Web Personalization Cues and Their Differential Effects on User Assessments of Website Value

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ABSTRACT: Although various kinds of personalization cues are pervasively used on websites, previous research studies have treated web personalization primarily as a coarse-grained, monolithic block (e.g., by comparing personalization vs. nonpersonalization or personalization vs. privacy) rather than as a combination of salient types of personalization cues that may create—either jointly or separately—different effects on user assessments of website value. Based on the stimulus–organism–response framework, we develop a research model that proposes users' preference fit and perceived enjoyment as two key intervening mechanisms that carry over the differential effects of content and design personalization cues on users' willingness to stick to a website and to pay for website offerings. In a field experiment with 206 subjects using a real-life news aggregator website, our findings provide evidence in support of different effect paths emanating from content and design personalization cues. Furthermore, we show that the effects of content personalization cues on website stickiness and users' willingness to pay (WTP) are mediated by both preference fit and perceived enjoyment, whereas design personalization cues exert their effects on website stickiness only through perceived enjoyment. Counter to intuition, we find that a combination of content and design personalization cues is ineffective—or even counterproductive—in increasing preference fit and users' WTP above and beyond the levels generated by content cues alone. With regard to perceived enjoyment and website stickiness, however, content and design personalization cues exhibit synergistic properties indicating that the combination of both cues are more than the sum of the individual cues alone. Recommendations are provided as to how online managers and web designers can use web personalization cues to positively influence website stickiness and to strengthen their digital business model.

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Companies worldwide are using advanced personalization technologies such as content filtering or clickstream analyses to customize their web offerings based on users' individual preferences or past usage behaviors [12, 27]. Whereas such technologies allow users to find information more efficiently and to tailor the web environment to their own tastes, they also empower firms to induce users to attend to web content (i.e., to increase website stickiness and advertising revenues) and to behave in ways that are congruent with the firm's sales objectives (i.e., to increase users' willingness to pay and sales revenues) [26]. In this regard, web personalization has been recognized as a key differentiation strategy that help firms to attract and retain customers, and ultimately, to make their business models more viable [70, 79]. It is expected that corporate investment in personalization technologies will continue to surge in the future, given the growing benefits from exploiting vast amounts of available data on the web through advanced analytics [3].

In recent years, through the proliferation of more sophisticated user interface technologies (e.g., HTML5, Javascript/jQuery, Flex, Silverlight), users are increasingly encouraged to participate in the personalization process on websites. Two salient types of personalization features delivered on websites are *content* personalization cues that enable users to reveal their preferences in terms of what product or service attributes they like or dislike (e.g., "Thumb up/down" or "Like/Dislike" buttons) and *design* personalization cues that allow users to indicate their preferences regarding how a website's core content is presented and laid out. Such features have become an integral part of many websites, including news services (e.g., Google News), music recommendations (e.g., Last.fm), or e-auctions (e.g., My eBay). As web personalization cues provide touch points for users to cocreate value [80], the absence of such feedback mechanisms is likely to produce unintended consequences for commercial websites. More specifically, commercial websites may inadvertently squander opportunities in tuning in to users' individual preferences and thereby forgo the chance to increase website stickiness and sales over time.

Although delivering personalized web offerings has become increasingly ubiquitous in recent years and stakes are high for vendors offering personalized services on the web, our understanding of its distinct loyalty- and value-enhancing effects for online services is far from conclusive. On one hand, advocates of web personalization point out that personalization technologies lead to substantial dividends for service providers [5]. For example, MyBuys Inc., a personalization technology provider with 300 e-retailer clients, reported that with personalization practices, e-retailers realized a 12 percent increase in average order value for personalized transactions and could grow the share of repeat buyers by more than 20 percent

[61]. On the other hand, skepticism about the prospects of web personalization remains. For example, in a recent global consumer survey by Adobe, 42 percent of respondents said they were "neutral" about the value of personalized product and service recommendations online, and 26 percent even claimed that it is either not very or not at all valuable [1].

Despite the proliferation of personalization cues on websites and conflicting assessments of its distinct value impacts in practice, it is surprising to find that information systems (IS) research has paid only minimal attention toward disentangling these inconclusive findings so far. Numerous studies have focused on examining the trade-off between personalization and privacy [6, 14, 64] and have studied web personalization's impact on cognitive, affective, and behavioral user reactions such as perceived usefulness and social presence [27, 42], switching costs [38] or information processing [65], and sampling behavior [26]. However, there is as yet little understanding about *whether* web personalization increases users' assessment of website value (i.e., in particular, in terms of website stickiness and users' willingness to pay) above and beyond levels provided through online services lacking such cues. Moreover, previous research has largely neglected to study the differential effects of distinct types of personalization cues, although previous IS scholars have pointed to the importance of examining finer-grained conceptualizations of IT artifacts in general [8, 51], and of salient personalization cues (e.g., content and design cues) in particular [67], rather than studying a simplified dichotomy of personalization versus nonpersonalization. By clubbing together different types of salient personalization cues and failing to consider their heterogeneity on websites, previous research has thus ignored an important possibility—that the marginal effectiveness of such cues may differ and thus provide differential effect patterns. Finally, although previous studies have extensively investigated the effects of web personalization on different user outcomes, the explanatory mechanism of *how* and *why* web personalization cues influence such outcomes has remained largely implicit. Understanding such mechanisms may however help to better explain what processes are at work to make personalization cues more effective.

Taken together, the effects of different salient types of personalization cues and the explanatory mechanisms that delineate *whether, how,* and *why* web personalization should affect users' assessment of website value have remained largely underexplored. The objective of this study is to address these gaps guided by the following research questions:

1. What are the differential effects of salient (i.e., content and design) personalization cues on user assessments of website value (i.e., on their willingness to stick with a website and to pay for online services offered on this website)?
2. How and why do web personalization cues potentially yield higher website value above and beyond nonpersonalized services?

Our findings provide several noteworthy contributions to theory and practice. First, to our best knowledge, our study is the first to demonstrate in an experimental field

setting that personalization cues can increase user assessments of website value over and above levels provided through nonpersonalized websites. Second, we show that web personalization's effectiveness depends on the types (i.e., content vs. design personalization cues) and configurations (i.e., delivered in isolation or in combination) of personalization cues implemented on a website, highlighting the importance of disentangling the effects of salient personalization cues. Third, by identifying users' preference fit and perceived enjoyment on websites as critical mediators, we unblackbox the effect mechanisms of web personalization and thus advance our understanding of why personalization cues affect user assessments of website value. The results of our study also provide useful guidelines on how website designers can successfully design and deliver personalization cues to increase users' website stickiness. Website managers striving to leverage personalization strategies for enhancing their business models may get an advanced understanding of how web personalization can lead to higher user loyalty and add monetary value to their online services.

Theoretical Background

The Stimulus-Organism-Response Model

With the aim of examining the differential effects of salient web personalization cues on users' assessment of website value, we draw on the stimulus-organism-response (S-O-R) model in environmental psychology [49]. The S-O-R model posits that various stimuli within a shopping environment influence a consumer's cognitive and/or affective processes (organism), which in turn determine the consumer's responses. Stimuli are contextual cues external to consumers that attract their attention. Stimuli may manifest themselves in various forms, such as product reviews, product displays or a store's visual design [10, 30]. In the context of commercial websites, stimuli pertain to the content and design features of websites with which users interact, such as website quality signals [9, 76] or a web-based recommendation system's trade-off transparency [77]. The organism reflects the cognitive and affective internal states intervening between the stimuli and the final user response. Intervening processes consist of perceptual, physiological, feeling, and thinking activities. Particularly, the cognitive state is the process of thought regarding an information-processing view of an individual's psychological functions, whereas the affective state reflects the experience of feeling or emotion. The response comes in many forms, and reactions can range from conscious to unconscious and internal (e.g., perceptions and/or behavioral intentions) to external (e.g., acquisition of products) [30]. Several studies in IS research drew on the S-O-R paradigm as a theoretical framework to explain how website features may affect users' internal preferential choice processes and their resulting choice behaviors [53, 77], with their findings supporting its applicability.

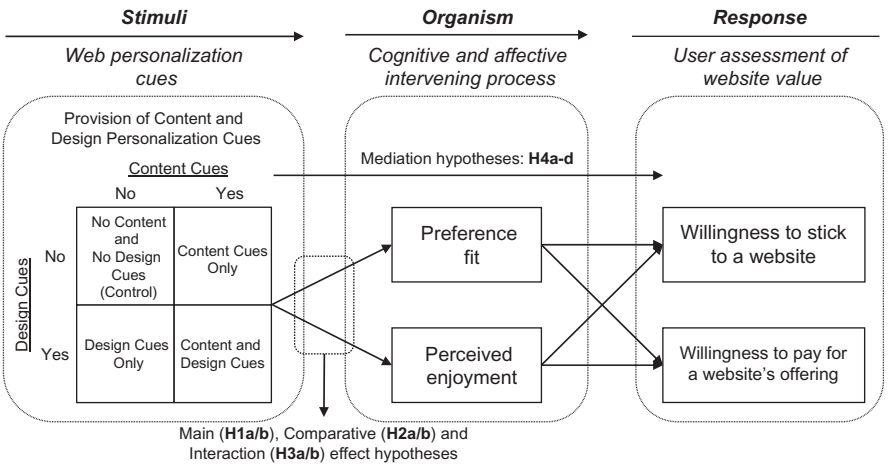


Figure 1. Research Model

The use of the S-O-R framework as an appropriate overarching framework for our own research model (see Figure 1) has the following advantages: (1) it provides a parsimonious and theoretically justified way of investigating the effects of web personalization cues as environmental stimuli, (2) it allows for examination of the role of cognitive and affective reactions to these cues as an organism, and (3) it provides a theoretical rationale for studying user assessments of website value as a state of mind resulting from cognitive and affective changes of an organism (i.e., as a response).

Following the S-O-R model, this study operationalizes (1) *stimuli* as content and design personalization cues on commercial websites, which are the two most salient types of web personalization [43, 67], the first of which refers to features that allow users to reveal their preferences in terms of what *products or services* they like or dislike and the second to features that allow users to indicate their preferences regarding the *presentation and layout* of website content; (2) *organism* as users' perceived preference fit (cognitive system) and perceived enjoyment (affective system); and (3) *response* as users' assessment of two key facets of website value, namely, users' willingness to stick with a website and pay for a website's main offerings. In the next section, we elaborate on web personalization cues as stimuli, preference fit and perceived enjoyment as two facets of the organism and users' assessment of website value as response before we develop our hypotheses.

Web Personalization Cues as Environmental Stimuli

Web personalization generally refers to the process of adapting web content to meet users' individual preferences and to maximize business opportunities [66]. In other words, the goal of web personalization is to deliver individualized content to users at the right time to induce a favorable response to the provider's offerings and to

increase user loyalty for future transactions [39]. In this regard, web content can be conceptualized as a mix of stimuli that take the form of text, images, audio, animations, or videos that are discernible to consumers and influence their cognitive and/or affective responses during the site visit. According to Eroglu, Machleit, and Davis [19] and Parboteeah, Valacich, and Wells [53], prior cues that can generate a cognitive reaction include product descriptions (e.g., price), reviews, and information filtering features that help in the attainment of the online consumer's shopping goals. In contrast, cues such as decorative and vivid depictions (e.g., animation, cheerful colors, interactivity, and pleasant layout) influence a consumer's affective experience with a shopping site, but they do not directly support a particular shopping goal. In the course of interacting with a web page, a user is subjected to the influences of these stimuli. Website providers have different options to present such stimuli to users, of which web personalization cues play a prominent role [43, 67].

There are different approaches to web personalization ranging from user-driven to transaction- and context-driven personalization strategies [66]. User-driven personalization refers to an approach in which a website provides users with features, tools, and options to explicitly specify their information requirements and presentation format so that the website learns from direct user input. For example, a user of the music-streaming service Spotify would tailor her playlist based on the offered music genres and channels to match her own taste of music. In transaction-driven personalization, the online merchant generates personalized layout and content such that personalization is implicitly driven by previous transactions rather than specified by the user [18, 73]. With context-driven personalization, a very adaptive mechanism is employed to personalize content and layout for each individual user in real time. Advances in clickstream and search-pattern analysis have made it possible to understand the context and to infer the user's processing objective while navigating the website.

Although these different approaches to web personalization exist on the Internet, this study focuses on user-driven personalization for two reasons. First, because users are actively involved and consciously partake in user-driven personalization processes, a change in users' assessment of website value can be attributed more unambiguously to users' configurations of personalization cues on websites. Second, user-driven personalization is among the most widely deployed personalization approaches on the Internet and explicit, user-driven personalization approaches have been shown to be equally well in eliciting user preferences as implicit approaches [66].

Web personalization cues are types of environmental stimuli. They are clearly visible to online users, insofar as they engage them in conveying their preferences to the website that in turn can influence users' cognitive system by displaying personalized items that directly facilitate shopping goal attainment [53]. Environmental stimuli not only can be perceived cognitively but also can be perceived affectively. For example, cues that lead to affective reactions include attractive visual designs and interactivity [32]. If web personalization cues can facilitate two-way interaction

between users and a website and provide personalized changes in a website's appearance, then users will likely have a higher sense of positive affect [34]. Taken together, because web personalization cues can emit both content-related (i.e., variations in the display of recommended items) and context-related (i.e., variations in the appearance of the website surrounding the core content) stimuli, they are expected to influence users' cognitive and affective systems (i.e., organism), which are discussed next.

Preference Fit and Enjoyment as Organism

As postulated in the S-O-R model, organism includes the affective and cognitive reactions to a stimulus [49]. Examining a user's affective and cognitive reactions in the context of web personalization is particularly important, because these reactions become not only an integral part of users' experience on websites but also of the online purchase process. Affective reactions represent an individual's emotional response when interacting with an environmental stimulus. To represent users' affective reactions, we propose the construct of perceived enjoyment, which is defined as intrinsic reward derived through the use of the technology or service studied [78]. Perceived enjoyment is an affective measure of a user's perception of whether or not interaction with a system is interesting and fun [40]. The IS literature has frequently studied perceived enjoyment to capture users' affective feelings, and such studies show it to be an important affective component [37].

Compared with affective reactions, cognitive reactions refer to the users' mental processes when they interact with the stimulus [19]. Cognitive reactions relate to how the online user processes content-related (i.e., product- or service-related) information presented on the website [53]. In the web personalization literature, one of the most frequently studied cognitive reaction variables associated with personalized information is preference fit (also called preference matching), which is defined as users' subjective evaluation of the extent to which a website's offerings correspond to their current preferences [27, 65]. Numerous IS studies have demonstrated the importance of preference fit in the web personalization context with its influence on information elaboration, acceptance of personalized offers, and attitude toward purchasing [45, 65]. Yet, only minimal attention has been paid to the effects of users' preference fit on their assessment of website value as manifested in users' intentions to stick to a website and their willingness to pay for the website's offerings. In summary, the perceived enjoyment and preference fit constructs used in this model to represent users' affective and cognitive reactions are consistent with past IS literature in that they are highly relevant in the web personalization context.

Users' Website Stickiness and Willingness to Pay as Responses

As mentioned earlier, the *response* portion of the S-O-R model can be elicited in many forms, ranging from internal (i.e., nonvisible) to external (i.e., detectable), the

former including changes in beliefs, perceptions, and judgment of value [30]. Accordingly, in the web personalization context, we operationalize the responses as users' intentions to stick or return to a website and their willingness to pay (WTP) for the website's offerings as two major manifestations of website value that are closely connected to a commercial website's indirect (advertising-related) and direct (transaction-related) sources of revenues. Whereas website stickiness reflects a website's inherent worth resulting from capturing and holding users' attention on the website's content (including a website's core and ad content as well as its offered utilitarian and hedonic features), users' WTP for a website's core offerings indicates the potential of how site visitors can be converted into paying customers.

The gist of these two somewhat opposing facets of website value is that website providers have to strike a balance between the desire to keep users on their website (e.g., by increasing visit duration or visits per month) and the desire to encourage users to complete transactions (e.g., by purchasing product items or by upgrading to a premium subscription). Accordingly, shedding light on the effect mechanisms behind the trade-off between these two facets of website value—and thus adding a hitherto underexplored theoretical explanation for how such facets are differentially affected—is of significant theoretical and practical value.

Hypotheses Development

As described earlier, the proposed research model is congruent with past applications of the S-O-R model in that our basic framework is consistent with environmental psychology literature. In addition, the web personalization cues used as stimuli as well as both the cognitive and affective reactions (i.e., preference fit and perceived enjoyment) are grounded in the IS domain. Against this background, and as depicted in Figure 1, we first argue that the provision of personalization cues on websites have *overall* (i.e., when either content or design personalization cues, or both, are provided) favorable effects on cognitive and affective user reactions compared to websites lacking such cues (main effect hypotheses). Then, we propose that content and design personalization cues differ in how they *separately* affect cognitive and affective user reactions (comparative effect hypotheses), before we hypothesize their *joint* effects (interaction effect hypotheses). Finally, we look at how these user reactions *mediate* the effects of web personalization cues on users' assessment of website value (mediation hypotheses).

Main Effects of Web Personalization Cues

Before we disentangle and compare content and design personalization cues' separate and distinct effects [75], we seek to investigate whether overall the provision of web personalization cues—compared to contexts in which such cues are not provided—have an impact on cognitive and affective user reactions and thus make a difference. The S-O-R model posits that environmental stimuli have an effect on an

individual's cognitive system. For example, navigation aids and security seals, as environmental stimuli, have been shown to positively impact users' cognitive reactions [53]. Furthermore, trade-off transparency cues provided by online recommendation systems have been found to positively improve consumers' understanding of product attributes [77]. Likewise, we expect that web personalization cues will enhance users' preference fit with a website's offerings.

Our arguments can be supported by preference fit theory [60]. Preference fit theory is based on the straightforward economic argument that a closer fit between preferences and product attributes brings about increased benefits for consumers. In this regard, perceived preference fit is defined as consumers' subjective evaluation of the extent to which a product's or service's features correspond to their preference system [27, 65]. Preference fit is thereby improved when consumers recognize greater overlap between their own needs and the offered products' or services' attributes [57]. The underlying mechanism that operates to increase preference fit in web personalization thus is a constant matching between users' own tastes and a website's product recommendations that are informed by users' personalization activities [27].

In line with preference fit theory, we argue that websites that deploy either content or design personalization cues or both can produce higher preference fit compared to websites without such cues. The key rationale for this effect is that web personalization cues allow users to reveal their preferences to the website and its underlying personalization engine such that they will be better able to adjust the website's appearance and offerings to their own needs. When considered separately, design personalization cues can help users express their aesthetic preferences on a website, whereas content personalization cues enable users to directly indicate their product or service needs to the website. When content and design personalization cues are provided together, users are even able to use these cues in combination (e.g., first to adjust the layout of a websites' content items and then indicate which ones fit best) such that the personalization engine learns through a mixing and matching of diverse personalization signals that allows it to better adapt to users' individual preferences compared to a scenario in which no personalization cues are provided. Taken together, we argue that the provision of web personalization features (i.e., either content or design personalization cues or both) allows a website to better tune in to users' preferences and thus provide a better match with users' tastes than websites lacking such cues.

> ***Hypothesis 1a:*** *Web interfaces that provide personalization cues lead to higher preference fit with a website than web interfaces that do not provide personalization cues.*

In addition to cognitive user reactions, the S-O-R model also posits that environmental stimuli affect individuals' affective or emotive systems [49]. Prior research on environmental stimuli in the e-commerce context found that an interface with stimulating and responsive cues has a positive influence on users' affective feelings

with the website's appearance and content [53]. As salient website stimuli, web personalization cues usually interactively respond to users' preference indication. For example, when a user presses a "Like" button to indicate a need for more news articles of a certain genre, the personalization engine will automatically filter the content items on the website to better represent users' specific tastes. As another example, when a user changes the background color of a website by using design personalization cues, the website will immediately reflect the user's aesthetic tastes.

Consistent with previous studies [33, 77], we argue that these responsive functions of content and design personalization cues—provided either separately or together—are expected to draw more of the users' attention, stimulate their sensory experience, and subsequently lead to positive emotional effects. As such, web personalization cues that give continuous interactive feedback through visual representations of content and design adaptations (which is the case when either or both content and design cues are provided) can keep users' attention focused and can facilitate greater information processing, both of which have been shown to increase intrinsic motivation and enjoyment [37]. In line with the above reasoning and previous empirical findings, we thus propose that a website that incorporates web personalization cues—again, either or both content and design personalization cues—can be expected to lead to greater enjoyment compared with a website lacking such cues.

> ***Hypothesis 1b:*** *Web interfaces that provide personalization cues lead to higher perceived enjoyment than web interfaces that do not provide personalization cues.*

Comparative Effects of Content and Design Personalization Cues

As noted earlier, we distinguish between two different salient types of user-driven web personalization cues that can be deployed on websites. First, *content personalization cues* refer to personalization features that allow users to reveal their preferences in terms of what *product or service attributes* they like or dislike by configuring the personalization features according to their needs. Such cues are most often visually located right next to focal content items on a website (e.g., news articles, product items) so that users are able to use these features to instantly evaluate or rate these content items. For example, the music-streaming service Spotify offers instant feedback buttons located right next to songs (e.g., "add to my playlist," "star songs") that allow users to indicate that they like this style or genre of music. Second, *design personalization cues* refer to personalization features that enable users to indicate their preferences regarding how the core content of the website is presented and laid out. Such cues thus help users to adjust the website's *context* to their individual needs and are usually located in the periphery (e.g., in the navigation bar) of a website. Typical examples include features that enable users to adjust the background color or the layout and order of the items presented to the user on a website.

Based on task–technology fit theory [24], we argue that content and design personalization cues—when provided separately—will differentially affect users' preference fit and enjoyment.[1] Task–technology fit theory suggests that technologies produce and provide the information (and visual representations thereof) necessary for completing tasks, facilitating their task activities and processes, and assisting users with making optimal decisions, all of which positively influence not only users' performance but also their intrinsic motivation and enjoyment [41, 71]. In the context of web personalization, content and design personalization cues predominantly aim at facilitating two divergent task goals. On the one hand, content personalization cues' main purpose lies in the support of users in attaining their search and evaluation goals by facilitating comparative information processing and nurturing the fit between users' preferences and the website's recommended items [27]. As such, content personalization cues primarily target users' cognitive evaluation system (i.e., preference fit). On the other hand, design personalization cues' main task goal is in helping users' adjust a website's appearance to their own aesthetic needs. Such cues thereby emphasize making users feel more comfortable with using a website and thus mainly appeal to users' affective reactions (i.e., perceived enjoyment). Previous empirical research has also shown that while content personalization enhances users' cognitive information processing, design personalization facilitates making users more emotionally attached to a website [13, 66]. Given the different foci of content and design cues in supporting users' task goal attainment on websites and their corresponding differential emphasis on cognitive and affective user reactions, we propose the following hypotheses:

> ***Hypothesis 2a:*** *Web interfaces that provide only content personalization cues lead to higher preference fit with a website than web interfaces that provide only design personalization cues.*

> ***Hypothesis 2b:*** *Web interfaces that provide only content personalization cues lead to lower perceived enjoyment on a website than web interfaces that provide only design personalization cues.*

Interaction Effects Between Content and Design Personalization Cues

In order to theorize on potential interaction effects between content and design personalization cues on users' preference fit, we refer to central capacity theory [36] from cognitive psychology to understand how website stimuli differ in the ways they can draw users' attentional resources on a website. Central capacity theory is rooted in the view that humans possess a limited pool of processing resources (i.e., attention, capacity, or cognitive effort) [68]. Despite this limited capacity, humans seem to be able to divide their attention among different stimuli and tasks. For example, one can surf on the Internet, listen to music, and talk to a friend (offline or online) simultaneously. In this cognitive resource allocation paradigm, Kahneman [36] proposed a limited capacity model of attention, which has a central processor

that allocates attention. In his model, parallel processing in attention is possible, where the limited attentional resource is allocated among different stimuli. The amount of attention that each stimulus receives depends on the difficulty of perceiving this stimulus and the degree of practice that an individual has in processing it. In this regard, extant work in human–computer interaction research has shown that a user's attention is shaped by the way website cues are made salient (e.g., through interaction, multimedia, flash) and are positioned (e.g., in the periphery or at the center) on a website and how they are pertinent to the task environment [28, 29].

A typical situation in website usage is that focal and nonfocal objects compete for attention within an individual's visual field. When an object is the focus of attention, other objects will constantly compete for attention with the focal object, such that the individual has to cope with interferences emanating from these nonfocal objects [31]. According to central capacity theory, if users need to spend attentional resources to suppress the interference of other stimuli, they will be left with fewer resources for the central task of information processing. Hence, central capacity theory suggests that when a salient new item is added to a website, information processing of the other items on the website will decrease because some of the attentional resources are spent on suppressing the interference of this added stimulus [32].

We argue that when content and design personalization cues are provided jointly on a website, content personalization cues will have a higher probability of being a focal object because they more directly support users' central, functional tasks on websites (e.g., sample or purchase recommended items) and are located more at the center of users' visual field (i.e., right next to focal items recommended on the website) [53]. However, given the low likelihood that users completely ignore nonfocal items on a website (i.e., users usually notice them consciously or subconsciously) [63], design personalization cues will still interfere with users' information processing of the focal objects and thus also with users' perceptions of content personalization features. A key explanation is thereby that when users have to use their limited attentional resources on suppressing interferences of nonfocal items, they will have less mental resources to process information about focal items [29, 36].

Consequently, when design and content personalization cues are provided together, users will be relatively more distracted from using content personalization cues to increase their preference fit with the website compared to a scenario in which only content personalization cues are provided. Although providing design personalization cues increases preference fit in its own right through adapting the website to users' hedonic needs, we posit that the loss in preference fit through users' distractions from using content personalization cues will outweigh the gain in preference fit through design personalization cues. This is because we argue that users' appreciation of a marginal increase in content personalization is higher than of a marginal increase in design personalization, given the higher importance of fulfilling utilitarian needs than hedonic needs for users' preference-building processes on commercial websites [53]. In sum, we therefore suggest that combining content and design personalization cues on a website will be less effective in increasing preference fit than providing content cues alone.[2]

Hypothesis 3a: *Web interfaces that provide a combination of content and design personalization cues lead to lower preference fit with a website than web interfaces with content personalization cues alone.*

Quite contrary to the *substitutive* joint effect of content and design personalization cues (compared to content cues alone) on preference fit, we argue that the interaction between content and design personalization cues will have a *complementary* effect on perceived enjoyment. This argument can be based on previous consumer decision-making literature that has found that a diverse set of decision-related stimuli of the same kind (e.g., different food item options on a menu or different brands of the same product category on a supermarket shelf) outperform less diverse stimuli or a single stimulus in terms of positive affect and enjoyment [35]. Consistent with the dictum "variety is the spice of life", which has been the point of departure for several experimental studies in consumer psychology [23, 59], consumers usually hate losing options and therefore consistently seek variety in their choice behaviors because of the positive affect it generates when they have the possibility of satisfying similar needs via distinct routes. One main source of such a variety-seeking behavior is consumers' internal need for stimulation or novelty [35].

Applied to the web personalization setting, content and design personalization cues represent two complementary ways of bringing users' tastes and a website's recommendations and appearance into accordance. Given that these two sources of personalization offer similar (both cues enable users to personalize a website) but distinct (content cues target a website's recommended items, and design cues target a website's appearance) configuration options, we argue that they serve as complements to each other and thus evoke higher levels of enjoyment when they are provided together than when they are provided separately. In particular, content and design personalization cues enable each other insofar as one type of cue creates conditions that may facilitate the use of the other type of cue. For example, when users have adjusted the appearance of a website by using design personalization cues, it is likely that they appreciate the website's enhanced accessibility (e.g., through improved color contrasts or a more adequate sorting layout for recommended items) and thus are better able to leverage the website's content personalization cues. Previous empirical research in e-commerce has also shown that combining content and interface personalization cues can have synergistic effects on customer satisfaction and loyalty [45]. Based on the preceding arguments and previous empirical findings, we hypothesize:

Hypothesis 3b: *Web interfaces that provide a combination of content and design personalization cues lead to higher perceived enjoyment on a website than web interfaces with content or design personalization cues alone.*

The Mediating Role of Preference Fit and Enjoyment

Given the centrality of cognitive and affective user reactions for capturing and transmitting environmental stimuli in the S-O-R model, we suggest that preference

fit (as main cognitive user reaction) and perceived enjoyment (as key affective user reaction) are essential explanatory mechanisms underlying the relationship between web personalization cues and user assessments of website value.

First, we posit that preference fit positively mediates the effect of web personalization cues on website value. The prevailing perspective on preference expression and elicitation in the field of behavioral decision research is that consumers do not have clear and stable preferences to reveal but instead construct them on the fly when the need to make a choice arises [54, 62]. One implication of the unstable nature of preferences is that the construction of preferences is affected by many contextual factors. On personalized websites, personalization cues are particularly salient signals that help users to express their preferences and convey them to the personalization system so as to reach a continuous matching of their preferences with a website's appearance and recommended items. A user who believes that a website provides high preference fit (i.e., believes that the personalization system of a website is designed such that it is able to capture and reflect the user's true set of preferences) can be expected to evaluate the website's performance as better. In this sense, preference fit acts as a mediator transmitting the impact of personalization cues to a user's performance assessments of a website and its offerings [16, 27]. That is, web personalization cues will *first* shape the matching process between users' preferences and a website. In the attempt of a website to offer personalized recommendations, a user is *then* likely to infer that the website and its underlying personalization system are able to increase the user's preference fit in a way that leads to higher user assessments of website value.

As mentioned earlier, higher website valuation judgments can be expressed through higher user intentions to stick to a website and higher WTP for the website's offerings. Previous empirical research studies could show that higher preference fit experienced by users on websites positively affects user satisfaction and loyalty because users can expect that such websites offer new content (e.g., products, services, or news) on a recurring basis that fits with their needs [37]. As such, they are likely to keep coming back to the website for its informational value. In the same vein, we propose that users not only become more loyal to a website by itself due to a higher preference fit but also have a higher WTP for the products and services offered on such websites. When users perceive greater preference fit, they experience a greater overlap between their own needs and the recommended items' attributes, which is usually reflected in higher perceived utility and WTP [57]. Previous empirical studies have also shown that web users' evaluations of the level of match between a website's recommendations and their individual preferences are strongly related to the success of a website and lead to more time spent browsing, more varied products explored, and enhanced probability of purchasing [50]. Taken together, we argue that users' preference fit evoked by web personalization cues will have carryover effects on their assessments of website value. Consequently, we hypothesize:

> ***Hypothesis 4a:*** *Users' preference fit with a website mediates the effect of content personalization cues on users' willingness to stick to a website and to pay for a website's core offerings.*

Hypothesis 4b: *Users' preference fit with a website mediates the effect of design personalization cues on users' willingness to stick to a website and to pay for a website's core offerings.*

Second, we also argue that perceived enjoyment serves as a mediator between web personalization cues and users' assessment of website value. Previous research could demonstrate that perceived enjoyment positively influences user attitudes and satisfaction with a system interface [33], leads to a higher level of online customer loyalty [17], greater likelihood of returning to a website [37, 40], and greater behavioral intention to use a system [69]. In the same vein, higher levels of enjoyment are believed to positively affect users' website stickiness. With greater enjoyment, users will feel more comfortable on a website [40], resulting in a greater likelihood of staying longer and returning more often to a website. Conversely, less enjoyment may hinder users from feeling affectively attached to a website, consequently hampering their stickiness to the website.

If a website provides personalization cues that engage and entertain users, we expect that users' will also have a higher WTP for products or services offered on this website. One rationale is that when a website is regularly able to bring users into a state of deep involvement with its services and thus fulfills users' hedonic needs, users should be more likely to have a higher WTP for such services [37, 69]. Another argument is that users with higher enjoyment usually act more spontaneously and less deliberately, resulting in lower aversions to paying marginally higher prices [40]. In the case of web personalization, when users find that interacting with personalization cues is appealing, they will be more involved in using the cues and the overall website, and their impulsivity will be higher compared with those who find interaction with personalization cues boring and dull. In summary, we therefore argue that the consequence of an increased perceived enjoyment evoked by web personalization cues is a key reason for higher user intentions to stick with a website and WTP for a website's offerings. Accordingly, we propose:

Hypothesis 4c: *Users' perceived enjoyment on a website mediates the effect of content personalization cues on users' willingness to stick to a website and to pay for a website's core offerings.*

Hypothesis 4d: *Users' perceived enjoyment on a website mediates the effect of design personalization cues on users' willingness to stick to a website and to pay for a website's core offerings.*

Research Methodology

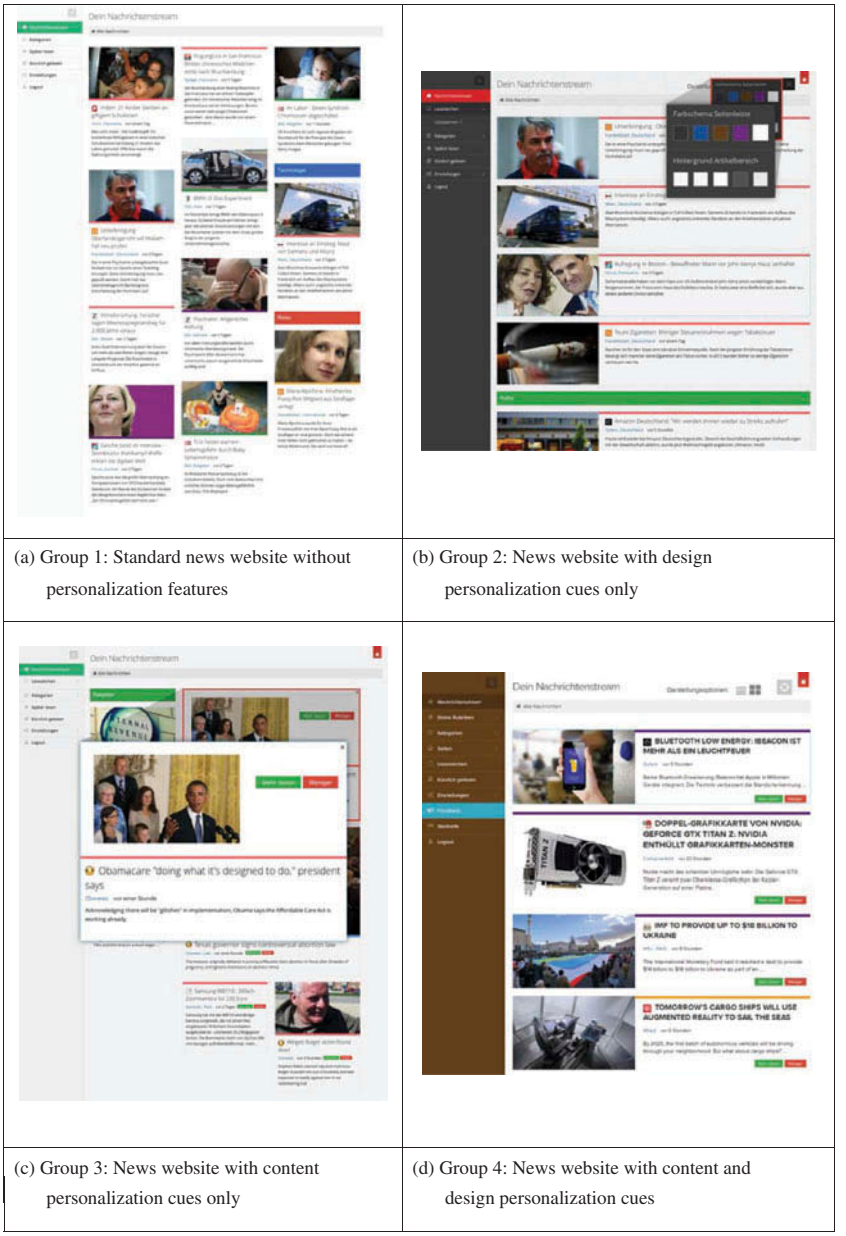
Experimental Design, Website and Manipulations

A 2 (*content* personalization cues: Yes vs. No) × 2 (*design* personalization cues: Yes vs. No) between-subjects, full factorial design was implemented to test the hypotheses

[58]. To deploy this experimental design on a real website in a natural field setting, we collaborated with the German start-up company Yones, which specializes in online news aggregation. Yones draws on different online news platforms (such as NYTimes.com, WSJ.com, Spiegel.de) via RSS feeds and provides functions that are common on many e-commerce websites, including (1) user profile management, (2) collection and analysis of web activities, and (3) personalization of web content based on users' preferences. The personalization engine underlying Yones generates a set of rules that drives the personalized content on the news aggregation site. These rules are based on users' direct input from indicating their preferences for news articles (i.e., content personalization cues) and presentation formats (i.e., design personalization cues). For all experimental conditions, Yones drew on the same basic set of online news articles and these articles were filtered based on exactly the same content-based filtering techniques [2, 74, 75].

In group 1, the control condition (*absence of design and content personalization cues*), the selection of news articles was not personalized but displayed in a standard way that came closest to a mass-marketing newspaper [21]. In group 2 (*provision of design personalization cues but lack of content personalization cues*), users could personalize the presentation format of the website in addition to the standardized presentation of news articles provided in the control group. For example, users could change the background color for different areas (i.e., navigation bar and news article area) or configure the layout options of the news articles presented to users (e.g., displaying the articles in a list or tile layout). In group 3 (*provision of content personalization cues but lack of design personalization cues*), subjects could alter the relevance of specific news topics during usage of the website by clicking on preference buttons (i.e., "More/Less of this topic") located right next to each news article. Finally, in group 4 (*provision of both content and design personalization cues*), content and design personalization cues were combined and presented together on the website. To increase ecological validity, all web personalization cues could be used voluntarily and their presentation format and saliency were based on designs commonly used on personalized websites. Figure 2 depicts characteristic displays of the four conditions in our experiment.

We performed a pretest with twenty-four subjects employing a within-subject design and using a cover story similar to that in the main experiment (i.e., exploration and use of a new online news aggregator website) to test the manipulation of variables, check different basic website designs (low vs. high quality) for Yones, and fine-tune the experimental procedure. Each subject was instructed to evaluate eight different websites based on a 4 (no cues, design cues only, content cues only, design and content cues together) × 2 (low vs. high website design quality) design in a random order. Feedback from subjects in the pretest indicated that the design and content cues were recognized as distinct and commonly used personalization features on websites. Furthermore, we did not find any significant differences in the effect patterns of the manipulated personalization cues across low- and high-quality website designs in terms of perceived enjoyment, preference fit, and website stickiness, such that potential halo effects from the basic quality of



(a) Group 1: Standard news website without personalization features

(b) Group 2: News website with design personalization cues only

(c) Group 3: News website with content personalization cues only

(d) Group 4: News website with content and design personalization cues

Figure 2. Displays of the Four Experimental Conditions on the Yones Website

the website design on our experimental stimuli could be ruled out. As a result, Yones used just one basic website design for the main experiment that was similar to other commonly used online news aggregator websites (e.g., Feedly, Google News).

Variables Measured

During the registration process on the Yones website, subjects in each condition were asked to indicate their maximum WTP for a monthly subscription to an online news aggregator that we used as control variable. After subjects had been exposed to the experimental website, they were again requested to indicate their maximum WTP, but this time specifically with regard to Yones. This measure was used as dependent variable in our data analyses. We measured WTP for all four conditions by providing the participants with an input box in which they could directly enter a euro amount, which constitutes a form of a contingent valuation method [72]. We did not apply any transformations to either WTP measure (i.e., before and after treatment) because they approximated a normal distribution.

Consistent with previous studies [10], website stickiness was measured using items that reflected users' intention to reuse or return to a website in the future. For perceived preference fit and perceived enjoyment, we adapted established scales from published studies [22, 27, 40]. We collected additional data in the pre- and postexperimental surveys and during website usage through clickstream analysis. We used these variables as sample descriptives, manipulation checks, and controls in subsequent analyses. All of the items of the study's principal constructs and their sources are shown in Table A1 of the Appendix.

Subjects, Incentives, and Procedures

Consistent with previous experimental studies [21, 22], we used the online panel of a market research firm to obtain a random and representative sample of 220 German Internet users, thereby increasing the generalizability of the findings. This sampling frame also ensured that participants did not systematically differ in the context and background of their experiences regarding the experimental website and that the disparities across our treatments were caused only by different treatment stimuli [25]. The participants were asked in an e-mail invitation to register as new users at Yones, where they were randomly assigned to one of our experimental conditions. To provide extra incentives for the subjects to use the website and complete the pre- and postexperimental surveys, subjects participating in the study were told that they would be entered into a raffle where they could win an e-book reader, a tablet, or Amazon coupons. Furthermore, Yones offered them a free subscription to their services for one year. Previous research [10] indicates that such incentives are important, as they serve to motivate participants to view the experiment as a serious online experience session and increase their involvement. Fourteen participants were removed from the sample for the following reasons: Four subjects failed to complete the questionnaires. Six subjects reported inconsistent information. The other four subjects were outliers in their indication of WTP. Hence, we used a sample of 206 subjects in the following analysis. Of the 206 subjects, 105 were females and 101 males. Their average age was 35.13 years. On average, the subjects had been using

the Internet for 16.5 years, and spent 24.3 hours on the Internet per week. The average reported interest in online news was 4.87 and their product involvement was 4.92 on a seven-point Likert scale. The subjects' average monthly spending on print publications was €12.34.

The field experiment proceeded in three major steps. First, upon arrival at the experimental website, all subjects had to go through a registration process (to prevent repeated participation) and complete a preexperimental questionnaire with basic questions on sociodemographic data and their WTP for online news. Second, upon completion of the questionnaire, subjects were randomly assigned to one of the four conditions and instructed to explore and use the news aggregator website (Yones) according to their own preferences and tastes (i.e., the use of personalization cues was optional). After a period of using the website, a postexperimental survey popped up asking the subjects to respond to questions measuring website stickiness and their WTP for a monthly subscription at Yones and several other variables (see "Variables Measured"). The postexperimental questionnaire was triggered when users had read more than thirty news articles in at least five usage sessions (i.e., after at least five log-ons) in order to ensure that the underlying filtering mechanism of the website had sufficiently tailored its content to users' individual preferences. On the last page of the survey, subjects were debriefed and thanked for their participation.

Data Analysis and Results

Control and Manipulation Checks

To confirm the random assignment of subjects to the different experimental conditions, we performed one-way analysis of variance (ANOVA). There were no significant differences in gender ($F = 0.642$, $p > 0.1$), age ($F = 0.432$, $p > 0.1$), Internet experience ($F = 0.191$, $p > 0.1$), monthly spending on news articles ($F = 0.982$, $p > 0.1$), product interest ($F = 0.776$, $p > 0.1$), product involvement ($F = 0.998$, $p > 0.1$), and users' WTP for a monthly subscription to an online news aggregation provider prior to the exposure to our experimental website ($F = 1.129$, $p > 0.1$) among the four experimental conditions. There were also no significant differences in session log-ons, number of total clicks and page views (all $p > 0.1$) during the usage of the Yones platform among the four experimental conditions. These results indicate that these factors were not the cause of the differences in users' WTP. In order to examine whether subjects correctly recognized the provision of the web personalization cues on the Yones website, we provided brief definitions of design and content cues in the postexperimental survey and asked each subject three questions (i.e., "What personalization cues could you identify on the website? [Design cues, Content cues, No cues at all]"). We found that an average 97 percent of the subjects exactly matched our treatments for the four different conditions, implying that the manipulations were successful.

Based on the clickstream data collected during subjects' usage of the experimental website, we could additionally verify that our experimental manipulations were

Table 1. Analysis of User Clickstreams During Experimental Usage Period

	Experimental groups			
	(1) None (control group)	(2) Design cues only	(3) Content cues only	(4) Content and Design cues
# of subjects	51	53	51	51
# of logons	7.71 (1.54)*	6.94 (1.31)	7.40 (1.53)	7.36 (1.32)
# clicks on news articles	54.17 (18.69)	55.81 (17.12)	56.12 (15.76)	50.63 (19.23)
# of clicks on design personalization cues	–	5.67 (2.06)[a]	–	4.63 (1.29)[c]
# of clicks on content personalization cues	–	–	10.88 (3.34)[b]	6.84 (1.89)[d]
# of other clicks	13.73 (3.72)	10.34 (2.99)	9.87 (2.65)	11.45 (4.50)
# of total clicks	67.92 (23.34)	71.82 (24.54)	76.97 (24.02)	73.55 (28.19)

*Mean (standard deviation)
Breakdown of click levels for design and content cues:
[a]0:0.0%; 1–3: 27.2%; 4–6: 41.3%; 7–9: 24.8%; ≥10: 6.8%
[b]0: 0.0%; 1–5: 14.1%; 6–10: 34.5%; 11–15: 43.7%; ≥16: 7.8%
[c]0: 0.0%; 1–3: 35.9%; 4–6: 39.3%; 7–9: 21.8%; ≥10: 2.9%
[d]0:0.0%; 1–3: 22.3%; 4–6: 44.7%; 7–9: 27.2%; ≥10: 5.8%

successful. As can be seen from Table 1, the number of clicks on web personalization cues during the experimental usage period was significantly greater than zero ($p < 0.5$) for all subjects in groups (2) to (4) indicating that our experimental manipulations based on the provision of web personalization cues were actually used by the subjects.

Main, Comparative, and Interaction Effects of Web Personalization Cues

A multivariate analysis of variance (MANOVA) test was conducted to test the effects of the provision of the different kinds of web personalization cues examined in our study. MANOVA test statistics included Pillari's trace, Wilks's lambda, Hotelling's trace, and Roy's largest root. The *p*-values of these statistics were found to be significant ($p < .05$). Therefore, further ANOVAs were conducted on the two dependent variables.

The subsequent 2 × 2 ANOVA tests (see Table 2) showed that content personalization cues had significant effects both on users' preference fit and on perceived enjoyment, whereas design personalization cues had only significant effects on perceived enjoyment. The interaction effects between content and design personalization cues were found to be significant for both preference fit and perceived enjoyment.

Table 2. ANOVA Tests of Between-Subjects Effect

Source	Dependent variables	Sum of squares	df	Mean square	*F*	Sig.
Intercept	Preference fit	4,425.149	1	4,425.149	4,090.787	0.000
	Perceived enjoyment	4,073.653	1	4,073.653	4,598.575	0.000
Provision of Design cues	Preference fit	0.404	1	0.404	0.374	0.542
	Perceived enjoyment	65.783	1	65.783	74.259	0.000
Provision of Content cues	Preference fit	33.577	1	33.577	31.040	0.000
	Perceived enjoyment	53.563	1	53.563	60.465	0.000
Design × Content cues	Preference fit	5.596	1	5.596	5.174	0.024
	Perceived enjoyment	4.665	1	4.665	5.267	0.023
Error	Preference fit	218.511	203	1.082		
	Perceived enjoyment	178.942	203	0.886		
Total	Preference fit	4,679.000	206			
	Perceived enjoyment	4,374.889	206			

Table 3. Contrast Analysis

Manipulation	No cue	Design only	Content only	Design and Content
Dependent variable: Preference Fit				
Mean (SD)	4.11 (0.90)	4.34 (1.06)	5.25 (0.87)	4.83 (1.28)
N	51	53	51	51
No cue	–			
Design only	0.23 (0.239)†	–		
Content only	1.14 (**0.000**)	0.91 (**0.001**)	–	
Design and content	0.72 (**0.001**)	0.48 (**0.020**)	–0.42 (**0.044**)	–
Dependent variable: Perceived Enjoyment				
Mean (SD)	3.52 (1.02)	4.35 (1.09)	4.24 (0.79)	5.67 (0.82)
N	51	53	51	51
No cue	–			
Design only	0.83 (**0.000**)	–		
Content only	0.72 (**0.000**)	–0.11 (0.551)	–	
Design and Content	2.15 (**0.000**)	1.32 (**0.000**)	1.43 (**0.000**)	–

† Planned contrast estimate between column and row conditions (Significance); significant contrasts are in bold font.

We conducted planned contrast analyses to further detail the difference between content and design web personalization cues for preference fit and perceived enjoyment. Table 3 indicates that content cues only and design and content cues jointly were observed to generate significantly higher preference fit than the no-cue interface, whereas design cues only had no significant effect over the control condition; thus, H1a could be only partially supported. The three treatment conditions also vary in the magnitude of their effects on users' preference fit. While content cues are relatively more effective than design cues, which supports H2a, it is interesting to find that the combined content and design condition is significantly less effective than the content only condition in increasing preference fit. This finding indicates that combining both types of web personalization cues has a *substitutive* effect to the point that preference fit is significantly diminished compared to a content-cue only condition, supporting H3a.

In a supplementary clickstream analysis comparing groups 3 (content cues only) and 4 (design and content cues), we found that the number of clicks on content personalization cues was significantly lower in group 4 (6.84 clicks) compared to group 3 (10.88) (i.e., by around 37 percent; $p < 0.05$), whereas the total number of clicks remained stable across these two groups (see Table 1). This provided additional evidence for our assumption that combining design with content personalization features drew users' attention away from using content personalization cues for increasing preference fit.

For perceived enjoyment, we found significant differences between the no-cue interface condition and design-cues only, content-cues only, and design and content

conditions, respectively. This shows that websites with either web personalization cues (design or content) or combinations of cues (design and content) are both effective in increasing perceived enjoyment, in full support of H1b. The three treatment conditions again vary in the magnitude of their effects on users' perceived enjoyment. In contrast to our findings regarding preference fit, however, content personalization cues are not significantly more effective than design personalization cues in enhancing perceived enjoyment. In fact, both types of web personalization cues do not differ in their impact on perceived enjoyment, which leads us to reject H2b. In stark contrast to our findings regarding preference fit, combining design and content cues is significantly more effective than the content-cue or design-cue only conditions, respectively, in increasing perceived enjoyment, implying *complementary* effects such that either (design or content) personalization cue increases the marginal impact of the other on perceived enjoyment, supporting H3b.

As shown in Figures 3 and 4, the estimated means of preference fit, perceived enjoyment, website stickiness and users' WTP were plotted for the provision of each of the two web personalization cues. The results illustrate that design cues alone are not sufficient for significantly increasing preference fit and users' WTP compared to a no-cue condition, while content cues alone have strong effects on these two outcome variables—even significantly stronger than a combination of content and

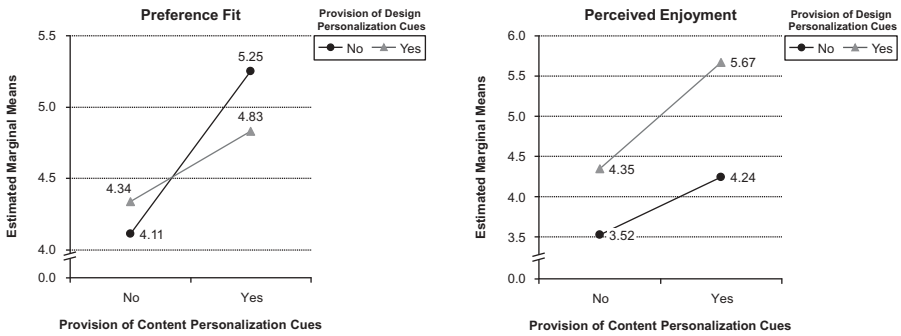


Figure 3. Estimated Marginal Means for Preference Fit and Perceived Enjoyment

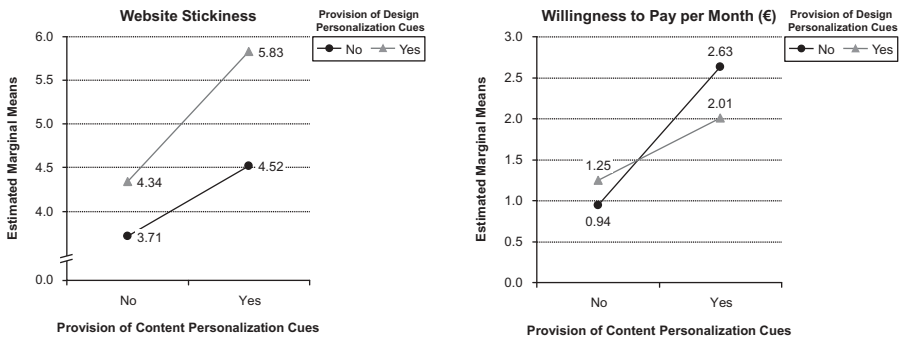


Figure 4. Estimated Marginal Means for Website Stickiness and Users' WTP

design personalization cues. At the same time, however, design cues have a significant impact on perceived enjoyment and website stickiness that is even disproportionately increased in combination with content cues.

Test of the Research Model

We performed structural equation modeling using partial least squares (PLS) to test our research model in general, and our mediation hypotheses in particular. PLS has an added advantage over covariance-based methods (e.g., LISREL) in that (1) it maximizes the explained variance of endogenous variables in the structural model [15], which enables us to understand the amount of variance explained in our principal dependent constructs, and (2) PLS does not make distributional assumptions for the data [15]. We used the software Smart PLS 2.0 [56] to conduct the analyses.

Measurement Model Assessment and Common Method Bias

The psychometric properties of the measurement models were assessed by examining outliers, individual item loadings, internal consistency, convergent validity, and discriminant validity of all latent constructs. We screened the data set (including the clickstream data) for outliers using Cook's D and standardized residuals, and detected four outlier cases that were removed from the sample (see section "Subjects, Incentives, and Procedures") [11]. Convergent validity for latent constructs was evaluated using three criteria recommended by Fornell and Larcker [20]: (1) all the measurement factor loadings must be significant and above the threshold value of 0.70, (2) the composite reliabilities must exceed 0.80, and (3) the average variance extracted (AVE) by each construct must exceed the variance due to measurement error for that construct (i.e., AVE should exceed 0.50).

As evident from the measurement models in Table A3 of the Appendix, the loadings of the measurement items on their respective factors were above the threshold value of 0.70, and all were significant ($p < 0.05$). Composite reliabilities and Cronbach's alpha of the constructs ranged between 0.87 and 0.94, and values for AVEs ranged from 0.80 to 0.84 (see Table A2 of the Appendix). Thus, all of the constructs met the norms for convergent validity. In addition, as seen from the factor correlation matrix in Table A2 of the Appendix, all of the square roots of the AVE exceeded interconstruct correlations, providing strong evidence of discriminant validity [20]. Moreover, the loadings of a given construct's indicators were higher than the loadings of any other, and these same indicators loaded more highly on their intended construct than on any other construct. This lends further support to discriminant validity. Hence, the latent constructs in this study represent concepts that are both theoretically and empirically distinguishable.

To address the potential concern for common method bias, we performed two tests. First, we applied the Harman one-factor extraction test [55]. Using a principal

component analysis for all of the items of the principal latent variables measured in the study, we found three factors with eigenvalues greater than 1, accounting for 85.76 percent of the total variance. As the first factor accounted for only 38.35 percent of the total variance, less than 50 percent of the total variance, it indicates a lack of a substantial common methods bias. Second, we followed the marker-variable technique suggested in extant literature [46, 47]. We used computer self-efficacy (CSE) [48], a theoretically unrelated construct, as marker variable. High correlations among any of the items of the study's principal constructs and CSE indicate common method bias. Since the average correlation among CSE and the three principal latent constructs was r = .07 (average p-value = 0.32), minimal evidence existed of common method bias. Thus, these two tests suggested that common method bias is not a major concern in this study.

Structural Model Analysis and Mediation Tests

Figure 5 depicts the results of the structural model, including path coefficients and the variance explained. The model successfully explained a considerable amount of variance in preference fit (R^2 = 0.19), perceived enjoyment (R^2 = 0.41), website stickiness (R^2 = 0.33), and users' WTP (R^2 = 0.27). Content personalization cues strongly influenced preference fit and perceived enjoyment, whereas design personalization cues had a significant effect on perceived enjoyment but not on preference fit. We also found a positive interaction effect between content and design cues on perceived enjoyment and a negative one on preference fit. These results validated the previous findings about our main and interaction hypotheses. In addition, we found that preference fit strongly influenced website stickiness and users' WTP, whereas perceived enjoyment had only a significant effect on website stickiness.

In a next step, we formally examined whether the effects of content and design personalization cues on website stickiness and users' WTP were mediated through preference fit and/or perceived enjoyment. To test for mediation, we followed the well-established procedure recommended by Baron and Kenny [7]. As a first step, Figure 5 demonstrates the effects of the provision of design and content personalization cues (independent variables) on preference fit and perceived enjoyment

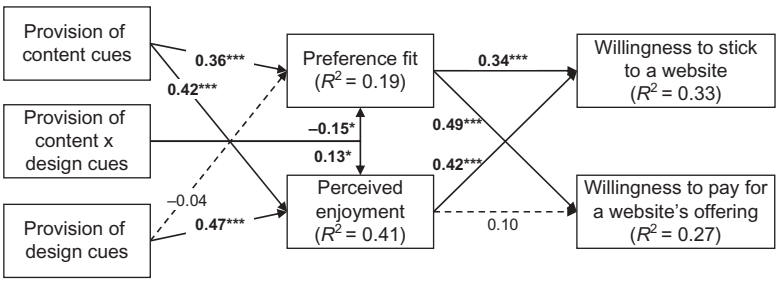


Figure 5. Results of Research Model

*p < 0.05; **p < 0.01; p < 0.001

(potential mediators). We then tested the direct effects of design and content personalization cues (independent variables) on users' willingness to stick to a website and to pay for a website's offerings (dependent variables). The paths from content ($\beta = 0.47$, $p < 0.01$) and design personalization cues ($\beta = 0.39$, $p < 0.01$) to website stickiness were both significant. In contrast, only the path from content personalization cues ($\beta = 0.53$, $p < 0.01$) to users' WTP was significant, but the path from design personalization cues to users' WTP was not ($\beta = -0.07$, $p > 0.05$). Next, when preference fit and perceived enjoyment (potential mediators) were added to the model together with content and design personalization cues to predict website stickiness and users' WTP, the effects of content personalization cues on website stickiness and users' WTP were still significant with coefficients of $\beta_{Sticky} = 0.31$ ($p < 0.01$) and $\beta_{WTP} = 0.45$ ($p < 0.01$), while the effect of design personalization cues on website stickiness also remained significant ($\beta_{Sticky} = 0.34$, $p < 0.01$). As such, preference fit partially mediated the effects of content personalization cues on *both* outcome variables, but it did not mediate the effects of design personalization cues, thus supporting H4a and rejecting H4b. In contrast, perceived enjoyment only partially mediated the relationship between *both* web personalization cues and website stickiness, but it did not for users' WTP. Thus, H4c and H4d could only be partially supported.

Discussion

Our motivation for this study was to advance our understanding of the differential effects of personalization cues on websites to clarify the debate on whether, how, and why web personalization contributes to increasing website value. Related to our research questions outlined at the outset of this paper, three main findings can be derived from our study.

First, our results show that personalization cues on websites can indeed evoke higher user assessments of website value, yet that this value premium depends on the different types of personalization cues offered on a website. In particular, our study could disentangle the distinct causal effects of two salient personalization cues. While content personalization cues are effective in increasing both preference fit and perceived enjoyment, design personalization cues have strong effects on perceived enjoyment but not on preference fit. These effects are also mirrored in personalization cues' impacts on website value. Whereas content personalization cues significantly affect both facets of website value, design personalization cues influence just website stickiness. One possible explanation for the nonsignificant effects of design personalization cues on preference fit and users' WTP is that design cues predominantly affect users' aesthetic tastes and hedonic needs regarding a website's appearance and responsiveness and, to a lesser degree, users' preferences for a website's core recommended items. In this regard, it thus seems likely that design personalization cues have only negligible effects on users' cognitive processes that generally constitute a main precondition for influencing users' WTP.

Second, we find that a combination of content and design personalization cues exhibits opposite effect patterns. On one hand, mixing content and design personalization cues on a website is ineffective—or even counterproductive—in increasing preference fit and users' WTP above and beyond the levels generated by content cues alone. One plausible explanation supported by the empirical findings in our study is that design personalization cues distract users' attention from using content personalization cues that offer users higher marginal benefits from increasing their perceived preference fit with the website. As such, overwhelming users by adding design personalization cues may diminish the beneficial effect of personalizing the core (i.e., content) services on a website to the point that it backfires by leading to a significant drop in users' WTP. On the other hand, content and design personalization cues together exhibit synergistic properties with regard to perceived enjoyment and website stickiness. This indicates that the combination of both cues is more than the sum of the individual cues alone, when it comes to keeping users' on a website.

Third, our findings show that the effects of content personalization cues on website stickiness are mediated by both preference fit and perceived enjoyment, whereas its effects on users' WTP are only mediated through preference fit. In contrast, design personalization cues exert their effects on website stickiness only through perceived enjoyment and have neither direct nor indirect effects on users' WTP. A plausible reason for the nonsignificant effect of enjoyment on users' WTP is that mere enjoyment experienced on a news aggregator website—an information system predominantly used in a utilitarian way to gather knowledge about different general interest and specialized topics—may not be strong enough to impact users' WTP for the website's offerings.

Theoretical Contributions

We believe this research makes three important theoretical contributions that highlight *whether, how,* and *why* web personalization cues affect user assessments of website value.

First, understanding how web personalization influences users' cognitive, affective, and behavioral reactions is critically important, yet whether web personalization cues affect user assessments of website value has not been fully established. Previous online personalization studies have focused mainly on online user behaviors as outcomes [26, 27, 65, 66]. Those few studies that looked at the value-enhancing effects of personalization on websites only elicited users' agreement or disagreement to prespecified levels of WTP without letting users freely indicate their WTP [45]; in such cases, users may, however, incorrectly specify their WTP, and providers get an unrealistic impression of users' preferences. As such, we advance the online personalization literature by demonstrating that web personalization can indeed generate a behavioral *and* monetary value premium compared to websites with nonpersonalized offerings. By integrating two key facets of website value, our

study also contributes a more holistic predictive model of website value to online personalization research.

Second, our findings provide evidence in support of different effect paths emanating from content and design personalization cues. In other words, the two types of web personalization cues play distinct roles. When considered in isolation, content personalization cues have significant and strong effects on users' preference fit and WTP, while design personalization cues have strong impacts on perceived enjoyment and website stickiness. When considered together, our study provides evidence for opposite effect patterns: a combination of content and design personalization cues has substitutive effects on users' preference fit and WTP (when compared to content cues alone), whereas it has complementary effects on users' perceived enjoyment and website stickiness. These findings imply that implementing content and design personalization cues jointly on a website is a double-edged sword, as favorable and detrimental effects on website value have to be balanced. To optimize users' stickiness to a website, both content and design personalization cues are necessary and a lack of one type of personalization cue may lead to missed opportunities for website stickiness improvements. However, at the same time, an excessive emphasis of design over content personalization cues on websites may weaken the beneficiary effects of content personalization cues on users' WTP and thus hurt websites' conversion rate (i.e., the conversion of site visitors into paying customers). Hence, our study contributes an advanced understanding of the competing impacts that personalization cues can have on website value.

In addition, and more broadly, our findings underscore the importance of decomposing the effects of distinct personalization cues. Previous studies tended to take a unitary and monolithic view of web personalization by treating web personalization as singular in nature, obscuring each personalization cue's particular impacts on user outcomes. By highlighting the distinction of different salient types of web personalization cues, our study fleshes out a more nuanced and finer-grained understanding, which is needed to theoretically advance the core (i.e., the IT artifact) in IS research in general and in web personalization research in particular [8, 51, 67].

Third, this study also addressed an important gap in personalization research in terms of understanding the underlying explanatory mechanisms of how and why web personalization cues affect users' assessment of website value. Although previous studies have extensively examined the direct impacts of web personalization on different user outcomes on websites, the question of why web personalization influences such outcomes has remained largely unanswered. By proposing users' preference fit and perceived enjoyment on websites as two critical cognitive and affective intervening factors, we unblackbox the effect mechanisms of web personalization and thereby provide a window into the process of how and why specific personalization cues operate in a more or less effective manner. More specifically, our findings imply that content personalization cues increase users' willingness to stick to a website *because* they simultaneously enhance preference fit and perceived enjoyment, while design personalization cues increase website stickiness *because* they particularly foster perceived enjoyment. Most important, it is through higher preference fit but not through

higher perceived enjoyment that content personalization cues can increase users' WTP, which highlights the critical role of interactively shaping consumers' malleable preferences in personalized e-commerce. In summary, our mediation outcomes complement prior studies on web personalization's influences on critical user responses (e.g., [26, 65, 66]) by adding hitherto-missing theoretical explanations for how and why content and design personalization cues enhance user assessments of website value.

Practical and Managerial Implications

While the preceding comments focus on theoretical contributions, the results regarding the impact of web personalization on users' stickiness and WTP have practical implications for web designers and online companies, particularly those with personalization capabilities and the desire to build their business model around personalized services on their websites.

For online companies evaluating web personalization strategies for their business models, our study demonstrates that both content and design personalization cues can increase users' attachment to a website. They even work hand in hand by displaying mutually reinforcing effects: Design personalization cues increases the stickiness-enhancing effects of content personalization cues and vice versa. By contrast, content and design personalization cues do not work properly together when it comes to increasing users' preference fit and WTP for websites' core offerings. In this regard, providing both content and design personalization cues on a website even has counterproductive effects compared to situations in which only content personalization cues are provided, because users may become overwhelmed by too many personalization cues and distracted from the core services of the website. Given these results, the business goals and scope of a given website must be weighed and prioritized when deciding the types and combinations of personalization capabilities to be made available to users. A commercial website, for example, focusing on direct monetization from selling products and seeking to attract transaction-oriented users might accentuate content personalization features, while making do with little design personalization. On the other hand, a service-oriented website building on long-term relationships and advertising revenues might benefit from higher proportions of design compared to content personalization cues. In any case, website providers may benefit from this study by carefully testing and monitoring the relative effectiveness of different personalization cues on their own websites.

For website designers, the results of our study provide useful guidelines on how they can successfully manage user experiences with a website by devising appropriate personalization cues to increase users' preference fit and enjoyment. After investigating a wide variety of current practices of using personalization cues online, we could conclude that most personalization features currently used on commercial websites appear to be designed largely based on designers' introspection and

intuition rather than on rigorous design procedures or guidelines, which leads to irregular implementation styles. Furthermore, the existing resources for designing user interfaces (e.g., [4, 52]) provide rather general discussions and suggestions and most of them are not specific enough to cover different types of web personalization cues. These observations demonstrate the need to design and test various web personalization features to better guide practitioners and derive best practices based on theory and rigorous experimental testing. To our knowledge, this study is one of the first that provides web designers with useful practical implications on when and how to deploy content and design personalization cues to increase users' preference fit and perceived enjoyment.

Finally, the contingent results of our study may also guide developers on when to deploy single types of personalization cues in isolation and when to deploy them in conjunction. Regarding single-cue strategies, content personalization cues appear to be an all-around device to impact both cognitive and affective user reactions on websites. At second glance, however, they seem to have particularly strong effects on users' preference fit and WTP. In contrast, design personalization cues appear to have specific strengths in affecting users' perceived enjoyment and website stickiness. Regarding multiple-cue strategies, combining both types of personalization cues seems to be a double-edged sword. Whereas both personalization cues mutually reinforce each other's positive effect on perceived enjoyment and website stickiness, design personalization cues seem to weaken the positive effect of content personalization cues on users' preference fit and WTP. Recognizing this balancing act may help web designers make more appropriate trade-off decisions that best fit their own business model.

Limitations, Future Research and Conclusion

Four limitations of this study are noteworthy and provide avenues for future research. First, readers should exercise caution in generalizing the results of this study. Although we chose to conduct our study in a context with broad applicability, examining web personalization cues and their effects on user assessments of website value based on other products or services (e.g., other experience goods or search goods) across different application domains (e.g., e-governance, e-health or social networking), and in various usage settings (e.g., stationary vs. mobile) would contribute to examining the boundary conditions of our study's findings. Second, although we could validate that users engage strongly in personalizing their news website during the experimental phase, it usually takes more time for users to fully configure websites to their particular needs. Future research can take our investigation further by examining the effects of web personalization on website value over longer periods. Third, although our study focused on user-driven personalization strategies, future research could extend its scope to other salient personalization strategies (e.g., transaction- or context-driven personalization). Finally, this study focused on user assessments of website value as the dependent variable, but the link between our model and investors' website valuation is still not established and

awaits future work. Exploring this hitherto-missing link could provide a rich basis for theory development.

Web personalization has become a critical vehicle for enhancing users' online experience on the web. Although their user benefits were widely confirmed in previous studies, the differential effects of salient, finer-grained personalization cues on user assessments of website value have remained empirically underexplored to date. Our study not only demonstrates that such cues add a distinct value to websites over and above nonpersonalized services on websites but also provides explanations for how and why web personalization translates into higher website value. From a practical perspective, an improved understanding of how different personalization cues affect user assessments of website value will be critical to firms to increase customer lifetime value, and ultimately, to make their web-based business models more viable.

Notes

1. Whereas we have suggested in H1a and H1b that content and design personalization cues—both jointly and separately—positively affect preference fit and enjoyment (compared to a situation in which no cues are provided), we assume a *comparative* perspective in which we compare the magnitude of content and design personalization cues' independent effects on preference fit and enjoyment.

2. Although we expect that a combination of content and design personalization cues will be superior to design personalization cues alone in affecting preference fit (because of the higher marginal contributions by content than design personalization cues to strengthening preference fit), we focus our hypothesis development on the theoretically more interesting case and thus leave this comparison to a supplementary analysis.

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References

1. Adobe. The state of online advertising - new insights into the beliefs of consumers and professional marketers (global report, regional comparisons). 2013, www.adobe.com/aboutadobe/pressroom/pdfs/Click_Here_Regional_Comparisons.pdf.

2. Adomavicius, G., and Tuzhilin, A. Toward the next generation of recommendation system: A survey of the state-of-the-art and possible extensions *IEEE Transactions on Knowledge and Data Engineering*, *17*, 6 (2005), 734–749.

3. Agarwal, R., and Dhar, V. Big data, data science, and analytics: The opportunity and challenge for IS research. *Information Systems Research*, *25*, 3 (2014), 443–448.

4. Agarwal, R., and Venkatesh, V. Assessing a firm's web presence: A heuristic evaluation procedure for the measurement of usability. *Information Systems Research*, *13*, 2 (2002), 168–186.

5. Ansari, A., and Mela, C.F. E-customization. *Journal of Marketing Research*, *40*, 2 (2003), 131–145.

6. Awad, N.F., and Krishnan, M.S. The personalization privacy paradox: An empirical evaluation of information transparency and the willingness to be profiled online for personalization. *MIS Quarterly*, *30*, 1 (2006), 13–28.

7. Baron, R.M., and Kenny, D.A. The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 6 (1986), 1173–1182.

8. Benbasat, I., and Zmud, R.W. The identity crisis within the IS discipline: Defining and communicating the discipline's core properties. *MIS Quartely*, *27*, 2 (2003), 183–194.

9. Benlian, A., and Hess, T. The signaling role of IT features in influencing trust and participation in online communities. *International Journal of Electronic Commerce*, *15*, 4 (2011), 7–56.

10. Benlian, A.; Titah, R.; and Hess, T. Differential effects of provider recommendations and consumer reviews in e-commerce transactions: An experimental study. *Journal of Management Information Systems*, *29*, 1 (2012), 237–272.

11. Bollen, K.A., and Jackman, R.W. Regression diagnostics: An expository treatment of outliers and influential cases. In J. Fox and J.S. Long (eds.), *Modern Methods of Data Analysis*. Newbury Park, CA: Sage, 1990, pp. 257–291.

12. Brown, B.; Sikes, J.; and Willmott, P. Bullish on digital: Mckinsey Global Survey results. *McKinsey Quarterly*, *12* (August 2013), 1–8.

13. Bush, A.A., and Tiwana, A. Designing sticky knowledge networks. *Communications of the ACM*, *48*, 5 (2005), 66–71.

14. Chellappa, R.K., and Shivendu, S. An economic model of privacy: A property rights approach to regulatory choices for online personalization. *Journal of Management Information Systems*, *24*, 3 (2007), 193–225.

15. Chin, W.W. The partial least squares approach for structural equation modeling. In G.A. Marcoulides (ed.), *Modern Methods for Business Research*. Hillsdale, NJ: Lawrence Erlbaum, 1998, pp. 295–336.

16. Cyr, D. Return visits: A review of how web site design can engender visitor loyalty. *Journal of Information Technology*, *29*, 1 (2014), 1–26.

17. Cyr, D.; Head, M.; Larios, H.; and Bing, P. Exploring human images in website design: A multi-method approach. *MIS Quarterly*, *33*, 3 (2009), 539–566.

18. Dörr, J.; Wagner, T.; Benlian, A.; and Hess, T. Music as a service as an alternative to music piracy? *Business and Information Systems Engineering*, *5*, 6 (2013), 1–14.

19. Eroglu, S.A.; Machleit, K.A.; and Davis, L.M. Empirical testing of a model of online store atmospherics and shopper responses. *Psychology and Marketing*, *20*, 2 (2003), 139–150.

20. Fornell, C., and Larcker, D.F. Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, *18*, 1 (1981), 39–50.

21. Franke, N.; Keinz, P.; and Steger, C.J. Testing the value of customization: When do customers really prefer products tailored to their preferences? *Journal of Marketing*, *73*, 5 (2009), 103–121.

22. Franke, N.; Schreier, M.; and Kaiser, U. The "I designed it myself" effect in mass customization. *Management Science*, *56*, 1 (2010), 125–140.

23. Galak, J.; Kruger, J.; and Loewenstein, G. Is variety the spice of life? It all depends on the rate of consumption. *Judgment and Decision Making*, *6*, 3 (2011), 230–238.

24. Goodhue, D.L., and Thompson, R.L. Task-technology fit and individual performance. *MIS Quarterly*, *19*, 2 (1995), 213–236.

25. Helson, H. *Adaption-Level Theory: An Experimental and Systematic Approach to Behavior*. New York: Harper and Row, 1964.

26. Ho, S.Y., and Bodoff, D. The effects of web personalization on user attitude and behavior: An integration of the elaboration likelihood model and consumer search theory. *MIS Quarterly*, *38*, 2 (2014), 497–520.

27. Ho, S.Y.; Bodoff, D.; and Tam, K.Y. Timing of adaptive web personalization and its effects on online consumer behavior. *Information Systems Research*, *22*, 3 (2011), 660–679.

28. Hong, W.-C.; Thong, J.Y.L.; and Tam, K.Y. The effects of information format and shopping task on consumers' online shopping behavior: A cognitive fit perspective. *Journal of Management Information Systems*, *21*, 3 (2005), 149–184.

29. Hong, W.-C.; Thong, J.Y.L.; and Tam, K.Y. Does animation attract online users' attention? The effects of flash on information search performance and perceptions. *Information Systems Research*, *15*, 1 (2004), 60–86.

30. Jacoby, J. Stimulus-organism-response reconsidered: An evolutionary step in modeling (consumer) behavior. *Journal of Consumer Psychology*, *12*, 1 (2002), 51–57.

31. Janiszewski, C.; Kuo, A.; and Tavassoli, N.T. The influence of selective attention and inattention to products on subsequent choice. *Journal of Consumer Research*, *39*, 6 (2013), 1258–1274.

32. Jiang, Z., and Benbasat, I. The effects of presentation formats and task complexity on online consumers' product understanding. *MIS Quarterly*, *31*, 3 (2007), 475–500.

33. Jiang, Z., and Benbasat, I. Investigating the influence *Information Systems Research*, of the functional mechanisms of online product presentations. *18*, 4 (2007), 454–470.

34. Jiang, Z.; Chan, J.; Tan, B.C.Y.; and Chua, W.S. Effects of interactivity on website involvement and purchase intention. *Journal of the Association for Information Systems*, *11*, 1 (2010), 34–59.

35. Kahn, B.E. Consumer variety-seeking among goods and services: An integrative review. *Journal of Retailing and Consumer Services*, *2*, 3 (1995), 139–148.

36. Kahneman, D. *Attention and Effort*. Englewood Cliffs, NJ: Prentice Hall, 1973.

37. Kamis, A.; Koufaris, M.; and Stern, T. Using an attribute-based decision support system for user-customized products online: An experimental investigation. *MIS Quarterly*, *32*, 1 (2008), 159–177.

38. Kim, S.S., and Son, J.-Y. Out of dedication or constraint? A dual model of post-adoption phenomena and its empirical test in the context of online services. *MIS Quarterly*, *33*, 1 (2009), 49–70.

39. Komiak, S.Y.X., and Benbasat, I. The effects of personalization and familiarity on trust and adoption of recommendation agents. *MIS Quarterly*, *30*, 4 (2006), 941–960.

40. Koufaris, M. Applying the technology acceptance model and flow theory to online consumer behavior. *Information Systems Research*, *13*, 2 (2002), 205–223.

41. Koufaris, M.; Kambil, A.; and Labarbera, P.A. Consumer behaviour in web-based commerce: An empirical study. *International Journal of Electronic Commerce*, *6*, 2 (2001), 115–138.

42. Kumar, N., and Benbasat, I. The influence of recommendations and consumer reviews on evaluations of websites. *Information Systems Research*, *17*, 4 (2006), 425–439.

43. Kwon, K., and Kim, C. How to design personalization in a context of customer retention: Who personalizes what and to what extent? *Electronic Commerce Research and Applications*, *11*, 2 (2012), 101–116.

44. Li, D.; Browne, G.J.; and Wetherbe, J.C. Why do Internet users stick with a specific web site? A relationship perspective. *International Journal of Electronic Commerce*, *10*, 4 (2006), 105–141.

45. Li, T., and Unger, T. Willing to pay for quality personalization? Trade-off between quality and privacy. *European Journal of Information Systems*, *21*, 6 (2012), 621–642.

46. Lindell, M.K., and Whitney, D.J. Accounting for common method variance in cross-selectional research designs. *Journal of Applied Psychology*, *86*, 1 (2001), 114–121.

47. Malhotra, N.K.; Kim, S.S.; and Patil, A. Common method variance in is research: A comparison of alternative approaches and a reanalysis of past research. *Management Science*, *52*, 12 (2006), 1865–1883.

48. Marakas, G.M.; Johnson, R.D.; and Clay, P.F. The evolving nature of the computer self-efficacy construct: An empirical investigation of measurement construction, validity, reliability and stability over time. *Journal of the Association for Information Systems*, *8*, 1 (2007), 16–46.

49. Mehrabian, A., and Russell, J.A. *An Approach to Environmental Psychology.* Cambridge, MA: MIT Press, 1974.

50. Menon, S., and Kahn, B.E. Cross-category effects of induced arousal and pleasure on the internet shopping experience. *Journal of Retailing*, *78*, 1 (2002), 4–5.

51. Orlikowski, W.J., and Iacono, C.S. Research commentary: Desperately seeking the "IT" in IT research—A call to theorizing the IT artifact. *Informations Systems Research*, *12*, 2 (2001), 121–134.

52. Palmer, J.W. Web site usability, design, and performance metrics. *Information Systems Research*, *13*, 2 (2002), 151–167.

53. Parboteeah, D.V.; Valacich, J.S.; and Wells, J.D. The influence of website characteristics on a consumer's urge to buy impulsively. *Information Systems Research*, *20*, 1 (2009), 60–78.

54. Payne, J.W., and Bettman, J.R. Behavioral decision research: A constructive processing perspective. *Annual Review of Psychology*, *43*, 1 (1993), 87–131.

55. Podsakoff, P.M.; Mackenzie, S.B.; Lee, J.; and Podsakoff, N.P. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*, 5 (2003), 879–903.

56. Ringle, C.M.; Wende, S.; and Will, A. *SmartPLS 2.0 M3 (beta)*. University of Hamburg, 2005.

57. Schreier, M. The value increment of mass-customized products: An empirical assessment. *Journal of Consumer Behaviour*, *5*, 4 (2006), 317–327.

58. Shadish, W.R.; Cook, T.D.; and Campbell, D.T. *Experimental and Quasi-experimental Designs for Generalized Causal Inference*. Boston: Houghton Mifflin, 2002.

59. Shin, J., and Ariely, D. Keeping doors open: The effect of unavailability on incentives to keep options viable. *Management Science*, *50*, 5 (2004), 575–586.

60. Simonson, I. Determinants of customers' responses to customized offers: Conceptual framework and research propositions. *Journal of Marketing Research*, *69*, 1 (2005), 32–45.

61. Siwicki, B. Online sales of full-priced items jump in April. May 12, 2011, www.internetretailer.com/2011/05/12/online-sales-full-priced-items-jump-april-mybuys-finds/.

62. Slovic, P. The construction of preference. *American Psychologist*, *50*, 5 (1995), 364–371.

63. Spool, J. *Web Site Usability: A Designer's Guide*. San Francisco: Morgan Kaufmann, 1999.

64. Sutanto, J.; Palme, E.; Chuan-Hoo, T.; and Chee Wei, P. Addressing the personalization-privacy paradox: An empirical assessment from a field experiment on smartphone users. *MIS Quarterly*, *37*, 4 (2013), 1141–1164.

65. Tam, K.Y., and Ho, S.Y. Web personalization as a persuasion strategy: An elaboration likelihood model perspective. *Information Systems Research*, *16*, 3 (2005), 271–291.

66. Tam, K.Y., and Ho, S.Y. Understanding the impact of web personalization on user information processing and decision outcomes. *MIS Quarterly*, *30*, 4 (2006), 865–890.

67. Tiwana, A., and Bush, A.A. Continuance in expertise-sharing networks: A social perspective. *IEEE Transactions on Engineering Management*, *52*, 1 (2005), 85–101.

68. Van der Heijden, A.H.C. *Selective Attention in Vision*. New York: Routledge, 1992.

69. Van der Heijden, H. User acceptance of hedonic information systems. *MIS Quarterly*, *28*, 4 (2004), 695–704.

70. Veit, D.J.; Clemons, E.K.; Benlian, A.; Buxmann, P.; Hess, T.; Kundisch, D.; Leimeister, J.M.; Loos, P.; and Spann, M. Business models: An information systems research agenda. *Business and Information Systems Engineering*, *6*, 1 (2014), 45–53.

71. Vessey, I., and Galletta, D. Cognitive fit: An empirical study of information acquisition. *Information Systems Research*, *2*, 1 (1991), 63–84.

72. Voelckner, F. An empirical comparison of methods for measuring consumers' willingness to pay. *Marketing Letters*, *17*, 2 (2006), 137–149.

73. Wagner, T.; Benlian, A.; and Hess, T. Converting freemium customers from free to premium: The role of the perceived premium fit in the case of music as a service. *Electronic Markets*, *24*, 4 (2014), 259–268.

74. Wang, W., and Benbasat, I. Interactive decision aids for consumer decision making in e-commerce: The influence of perceived strategy restrictiveness. *MIS Quarterly*, *33*, 2 (2009), 293–320.

75. Wang, W., and Benbasat, I. A contingency approach to investigating the effects of user-system interaction modes of online decision aids. *Information Systems Research*, *24*, 3 (2013), 861–876.

76. Wells, J.D.; Valacich, J.S.; and Hess, T.J. What signal are you sending? How website quality influences perceptions of product quality and purchase intentions. *MIS Quarterly*, *35*, 2 (2011), 373–396.

77. Xu, J.; Benbasat, I.; and Cenfetelli, R.T. The nature and consequences of trade-off transparency in the context of recommendation agents. *MIS Quarterly*, *38*, 2 (2014), 379–406.

78. Zhang, P. The affective response model: A theoretical framework of affective concepts and their relationships in the ICT context. *MIS Quarterly*, *37*, 1 (2013), 247–274.

79. Zott, C., and Amit, R. Creating value through business model innovation. *MIT Sloan Management Review*, *53*, 3 (2012), 41–49.

80. Zwass, V. Co-creation: Toward a taxonomy and an integrated research perspective. *International Journal of Electronic Commerce*, *15*, 1 (2010), 11–48.

Appendix

Table A1. Summary of Measurement Items

Construct and indicators		Source
WTP	Willingness to Pay	
	During the registration process on Yones:	
WTP(t_0)	Please indicate the maximum price you are willing to pay for a monthly subscription to an online news aggregation service.	[72]
WTP(t_1)	*After using the Yones website:* Please indicate the maximum price you are willing to pay for a monthly subscription to Yones.	
PREF	Perceived Preference Fit	[22, 27]
PREF1	I like the way my preferences were matched on Yones.	
PREF2	The way Yones responded to my configurations on the website comes close to my personal preferences.	
PFREF3	The personal adaptations provided by Yones coincide with my preferences.	
ENJOY	Perceived Enjoyment	[40]
	Using the personalization cues on the website was ...	
ENJOY1	Unexciting. . . . . ..Exciting	
ENJOY2	Unappealing. . . . . .Appealing	
ENJOY3	Not Fun. . . . .Fun	
STICK	Website Stickiness	[10, 44]
	If I needed to use an online news aggregation service in the future, ...	
STICK1	(1) It would be highly likely that I would return to this website.	
STICK2	(2) I would intend to continue using this website.	
STICK3	(3) I would predict my use of this website to continue in the future.	

Notes: Except for WTP, all other scales were measured on a seven-point scale: PREF and STICK: anchoring at (1) = strongly disagree and (7) = strongly agree; ENJOY: semantic differential with the extreme values at (1) and (7).

Table A2. Internal Consistency, Discriminant Validity, and Latent Variable Correlation Matrix

Latent construct	α	CR	AVE	(1)	(2)	(3)	(4)	(5)	(6)
(1) Provision of Content Cues	1.00	1.00	1.00	**1.00**					
(2) Provision of Design Cues	1.00	1.00	1.00	–0.01	**1.00**				
(3) Preference Fit	0.87	0.92	0.80	0.36	–0.04	**0.90**			
(4) Perceived Enjoyment	0.90	0.94	0.84	0.42	0.46	0.10	**0.91**		
(5) Website Stickiness	0.91	0.94	0.84	0.47	0.39	0.39	0.46	**0.92**	
(6) WTP	1.00	1.00	1.00	0.59	–0.08	0.51	0.15	0.40	**1.00**

Notes: α = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted; diagonal elements in parentheses are the square root of AVE. These values should exceed inter-construct correlations (off-diagonal elements) for adequate discriminant validity.

Table A3. Loadings and Cross-Loadings of Measures

Latent construct	CC	DC	PREF	ENJ	STICK	WTP
Content Cues (CC)	1.00	–0.01	0.36	0.42	0.47	0.59
Design Cues (DC)	–0.01	1.00	–0.04	0.46	0.39	–0.08
Preference Fit (PREF1)	0.37	–0.10	0.90	0.09	0.34	0.50
Preference Fit (PREF2)	0.31	0.01	0.89	0.11	0.35	0.47
Preference Fit (PREF3)	0.29	–0.02	0.89	0.07	0.34	0.38
Perceived Enjoyment (ENJ1)	0.39	0.42	0.11	0.93	0.44	0.17
Perceived Enjoyment (ENJ2)	0.42	0.42	0.13	0.93	0.40	0.18
Perceived Enjoyment (ENJ3)	0.33	0.42	0.02	0.89	0.40	0.06
Website Stickiness (STICK1)	0.41	0.36	0.37	0.46	0.93	0.38
Website Stickiness (STICK2)	0.49	0.39	0.34	0.44	0.92	0.38
Website Stickiness (STICK3)	0.37	0.32	0.35	0.36	0.90	0.34
WTP	0.59	–0.08	0.51	0.15	0.40	1.00