because a significant  $\chi^2$  value is sensitive to sample size, sometimes leading to rejection of the model (Hair et al. 1998), we reduced the sensitivity by dividing the value of  $\chi^2$  by the degree of freedom ( $df$ ). When a  $\chi^2/df$  ratio does not exceed 5.0, model fit is considered acceptable (Bentler and Bonnet

1980). Given that the  $\chi^2/df$  ratio was 3.73 and the other fit indices met the recommended cutoff criteria (Hu and Bentler 1999), the measurement model fits the data, despite the significant  $\chi^2$  value.

*Reliability.* We assessed composite reliability for each dimension of branded app usability. The composite reliability values ranged from .74 to .94, which are acceptable (Hair et al. 1998): user-friendliness = .94; personalization = .83; speed = .87; fun = .92; and omnipresence = .74. Convergent validity was assessed using the standardized factor loadings from the latent variables to the corresponding indicators for statistical significance (Baek, Kim, and Yu 2010; Baek and Morimoto 2012). As expected, all standardized factor loadings, ranging from .71 to .94, were statistically significant ( $p < .001$ ).

*Convergent and discriminant validity.* The average variance extracted (AVE) was calculated to investigate convergent validity of the scale more accurately. Fornell and Larcker (1981) suggested that convergent validity exists when the

AVE value is equal to or greater than .50. Results showed that the AVE values ranged from .59 to .86. We further calculated the maximum shared variance (MSV) and average shared variance (ASV) to assess discriminant validity ( $MSV < AVE$  and  $ASV < AVE$ ) (Fornell and Larcker 1981). Both MSV and ASV values were lower than the AVE values, confirming that the five dimensions of branded app usability achieved convergent and discriminant validity (see Table 2).

*First- versus second-order factor structure.* To assess the multidimensional nature of branded app usability, we compared the fit indices of the second-order factor model with those of three alternative models: (a) a single first-order factor model that accounted for all 13 items, (b) a first-order uncorrelated factor model in which the five factors are not allowed any direct correlation with one another, and (c) a first-order correlated factor model in which the five factors are freely

correlated with one another. As a result, the second-order model ( $\chi^2(60) = 203.7$ , CFI = .95, IFI = .95, TLI = .94, RMSEA = .08, SRMR = .06) showed superior fit to the single first-order model ( $\chi^2(65) = 1039.8$ , CFI = .67, IFI = .68, TLI = .61, RMSEA = .22, SRMR = .11) and the first-order uncorrelated factor model ( $\chi^2(65) = 221.5$ , CFI = .94, IFI = .94, TLI = .93, RMSEA = .08, SRMR = .08). The  $\chi^2$  difference tests also demonstrated that the second-order factor model fit better than the single first-order model ( $\Delta \chi^2(5) = 836.1$ ,  $p < .001$ ) and the first-order uncorrelated factor model ( $\Delta \chi^2(5) = 17.8$ ,  $p < .001$ ).

While the  $\chi^2$  difference was not significant ( $\Delta \chi^2(5) = 1.5$ ,  $p > .05$ ), the fit of the second-order model was as good as the fit of the first-order correlated factor model ( $\chi^2(55) = 205.2$ , CFI = .95, IFI = .95, TLI = .94, RMSEA = .07, and SRMR = .06). As such, the second-order model was

TABLE 2  
CFA Results ( $N = 319$ )

Items	Factor Loading	CR	AVE	MSV	ASV
User-friendliness		.94	.83	.52	.36
It is easy for me to learn the functions of the branded mobile app.	.90***				
Using the branded mobile app is clear and understandable.	.91***				
Overall, the branded mobile app is easy to use.	.91***				
Personalization		.83	.62	.55	.45
The branded mobile app makes me feel that I am a unique customer.	.79***				
I believe that the branded mobile app is customized to my needs.	.83***				
The push notifications and promotions that the branded mobile app sends to me are tailored to my situation.	.75***				
Speed		.87	.70	.60	.48
The branded mobile app is very fast in responding to my feedback.	.82***				
The branded mobile app processes my input very quickly.	.83***				
I am able to obtain the information from the branded mobile app without any delay.	.85***				
Fun		.92	.86	.50	.30
Using the branded mobile app makes me feel entertained.	.92***				
Using the branded mobile app makes me feel pleased.	.94***				
Omnipresence		.74	.59	.50	.30
Using the branded mobile app enables me to find information at any place.	.82***				
Using the branded mobile app fits any location, whenever I go.	.71***				

*Note.* CR = composite reliability; AVE = average variance extracted; MSV = maximum shared variance; ASV = average shared variance; factor loading is based on standardized estimates.

\*\*\* $p < .001$ .

empirically similar to the first-order correlated factor model in terms of model fit indices and theoretically consistent with the reflective higher-order factor structure. Therefore, we concluded that the 13 branded app usability items could be combined into the second-order factor model (see Figure 1).

*Nomological (or predictive) validity.* Nomological validity represents “the degree to which the construct, as measured by a set of indicators, predicts other constructs that past theoretical and empirical work suggests it should predict” (Okazaki, Mueller, and Taylor 2010, p. 13). To establish nomological validity, we evaluated the relationship between the branded app usability scale and three key dependent measures—intention to continue using the branded app, branded

app referral intention, and brand loyalty—known to be theoretically linked to the online usability-loyalty framework (Casaló, Flavián, and Guinalú 2008; Flavián, Guinalú, and Gurrea 2006).

Previous research has suggested that usability plays an important role in establishing customer loyalty and positive word of mouth (WOM) in the context of websites (Casaló, Flavián, and Guinalú 2008). Indeed, retaining consumers and generating positive WOM (or referral) have been recognized as important goals in mobile commerce (Okazaki 2008). Empirical evidence suggests that perceived benefits—mobile app usefulness and playful engagement—positively influence continued mobile app usage and WOM intention (Kim et al.

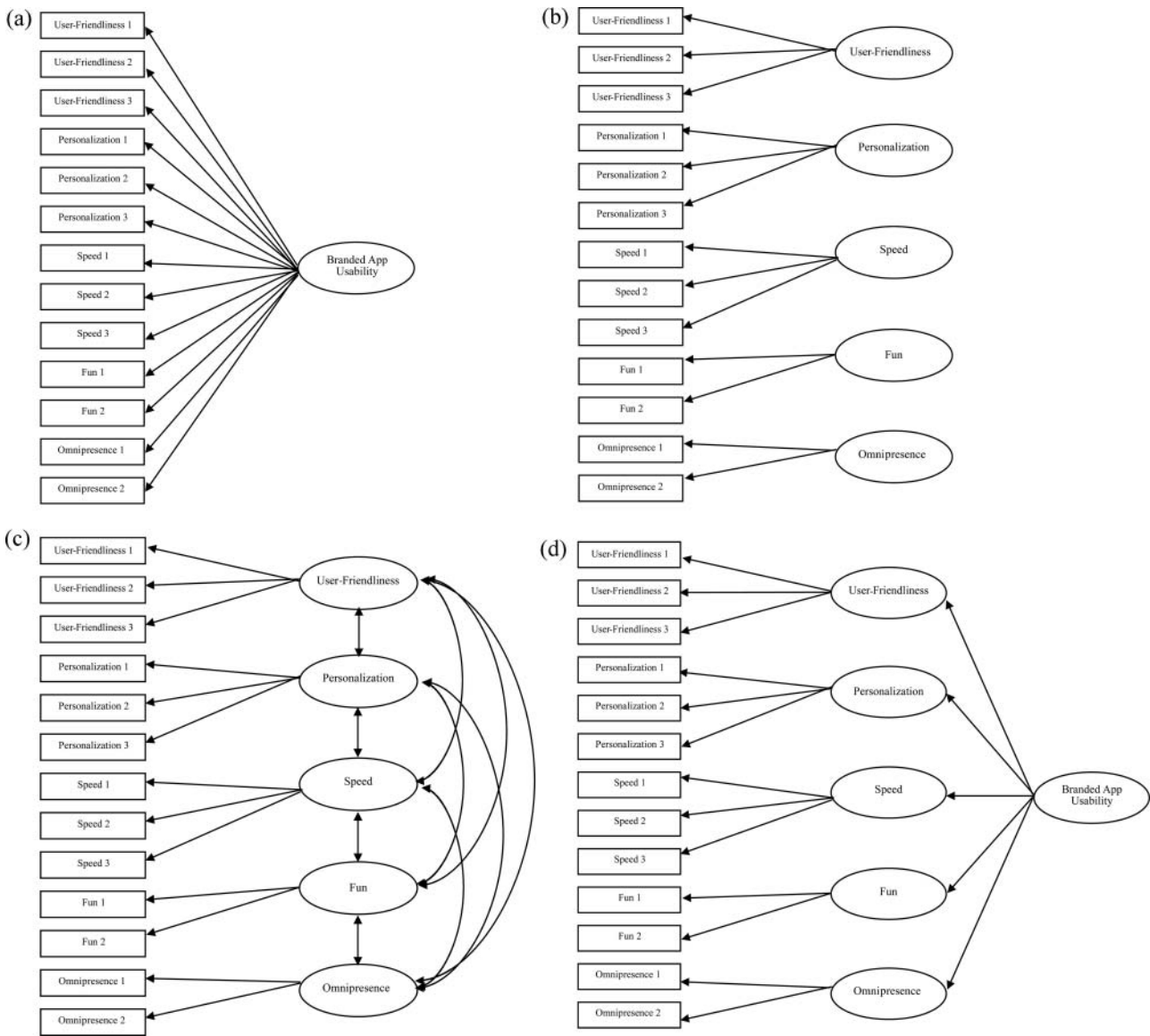


FIG. 1. (a) Single first-order factor model:  $\chi^2(65) = 1039.8$ , CFI = .67, IFI = .68, TLI = .61, RMSEA = .22, SRMR = .11; (b) first-order uncorrelated factor model:  $\chi^2(65) = 221.5$ , CFI = .94, IFI = .94, TLI = .93, RMSEA = .08, SRMR = .08; (c) first-order correlated factor model:  $\chi^2(55) = 205.2$ , CFI = .95, IFI = .95, TLI = .94, RMSEA = .07, SRMR = .06; (d) second-order factor model:  $\chi^2(60) = 203.7$ , CFI = .95, IFI = .95, TLI = .94, RMSEA = .08, SRMR = .06.

2016). In accordance with the usability-loyalty model for websites (Casaló, Flavián, and Guinalú 2008; Flavián, Guinalú, and Gurrea 2006), we proposed that branded app usability should positively predict continued branded app usage and referral intention, thereby indicating higher levels of brand loyalty.

First, we view continued branded app usage intention as the most predictable driver of customer loyalty. This proposition also aligns with previous findings of a positive relationship between stickiness and loyalty in an online context (Roy, Lassar, and Butaney 2014). For example, a higher level of stickiness—a user's intention to continue browsing at a website (Lin 2007)—led to stronger customer e-loyalty (Reichheld and Schefer 2000). Extending this notion, we predicted that strong beliefs about branded app usability would encourage users to keep using a branded app, thereby driving brand loyalty. In this research, intention to continue using the branded app was measured using three items from Agarwal and Karahanna (2000) (i.e., “I plan to keep using the branded mobile app in the future”; “I intend to continue using the branded mobile app in the future”; “I expect my use of the branded mobile app to continue in the future”).

Second, extant literature has shown that behavioral intention strongly predicts actual behavior (Chandon, Morwitz, and Reinartz 2005; Morrison 1979). According to Brown et al. (2005), positive WOM intention serves as a proxy for actual WOM behavior. Thus, we posited branded app referral intention as a critical dependent variable. There is further evidence that referral likelihood positively influences brand loyalty (Reichheld 1993). Branded app referral intention was measured using three items from Zeithaml, Berry, and Parasuraman (1996) (i.e., “I would say positive things about the branded mobile app to other people”; “I would recommend the branded mobile app to someone who seeks my advice”; “I would encourage friends and relatives to use the branded mobile app”).

Finally, brand loyalty is a multidimensional construct that has both attitudinal and behavioral components. Attitudinal loyalty reflects a favorable brand evaluation that is held with sufficient strength and stability to support a long-term relationship, whereas behavioral loyalty represents a consumer's willingness to repurchase a brand (Tam, Wood, and Ji 2009). Along these lines, brand loyalty has been conceptualized as “a deeply held commitment to re-buy or re-patronize a preferred product or service consistently in the future, despite situational influences and marketing efforts having the potential to cause switching behavior” (Oliver 1997, p. 392). Of course, habitual repeated purchase does not necessarily indicate brand preference. That is, consumers with habits are more likely to repeat purchase behavior and engage in repetitive consumption activities without having favorable brand attitudes, goals, or intentions (Tam, Wood, and Ji 2009). Therefore, we operationalized the concept of brand loyalty by using attitudinal and behavioral (purchase) loyalty measures that are

conceptually distinct from habitual repeated consumption. Thus, brand loyalty was measured using three items from Chaudhuri and Holbrook (2001) (i.e., “I intend to keep purchasing the brand”; “I will buy the brand the next time I buy the product category”; “I consider myself to be loyal to the brand”). All items were rated on a 7-point Likert scale (1 = *Strongly disagree*, 7 = *Strongly agree*).

We generated a structural equation model (SEM) representing branded app usability as a second-order factor indicated by the five first-order factors. The SEM results showed acceptable fit, except for the significant  $\chi^2$  value (due to the large sample size,  $\chi^2/df = 3.21$ ):  $\chi^2(200) = 642.3$ ,  $p < .001$ , CFI = .94, IFI = .94, TLI = .93, RMSEA = .08, and SRMR = .07. The RMSEA values, ranging from .05 to .08, are considered acceptable (Browne and Cudeck 1992) while a commonly recommended value for CFI, IFI, and TLI is .90 or greater (Hair et al. 1998; McDonald and Marsh 1990; Tucker et al. 2012). As shown in Figure 2, branded app usability was found to predict intention to continue using the branded app (standardized path coefficient = .91,  $p < .001$ ) and branded app referral intention (standardized path coefficient = .94,  $p < .001$ ). Finally, intention to continue using the branded app was found to have a positive effect on brand loyalty (standardized path coefficient = .35,  $p < .001$ ). Branded app referral intention was also shown to affect brand loyalty (standardized path coefficient = .46,  $p < .001$ ).

In the post hoc analysis, we added control variables—age, gender, ethnicity, and education—to test their potentially moderating or confounding effects on the usability construct. Results revealed that the paths from age (standardized path coefficient = .09,  $p = .11$ ), gender (standardized path coefficient = .11,  $p = .06$ ), ethnicity (standardized path coefficient = .03,  $p = .64$ ), and education (standardized path coefficient = .00,  $p = .95$ ) to usability were not statistically significant.

*Multigroup analysis.* Retail apps aim to enrich shopping experiences and offer customized product recommendations, thereby generating sales. Consumers are steadily downloading more retail shopping apps (Lipsman 2016), showing that growth in mobile commerce has far outpaced electronic commerce and brick-and-mortar stores. In this sense, we tested whether the impact of branded app usability might differ between retail shopping and nonretail shopping apps. Based on the “Shopping” category on the Apple App Store (<https://goo.gl/9RT4LZ>), data were put into two groups: (a) retail shopping app ( $n = 140$ ; e.g., Amazon, eBay, Target, Best Buy, Macy's, Kroger, Groupon, Etsy) and (b) nonretail shopping app ( $n = 179$ ). The results of the multigroup analysis are illustrated in Table 3. We used the  $\chi^2$  difference test to examine whether the hypothesized paths were significantly different between two groups. Results confirmed that the classification variable (retail versus nonretail shopping) was a significant moderator of the relationship between branded app usability and branded app usage continuance ( $\Delta\chi^2 = 9.97$ ,  $p < .01$ ) and between branded app usability and branded app referral



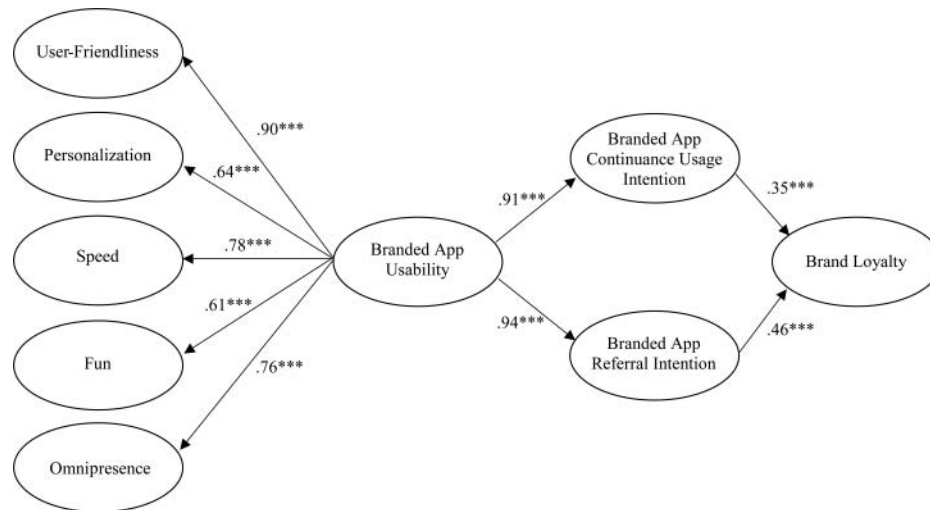


FIG. 2. Nomological network of the branded app usability scale. Branded app usability is a second-order factor comprising user-friendliness, personalization, speed, fun, and omnipresence;  $\chi^2(200) = 642.3, p < .001, CFI = .94, IFI = .94, TLI = .93, RMSEA = .08; SRMR = .07$ ; all coefficient values appear as standardized path estimates.

intention ( $\Delta\chi^2 = 10.40, p < .01$ ). Branded app usage continuance had a stronger effect on brand loyalty in the retail shopping app group than in the nonretail shopping app group ( $\Delta\chi^2 = 4.02, p < .05$ ), whereas branded app referral intention had a stronger effect on brand loyalty in the nonretail shopping app group than in the retail shopping app group ( $\Delta\chi^2 = 8.64, p < .01$ ).

## GENERAL DISCUSSION

The primary purpose of this study was to develop a reliable and valid measure of branded app usability that incorporated consumer perceptions. The scale items were generated, purified, and validated via a review of relevant literature, focus group interviews, expert judgment, and surveys of college

students and nonstudent adults. Branded app usability appeared to be a multidimensional construct with five factors: user-friendliness, personalization, speed, fun, and omnipresence. Overall, our results supported (a) the reliability of and (b) the convergent, discriminant, and nomological validity of the newly developed scale. Furthermore, branded app usability was found to predict consumer loyalty through its strong and positive effect on intention to continue using the branded app and on referral intention.

Theoretically, the current study expands the usability literature, which has, to date, narrowly focused on the technical attributes of mobile app interfaces and content (Hoehle and Venkatesh 2015). Indeed, the consumer-centric approach has been largely ignored. For example, previous studies have tested mobile app usability based on multidisplay buttons

TABLE 3  
Results of the Multigroup Analysis

Hypothesized Paths	Retail Shopping App		Nonretail Shopping App		$\Delta\chi^2$ ( $df = 1$ )
	Standardized Coefficient	<i>t</i> Value	Standardized Coefficient	<i>t</i> Value	
Branded app usability → Branded app continuance usage intention	.83***	8.29	.94***	16.48	9.97**
Branded app usability → Branded app referral intention	.91***	8.90	.96***	17.88	10.40**
Branded app continuance usage intention → Brand loyalty	.56***	5.19	.09	.66	4.02*
Branded app referral intention → Brand loyalty	.25*	2.50	.73***	5.31	8.64**

Note.  $\Delta\chi^2$  = chi-square difference.  
\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

(Kim et al. 2010), text entry and error rates (Lyons, Starner, and Gane 2006), and operating system complexity (Mallat 2007). While several scales purport to measure mobile app usability in the branding context, they have failed to consider the relationships between mobile app usage and consumer–brand engagement. Our scale, developed with consumer evaluations in mind, provides a new measure of branded app usability that can be used to examine focal brand relationships with mobile users.

Importantly, our research extends an existing scale developed by Hoehle and Venkatesh (2015), who identified six mobile app usability dimensions: application design, application utility, user interface graphics, user interface input, user interface output, and user interface structure. They included 82 items related to the nature of mobile app usability based on Apple’s user experience guidelines. However, their measures did not adequately represent the customized and ubiquitous nature of branded app usage. Moreover, their scale is too long and complex for large-scale mobile marketing studies. To overcome these limitations, the current research developed a more relevant subset of scale items (e.g., personalization and omnipresence) for the specific context of branded apps and a more parsimonious measure that is useful for the assessment of nomological validity.

Furthermore, our branded app usability scale could possibly serve as either a predictor or a criterion variable in relevant studies of digital engagement in advertising and marketing. For example, consumers are likely to post and share online reviews about specific branded apps on various social media channels (e.g., Reddit), virtual brand communities, or app stores. While consumers often perceive ads that emphasize branded app usability to be biased attempts to persuade them, they might expect online reviews to contain unbiased evaluations of branded apps (Kronrod and Danziger 2013). Thus, a promising avenue for future research might be to examine the context-specific effects of branded app usability—potentially shaped by ads or online reviews—on subsequent consumer–brand engagement behaviors. Investigating whether creating and sharing user-generated content might influence consumer evaluation of branded app usability would also be interesting.

As mobile usage continues to grow worldwide, strong mobile presences and strategies become increasingly vital to marketing success. Marketers see mobile engagement as an opportunity to create active relationships with customers; consequently, they integrate branded apps into their digital marketing portfolio. However, they worry that their branded apps might not engage target customers during the development and maintenance phases. To date, various usability evaluation tools (e.g., Apple iOS, Microsoft, and Android user interface guidelines) have been developed to aid marketers. However, the functional and technical attribute-oriented evaluation methods have been criticized for their limited applicability to all stages of the branded app life cycle. Accordingly, our branded app usability scale has important practical implications.

Our usability scale enables marketers to assess how consumers perceive potential benefits from their comprehensive interaction with branded apps. The scale transcends existing evaluation guidelines, which are primarily concerned with advanced functionality or design features, moves toward a practical understanding of branded app usability, and provides an instrument that is easy to administer and interpret. Thus, digital marketers can benefit from the underlying dimensions we identified, especially because they predict marketing outcomes such as continued app usage, referral intention, and brand loyalty. Furthermore, our usability scale could be used to survey potential consumers about the effectiveness of a branded app that is being developed or revamped. In other words, our scale could help marketers acquire information about the expectations and perceptions of branded app users during several stages of the branded app life cycle. Given the iterative nature of testing and implementing a branded app, consumer evaluations and feedback could guide app design, content, and functionality that more effectively engage customers. Our scale could help marketers monitor the quality of engagement with branded apps and ultimately enrich mobile app engagement strategies.

Branded app development and maintenance are costly and time-consuming for marketers. Thus, branded apps should not be considered as a panacea for all marketers. Mobile-friendly or mobile-accelerated websites might well serve marketers with minimal budgets or whose primary mobile objectives are to deliver content and to establish a broad presence that can be easily maintained, shared between users, and found on search engines.

## LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The current study has some limitations that suggest pathways for future research. A central limitation is that study respondents were asked to pick one branded app that they had regularly used and accessed on their smartphone, leading to high brand familiarity and leaving out infrequently used apps. Thus, future research should test our usability scale on new or unfamiliar branded apps from various product and service categories (e.g., shopping, entertainment, or social media) to minimize response bias associated with brand familiarity and infrequent use. Examining whether usability perceptions of new branded apps change over time might also be fruitful.


Despite our endeavor to discriminate the focal construct from other criterion variables, one might argue that branded app usability is part of continued usage and referral intention constructs based on the high path coefficients. In our data collection, variables of interest were measured using self-report surveys; thus, the intercorrelations among some variables might be inflated due to common method variance. However, we strongly claim that high path coefficients between constructs do not imply that those measured constructs are


conceptually equivalent. Thus, future research should use different procedural (e.g., multiple methods, longitudinal data, and counterbalancing question order) and statistical (e.g., multitrait-multimethod and Harman's single-factor test) methods to examine the relationships among branded app usability, continued usage, and referral intention.

Our finding that retail and nonretail shopping apps yielded different levels of referral intention and brand loyalty suggests that future research should examine the moderating role of industry classification in the relationship between branded app usability and other outcome variables. Doing so could broaden the generalizability of our findings across different industry categories. Future research might also look into different types of branded apps (i.e., native, hybrid, and desktop apps) to extend the applicability of our scale. Another caveat is that we did not investigate the antecedents of branded app usability and scale reliability over time. Thus, a promising avenue for future research might be to identify and examine possible determinants of branded app usability and to examine scale reliability over time via the test–retest method.

Finally, while the online panel sample for Stage 3 was more heterogeneous than the college student samples for Stages 1 and 2, respondents might not have been representative of all mobile users. Future research should validate our usability scale using a randomly selected sample from other mobile user populations.

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