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The playground effect: How augmented reality drives creative customer engagement



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ABSTRACT

Across various customer experiences, Augmented Reality (AR) is emerging as a strategic experience design tool. This study contributes to an emerging body of research on the use of AR in the early stages of customers' purchase journeys. Extending previous research, we propose that AR enables a unique form of customer creativity that is distinct from prior conceptualizations of creativity through its association with customer engagement. Specifically, we propose a sequential process of creative customer engagement, in which AR-enabled customer creativity stems from heightened customer engagement and, in turn, offers a source of intrinsic satisfaction for customers. In an experiment with a customer-facing AR application, we empirically demonstrate this sequential mediation process connecting the use of AR with customer engagement, customer creativity, and anticipated satisfaction. We also identify an important boundary condition based on a customer's assessment orientation, suggesting a novel behavioral effect in the context of regulatory mode theory.

1. Introduction

While many customers appreciate efficient consumption experiences through standardized products and services, such offerings often neglect to engage customers in playful, creative and enjoyable experiences. Through Augmented Reality (AR), however, virtual objects that augment a customer's direct experience with the world can turn underlying interactions with standardized products and services into creative playgrounds for customers (Scholz & Duffy, 2018). With many firms beginning to leverage AR for improved customer experiences (Flavián, Ibáñez-Sánchez, & Orús, 2019; Han, tom Dieck, & Jung 2018), especially throughout online and offline purchase journeys (Hilken et al., 2018), there is a growing need to better understand the unique benefits of the use of AR for creative activities in the marketing context. By seamlessly projecting virtual content (e.g., a virtual sofa) into the customer's view of the real world (e.g., their living room), AR enables a distinct form of product or service visualization that reduces intangibility (Heller, Chylinski, de Ruyter, Mahr, & Keeling, 2019b), enhances inspiration (Rauschnabel, Felix, & Hinsch, 2019), and promises to

enable creativity in customers' purchase decisions (Scholz & Duffy, 2018). For example, the Akzo Nobel "Visualizer" and IKEA "Place" applications engage customers in creating unique interior designs for their homes by helping them experiment with new combinations of furniture or decorations, and enabling them to share their AR creations with others.

However, despite these promising developments, recent reports and research suggest that managers not only lack insight into how AR might engage customers and enable creative activity (CMO, 2019), but also require guidance in targeting customers that will embrace AR (Hilken et al., 2018), so that they can offer more satisfying customer experiences. As research on these topics is scant, our objective is to break ground on this novel topic in the AR research stream and address these knowledge gaps. Specifically, we explore the research question of: how does AR-enabled customer creativity arise and lead to marketing-relevant outcomes in the early stages of the customer purchase journey?

To answer this question, we develop a process framework, which offers a detailed understanding of AR-enabled customer creativity and serves as a starting point for future research on this novel AR use case.

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In this framework, we emphasize creativity as a customer's search for a novel but also useful solution, linked with a customer's strong engagement with a purchase decision (Harmeling, Moffett, Arnold, & Carlson, 2017). To date, customer creativity has been examined in contexts where customers seek to maximize attainment of competing goals, for example, when furnishing a room with IKEA furniture whilst facing budget or resource constraints (Juechems & Summerfield, 2019; Mehta & Zhu, 2016). Through this lens, customer creative activity is a response to the inability of a customer to achieve their goals via product or service performance. Yet many examples of AR use suggest that customers enjoy being creative with this form of technology (Scholz & Duffy, 2018; Rauschnabel, 2018), and that solving purchase decisions in novel ways is a source of intrinsic satisfaction rather than just a reaction to an inability to achieve purchase goals. Far from being driven by resource constraints, interaction with AR has been demonstrated to be a positive experience (Poushneh & Vasquez-Parraga, 2017) that might engage customers to derive benefits such as greater satisfaction with purchase decisions from the creative activity itself (Scholz & Smith, 2016).

In this article, we propose that AR enables customer creativity by visually displaying the relations of products and services in their intended context of use, thus externalizing inter-concept networks (Hirschman, 1980). Aided by AR, customers can visualize these relations directly and expand the number of relations beyond what is feasible through mental imagery alone (Heller, Chylinski, de Ruyter, Mahr, & Keeling, 2019a). Furthermore, AR can simulate a greater repertoire of potential consumption situations as customers virtually rearrange products and services, creating what Hirschman (1980) calls consumption scripts. That is, through AR-enabled interactions, customers can experience different ways in which products could be used, even before deciding to investigate a specific product. From a managerial perspective, the concept of customer creativity extends beyond only idea generation; AR-enabled creativity entails the discovery of novel solutions to purchase decisions. AR is unique in the customer creativity process, because it enables a reduction in the mental effort required for customer creativity through virtual product or service prototyping. Accordingly, customer creativity represents a combination of new experiences and problem solving in AR, which becomes a new source of satisfaction in the early stages of customers' purchase journeys.

Even though AR is proving to be a powerful tool to improve customer experiences, there is currently a lack of published research to guide managers in how best to apply AR for enhanced customer creativity. We contribute to extant knowledge by conceptualizing and empirically testing how AR stimulates creativity through the mechanism of customer engagement. Specifically, we demonstrate how AR positively impacts a two-part process of 'creative customer engagement', in which greater customer engagement with a purchase decision is intrinsically linked to a customer's heightened sense of creativity. In addition, we argue and demonstrate that customers derive a sense of anticipated satisfaction from this process of creative engagement by finding novel consumption opportunities. Importantly, while AR use can increase customer exploration of multiple options, we argue that creativity improves satisfaction with products and services beyond the mere variety effect. As such, we investigate these effects while controlling for the mere variety effect in order to isolate the role of customer creativity. Finally, we identify a relevant boundary condition in the form of customers' regulatory mode orientation, which moderates AR's creativity effects in the purchase process.

In the following sections, we draw on literature in marketing and psychology (Table 1) to formulate a conceptual representation of how AR enables customer creativity (Fig. 1). We then empirically test this conceptualization through an experimental study. In our discussion we reflect on our findings to offer implications for theory, practice, and future research.

2. Theoretical background

2.1. AR use throughout the customer purchase journey

The potential benefits of AR throughout the entire customer purchase journey have been heralded in both conceptual academic works (e.g., de Ruyter, Heller, Hilken, Chylinski, Keeling, & Mahr, 2020; Flavián et al., 2019; Hilken et al., 2018) and practitioner-oriented reports (e.g., Boston Consulting Group, 2018). However, as illustrated in Table 1, the majority of current empirical evidence is focused on AR's benefits in the later stages of a purchase journey. For instance, Poushneh and Vasquez-Parraga (2017) describe AR's effect on a customer's willingness to buy. In line with such research findings, commercial applications of AR have been deployed to simulate direct product experiences for improved sales (Hilken, de Ruyter, Chylinski, Mahr, & Keeling, 2017). For example, L'Oréal offers "Modiface", an application that allows customers to virtually try on and buy makeup with the aid of their smartphone camera; and KabaQ offers a mobile AR application that allows customers to virtually preview a restaurant's food and beverage offerings by showing detailed interactive holograms during the selection process. Researchers describe such AR applications as effective means to convey detailed product information (Smink, Frowijn, van Reijmersdal, van Noort, & Neijens, 2019; Yaoyuneyong, Foster, Johnson, & Johnson, 2016) and reduce perceived purchase risk (Alimamy, Deans, & Gnoth, 2017). Research also increasingly considers the role of AR in improving how customers feel about their purchase decisions. For example, Dacko (2017) reports that customers expect the use of mobile AR applications in shopping malls to considerably increase their purchase confidence and purchase satisfaction, while Hilken et al. (2017) and Heller et al. (2019a) demonstrate that AR offers customers greater comfort with online purchase decisions.

In the context of the customer purchase journey, such benefits of AR use arguably only arise in the later stages of the buying process, when customers typically have decided to investigate a specific product in detail and consider its purchase. This reveals a blind spot in the understanding of AR's benefits in the early stages of a purchase journey, where current research is limited to offering insights into the use of AR for educational purposes (see Table 1). Furthermore, in the eyes of the customer, many later-stage AR applications have not yet reached their full potential (DigitalBridge, 2017), thus suggesting that these later-stage AR tools might have not yet addressed customers' imagination needs. Notably, Heller et al. (2019a) argue that imagination, based on the generation and transformation of mental imagery, is a critical early component in an AR-enabled buying process. We thus contend that AR's playful and experimental nature holds a unique potential beyond offering a set of risk management tools in the later stages of the purchase journey. This potential hinges on AR's ability to enhance the customer's imagination and to create conditions that encourage customer creativity during purchase decisions. This perspective is echoed by Zünd et al., 2015, who state that there is more to AR than supporting businesses with sales conversion tools. For example, forward-looking companies like Walt Disney "have begun exploring how to combine Disney storytelling, creativity, and artistry with advanced projection technology" in AR (Mine, Van Baar, Grundhofer, Rose, & Yang, 2012, p.32). However, within marketing literature, little is known about customer creativity in general, and the AR-enabled customer creativity in particular.

2.2. Customer creativity

Problem-solving research in psychology has informed contemporary views of customer creativity in the marketing literature (e.g., Hunt, 1994). Authors typically frame creativity as a customer's development of an idea to overcome an obstacle that prevents them from achieving a desired goal (Mehta & Zhu, 2016). Customers are said to use creative problem solving as a means to bypass resource constraints, such as an

Table 1
Selected AR literature addressing early versus late stages in the customer purchase journey.

Study	Context and method	Theory base	AR variables/AR variables	Process variables	Dependent variables	Key findings
<i>Early purchase journey stages: Feeling a need/want, getting to know and considering products/services, searching for information and learning'</i>						
Harley, Poitras, Jarrell, Duffy, and Lajoie (2016)	AR as a learning instrument Positive emotions Mobile learning Laboratory and outdoor study	Control-value theory of achievement emotions	Lab-based, virtually-situated location	–	Effectiveness (learn about historical differences) Self-reported enjoyment and boredom	AR users were able to effectively and enjoyably learn about historical differences by contextualizing their visual representations.
Dede (2009)	Engagement and learning; immersive interfaces; Literature review	Egocentric perspective; Immersive presence	Immersive interfaces	–	–	Immersion in an AR-enabled digital environment can potentially advance education in at least three ways: by allowing multiple perspectives, situated learning, and transfer.
This study	AR in the early stages of the purchase journey; Mobile AR Application Controlled Experiment	Customer creativity, mental imagery, regulatory mode	Mobile AR solution (IKEA App); Conventional website	Customer engagement, customer creativity	Anticipated satisfaction	The use of AR (versus a website) for creative purchase decisions sequentially increases customer engagement, customer creativity, and anticipated satisfaction. This effect is stronger for customers with a more pronounced assessment orientation.
<i>Stages: Liking a product/service, willing to pay, choosing, consuming, is satisfied and advocates through word-of-mouth.</i>						
Yaoyueyong et al. (2016)	AR marketing: handheld and wearable smart devices;	Consumer-brand interaction	Traditional print ad, a quick response (QR) code hypermedia (QRH) print ad & ARH print	–	Attitude (Ad), informativeness, entertainment, advertising value, time-effort, novelty, irritation & effectiveness	ARH print ad was preferred, yielding higher perceptions of informativeness & effectiveness; whereas the QRH print ad resulted in higher irritation; traditional ad resulted in higher time-effort
Heller et al. (2019a)	AR experimental marketing; AR Glasses Experiments between subject -qualitative study	Mental Imagery theory	AR configuration, AR transformation	Processing Fluency Decision Comfort	Choice, spending, WOM	AR-enabled frontline improved decision comfort, motivated positive WOM and facilitated choice of higher value products.
Smink et al. (2019)	AR Marketing; Persuasion Online Experiment	Equity theory	AR product presentation (web)	Perceived informativeness, perceived enjoyment	Brand attitude, purchase intention, willingness to share personal data	Perceived informativeness was shown to lead to a cognitive process, which enhanced purchase intention and willingness to share personal data with the brand.
Poushneh and Vasquez-Parraga (2017)	Retail user experience User satisfaction User's Willingness to buy	Equity theory	AR level of interactivity	User experience (UX)	Willingness to buy, User satisfaction	AR significantly shaped UX, by impinging on various characteristics of product quality, and that UX subsequently influenced user satisfaction & Willingness to buy.
Hilken et al. (2017)	Enhancing online service experience; Experiment in controlled environment	Situation cognition theory	Simulated physical control Environmental embedding	Spatial presence	Utilitarian and hedonic value perceptions, decision comfort, WOM and purchase intentions	The AR-enabled interaction of simulated physical control and environmental embedding positively affected customer value perceptions of the online service experience. Spatial presence functioned as a mediator and also predicted decision comfort. Customer value perceptions and decision comfort translated into positive behavioral intentions.

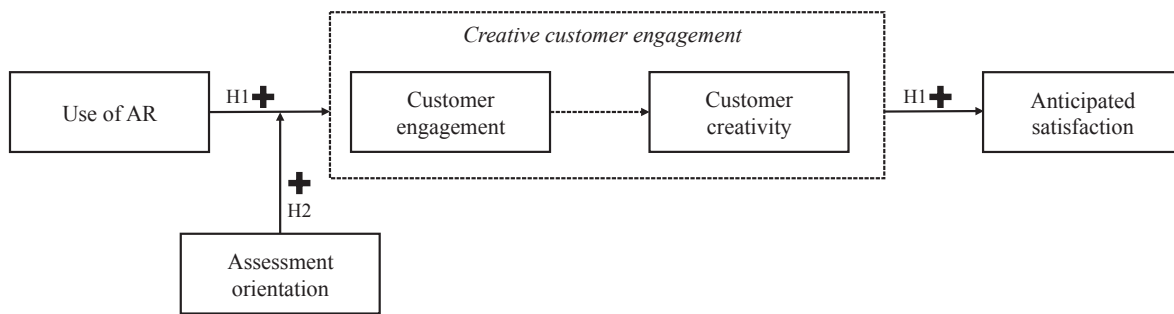


Fig. 1. Overall research model. Hypotheses indicated by H1 or H2.

insufficient budget or a lack of desired product attributes in the market (Moreau & Dahl, 2005; Sellier & Dahl, 2011). Solving a purchase problem in a novel way becomes worth the effort in this case because, without creative problem solving, customers are constrained from simply purchasing a needed item.

An important conceptual advancement of this 'resource constraint' view of customer creativity is the notion of functionality (Lubart, 1994). This notion implies that customer creativity is not merely a process of seeking novelty, but rather represents a functional search for previously undiscovered ways to achieve constrained purchase goals. In this view, customer creativity is also distinct from variety seeking. That is, creativity introduces novel information by facilitating an original purchase solution, while variety seeking only alters the order of consumption options (Herd & Mehta, 2019; Mehta & Zhu, 2016). This establishes the two pillars of customer creativity: originality and functionality of purchase solutions.

Burroughs and Glen Mick (2004) argue that marketers have not yet fully embraced the concept of customer creativity. The reason for this may be an implicit assumption that the role of marketing is to easily and affordably facilitate access to products and services. Hence, the resource constraint view of customer creativity, where customers search for their own purchase solutions, conflicts with the intended role of the marketer. In this article, we propose an alternative perspective that departs from the resource constraint view of customer creativity in a subtle, yet significant way. Specifically, we consider customer creativity, enabled through AR, as an intrinsically motivated activity involving the search for novel and useful consumption opportunities and solutions to purchase problems. This view of customer creativity is based on the premise that AR, uniquely, enables the augmentation of a customer's mental imagery abilities. Our hypothesis is that through its impact on mental imagery (Heller et al., 2019a), AR reduces the mental effort involved in creative activity. For instance, Burroughs and Glen Mick (2004) demonstrate that mental skills that facilitate mental transformation (i.e., an ability to mentally manipulate and evaluate alternative purchase solutions), such as analogical and metaphorical thinking, can assist customers during creative problem-solving. However, decision making that involves AR is different because it depends less on mental skills and more on the features of the technology. Since AR allows the customer to offload a significant amount of the creative information processing to the technology, it increases the customer's capacity for creative thought. This changes the way customers approach creative behavior when using AR.

Hirschman (1980), in some of the early work on customer creativity, identifies important dimensions that increase a customer's capacity for creative thought. These dimensions become uniquely relevant in the context of AR. Hirschman (1980), conceptualization introduces the notions of (a) inter-concept networks (i.e., relations between attributes of products and services within a decision context), and (b) consumption scripts (i.e., a repertoire of consumption situations a customer has experienced). Both of these dimensions positively correlate with the likelihood of achieving creative solutions. Customers who develop extended inter-concept networks, both in terms of the

number of products and their attributes as well as the functional relations between products, attributes, and the decision context, are more likely to find novel solutions to a purchase problem. Moreover, customers who have experience with products and services across different situations increase their repertoire of consumption scripts, which describe how and when a product or service can be used. These customers are also more likely to discover novel and useful solutions to a purchase problem, as they better understand the action sequences that lead to successful consumption outcomes.

2.3. AR-enabled customer creativity

AR uniquely supports inter-concept networks and consumption scripts, the two identified dimensions of customer creativity. For example, applications like IKEA "Place" offer an advanced form of creative activity by embedding multiple IKEA products, such as a couch, chair, and lamp, in the customer's view of a physical environment, such as their living room. By allowing the customer to visualize multiple products, AR eases the effort needed to generate mental imagery (Heller et al., 2019a). Since the products are embedded in their intended context (i.e., the living room), the application extends the customer's inter-concept network of products, in turn helping the customer process, store, and recall a greater number of product relations. Similarly, AR embodies interactivity with virtual objects (Hilken et al., 2017). For example, with IKEA's "Place" app, customers can easily arrange, customize, and transform virtual IKEA products to suit various physical environments. This process of embodied interaction allows the customer to simulate a range of experiences for products and services across multiple situations, thus expanding their repertoire of consumption scripts.

Recent research demonstrates that AR integrates the embedded and embodied aspects of digital interactions (Heller et al., 2019a; Hilken et al., 2017). Accordingly, AR extends inter-concept networks and consumption scripts in tandem. Hence, in a well-functioning AR application, such as the IKEA "Place", both functions are inseparable. This results in an opposite effect to the one described by the resource constraint view of customer creativity. That is, AR facilitates creative thinking by offloading mental effort during a purchase decision (Heller et al., 2019a), creating conditions for an abundance of customer creativity at a low marginal cost to creative thought.

Our argument is that under conditions of such abundance, customers can derive value from the creative activity itself. In contrast to concepts like variety seeking, creative customers value not only a changed sequence of previously known experiences, but gain intrinsic satisfaction from the discovery of novel consumption opportunities (Dahl & Moreau, 2007). This means that AR-enabled creativity has an expressive function (Hilken, Keeling, de Ruyter, Mahr, & Chylinski, 2020; Rauschnabel, 2018), where AR allows a customer to try out unusual purchase decisions and differentiate their particular purchase solution from others in a social setting. For example, AR enables IKEA customers to avoid the same arrangement of IKEA furniture at home as other customers.

Expression and personalization stimulate intrinsic satisfaction from the creative activity. For example, Carrozzini et al. (2019) show that in social contexts, AR allows customers to realize their social identity needs for differentiation, which contributes to enhanced feelings of psychological ownership over virtual products during AR interactions. We argue that the use of AR during the early stages of the customer purchase journey (i.e., when customers are still searching for a specific purchase solution) influences not only the level of customer creativity, but also the anticipated satisfaction from the creative process itself. We call this the 'playground-effect' of the AR-enabled customer creativity in reference to how physical playgrounds allow safe exploration and playful creativity. However, in extant literature, there is only a limited conceptual understanding of the underlying process of and the likely boundary conditions to AR-enabled customer creativity.

3. Hypotheses development

3.1. The process and benefits of AR-enabled creative customer engagement

Recent reviews of research on creativity classify conditions under which creativity emerges in customer settings (Mehta & Dahl, 2019). Such reviews describe a range of interconnected cognitive and affective, situational as well as motivational states that enhance creative activity. Taken together, these states are indicative of heightened levels of customer engagement, which most recent marketing literature describes as a customer's intrinsically motivated and voluntary investment of resources into a given interaction with a firm (Hollebeek, Srivastava, & Chen, 2019), whilst also pointing out that these resources are multi-dimensional in nature (i.e., they can entail cognitive and affective resources such as knowledge, time and energy, and emotions). On this basis, we take a more specific view of customer engagement relevant to the context of customer creativity as an intrinsically motivated activity. Specifically, we draw on seminal works in consumer psychology (Higgins & Scholer, 2009) and human-computer interaction (Oh, Bellur, & Sundar, 2018) literature, which both align, to describe customer engagement in terms of a customer's sustained attention in a technology-enabled activity—manifested in a state of immersion, absorption, and enjoyment.

Customer engagement is linked to heightened levels of customer creativity, in part, on the basis of so-called cognitive flexibility (i.e., the ability to simultaneously consider ideas from diverse perspectives). For instance, Burroughs and Glen Mick (2004) demonstrate that engagement increases cognitive flexibility because creative thought requires effort; engaged customers are thus more likely to justify the investment of limited mental resources into creative activities. Researchers also consider affective aspects of engagement to go hand in hand with cognitive flexibility in creative activity. For instance, Lin, Tsai, Lin, and Chen (2014) show that cognitive flexibility increases the effect of positive emotions during creative performance, and de Dreu, Baas, and Nijstad (2008) describe a range of emotions involved in cognitive aspects of engagement during customer creativity. In addition, there is also a significant body of literature that demonstrates how positive emotions can directly drive customer creativity (Dahl & Moreau, 2007; Seregina & Weijjo, 2017). Furthermore, in the marketing context, research has described how emotions shape not only customers' (creative) experiences but also satisfaction through heightened levels of customer engagement (Pansari & Kumar, 2017). Thus, in sum, we conclude that customer engagement is an important driver of customer creativity as an intrinsically motivated activity. As such, we specifically focus on AR's potential for enabling a two-part process we term 'creative customer engagement'—that is, a sequence of customer engagement followed by customer creativity.

When customer creativity is augmented with AR, the creative activity takes on aspects of the technology. Existing AR applications typically aim to facilitate engagement (Scholz & Smith, 2016), for example in the form of playful, immersive, and pleasant experiences

during which customers try out various purchase solutions across different contexts (Scholz & Duffy, 2018). Furthermore, research has empirically demonstrated positive effects of AR use on customer engagement (e.g., with a purchase decision; Hilken et al., 2020). Accordingly, and in line with the notion of creative customer engagement, we expect that AR enables a process beginning with a customer's heightened engagement in an AR-enabled activity, which then spills over into a greater sense of creativity related to finding novel and useful consumption opportunities. This points to a sequential mediation process that begins with customer engagement leading to customer creativity and, subsequently, this leads to perceived benefits of the creative activity for the customer.

In considering such benefits of creative activity, we focus on anticipated satisfaction with an outcome of a purchase decision as a relevant customer response in the early stages of a purchase journey (Parker, Lehmann, & Xie, 2016), as it constitutes a basic motivation for undertaking creative activities (Dahl & Moreau, 2007) and also shapes relevant downstream behaviors such as actual choice (Shiv & Huber, 2000). Anticipated satisfaction is based on customers' ability to form mental images of purchase options (Shiv & Huber, 2000), and as we previously argued, AR reduces the mental effort of generating such imagery (Heller et al., 2019a). With AR, customers can engage and feel more creative to find novel and useful consumption opportunities, which are hallmarks of an intrinsically satisfying activity. As customers consider satisfaction with (product) experiences as an important predictor of future consumption outcomes (Dahl & Moreau, 2007), creative customer engagement should result in greater anticipated satisfaction with purchase options discovered by using AR.

Tying together our conjecturing of the process and benefits of AR-enabled creative customer engagement, we therefore hypothesize:

H1: The use of AR improves customers' anticipated satisfaction through a sequential process of heightened customer engagement and customer creativity.

3.2. The moderating role of customers' regulatory mode orientation

Researchers have long recognized that motivational orientations affect performance, including creative performance. Kaufman and Sternberg (2010) provide an extensive overview of methods and incentives that motivate individuals to achieve greater creativity. However, in contexts where AR technology significantly reduces the mental effort associated with creative thinking (Heller et al., 2019b), customers' regulatory orientations rather than incentives should more accurately describe the boundary conditions to creative activity.

The theory of regulatory mode in social psychology (Higgins, Kruglanski, & Pierro, 2003; Kruglanski et al., 2000) is relevant in this context because it addresses divergent motivations in customer behavior. Exploitation, which is a primary motivation towards consumption, is characterized by the desire to complete a purchase decision. This motivation is referred to as a locomotion orientation and assumes that customers derive satisfaction from the process of controlling progress towards a purchase decision. In contrast, exploration, which more conventionally relates to creative behavior, involves an independent motivation towards finding the right solution. Within regulatory mode theory, this is described by an assessment orientation. Kruglanski et al. (2000) conceptualize assessment orientation as the "comparative aspect of self-regulation concerned with critically evaluating entities or states, such as goals and means, in relation to standards and alternatives in order to judge their relative qualities" (p. 794). Customers with a high assessment orientation are driven to make the right decisions, and they prefer to review and compare as many options as possible before making a decision.

Mathmann, Chylinski, de Ruyter, and Higgins (2017) show that when the properties of a decision environment facilitate assessment-related activities (e.g., a customer can compare many products from a

large assortment), customers with a high assessment orientation experience regulatory fit, which manifests itself through greater engagement and improved value perceptions in the purchase decision. That is, under regulatory fit, customers engage and derive value from the act itself of making comparisons between products. The interaction with AR is similar in this respect, as it enables customers to embed multiple products in their physical decision environment, which reduces mental imagery difficulty (Heller et al., 2019a) and allows customers to compare many more products than would be possible without using AR. Accordingly, we predict that highly assessment-oriented individuals derive greater engagement and value from the additional opportunity to make comparisons using AR. A greater range of comparisons leads to the development of more consumption scripts, suggesting that assessment-oriented customers should also improve perceptions of creativity. Crucially, Mathmann et al. (2017) show that regulatory fit manifests itself through heightened engagement for assessment-oriented customers. Given that our hypothesis H1 predicts a sequential mediation process starting with customer engagement, we anticipate that customer engagement with AR use will be greater for highly assessment-oriented individuals, and that engagement should decline at lower levels of assessment orientation. We thus hypothesize:

H2: A high *assessment orientation* strengthens the positive relationship between the *use of AR* and the level of *customer engagement*.

Hypothesis H2 suggests a boundary condition, where the intrinsic benefits of AR-enabled customer creativity are more likely to be realized by highly assessment-oriented customers. Since assessment and locomotion orientations represent two separate dimensions of regulatory mode, our theorizing is restricted to the effects for the assessment orientation dimension. In combination, hypotheses H1 and H2 imply a moderated sequential mediation model illustrated in Fig. 1.

4. Methods

4.1. Research design

We conducted an experiment to test the hypothesized sequence of AR-enabled effects through customer engagement and customer creativity on anticipated satisfaction (H1), as well as the moderation of these effects by customers' assessment orientation (H2). We utilized a controlled lab setting as this enabled us to address our main research objective of providing a first, fine-grained understanding of AR-enabled customer creativity. We used a two-group (website vs. AR) between-subjects design that followed a three-phased procedure. In phase 1, we welcomed participants, informed them about the study, and provided them the opportunity to opt out without consequence before asking them to first answer a short questionnaire about their assessment orientation. This enabled us to prevent priming effects on this measure through our manipulations. In phase 2, we randomly assigned participants to either the control or treatment group and introduced them to the stimulus material for the study. We presented participants with an empty, approximately 18 m² sized university room (website photos or AR-based experience) and tasked them with developing a new interior design for this room using the following directions delivered by a research assistant:

"Please familiarize yourself with the room by imagining that this room is yours. In an attempt to design the interior of the room presented to you, choose whatever furniture you desire and as many items as you desire. You can use every part of the room for your interior design choices. After a timeframe of 12 min, you will be asked to write out the items you have chosen."

To ensure that the room was suitable for the (creative) task of finding a new interior design, we specifically chose a room in which the floor, lighting, wall color, and textures were neutral and consistent with

other rooms in the university; participants thus were also familiar with the typical layout and features of the room. Furthermore, the room itself did not contain any furniture that might have influenced the task or participants' choices. We determined the time to complete the task on the basis of a pre-test, in which we tested the experimental procedure to facilitate scheduling of the study. During pre-testing, no participant needed more than 12 min, such that the time allotted during the actual study did not impose an experimental constraint on the task. In the experiment, we informed participants of the likely duration, so they had a reasonable expectation of their time commitment.

Participants in the control group (website) received photos and a floor plan of the room, then used the IKEA website on a desktop computer in our lab to browse the online assortment of IKEA products and select furniture and decoration items for designing the room. Participants in the treatment group (AR) could walk through the room using the IKEA "Place" AR application on a smartphone, which allowed them to virtually project furniture and decoration items into the room using the phone's rear-facing camera. We provide a number of illustrative interior designs that participants developed in Appendix A. Finally, in phase 3, all participants completed a survey in which they noted the items they chose for the room and rated an item battery regarding their perceptions of customer engagement, customer creativity, and anticipated satisfaction.

4.2. Sample

We recruited 106 participants between 19 and 25 years of age from a large European university in exchange for course credit. In line with our stated research objective, we purposefully sampled these younger customers, as they represent firms' primary target group for novel AR-enabled experiences (Boston Consulting Group, 2018; DigitalBridge, 2017). Furthermore, sampling from this group of customers with overall higher (and more consistent) levels of technology readiness (e.g., compared to older customers; Blut & Wang, 2019), enabled us to focus our testing of boundary conditions on customer differences in terms of assessment orientation (H2). We applied a set of pre-specified criteria and excluded participants from the study if they (a) experienced significant technical difficulties with the application, (b) indicated that they did not understand the instructions, or (c) provided an incomplete response. Application of these criteria resulted in a final sample of 100 participants (57 women, 43 men) in our between-subjects design ($n_{\text{Website}} = 50$, $n_{\text{AR}} = 50$).

4.3. Measures

To measure customer engagement, we formed a three-item scale based on items from Barasch, Zauberaman, and Diehl (2018). Two items captured cognitive aspects of engagement (e.g., "How much did you feel immersed in the experience/task?") and one was related to affective engagement in the experience ("How much did you enjoy the experience/task?"). Participants rated all items on a seven-point Likert scale ranging from 1 = "Not at all" to 7 = "Extremely". The three-item scale exhibited good internal consistency ($\alpha = 0.87$).

To assess customer creativity, we employed a self-reported measure that was consistent with our previously introduced conceptualization. Specifically, we used a four-item creativity scale developed by Goncalo, Flynn, and Kim (2010), which we adapted to fit the study context. This scale captured participants' feeling of having found a creative solution to a purchase problem (e.g., "The interior design I came up with was highly creative") and exhibited good internal consistency ($\alpha = 0.83$). Participants rated all four items on a seven-point Likert scale ranging from 1 = "Strongly disagree" to 7 = "Strongly agree".

For participants' anticipated satisfaction, we used two items ($r = 0.75$), which we slightly adapted from Parker et al. (2016) to fit the study context. Participants rated the first item ("How satisfied do you expect to be with your interior design choices?") on a seven-point

Likert scale ranging from 1 = “Completely dissatisfied” to 7 = “Completely satisfied” and the second item (“I expect that I will be completely satisfied with my interior design choices”) on a seven-point Likert scale ranging from 1 = “Strongly disagree” to 7 = “Strongly agree”.

Consistent with previous research (e.g., Ratner & Kahn, 2002), we assessed variety seeking by asking participants to list each individual furniture or decoration item they selected for the room. On the basis of this list, we identified the number of distinct categories using IKEA’s online catalogue from which participants chose the items. That is, a higher number of different categories corresponded to greater variety seeking in the interior design experience.

For the moderator, we used the 12 assessment orientation items ($\alpha = 0.66$) from the regulatory mode scale developed by Kruglanski et al. (2000). Participants rated items such as “I am a critical person” or “I like evaluating other people’s plans” on a five-point Likert scale ranging from 1 = “Strongly disagree” to 5 = “Strongly agree”. We list all constructs and their items in Appendix B.

5. Results

5.1. Sequential mediation

Hypothesis H1 predicts that the use of AR (vs. a website) sequentially leads to greater customer engagement, customer creativity, and finally anticipated satisfaction. We tested for sequential mediation using the PROCESS macro (Hayes, 2017, Model 6). To differentiate our hypothesized effects regarding customer creativity from mere novelty effects, we also controlled for the level of variety seeking in all analyses (Table 2). We first regressed customer engagement on AR use (coded 0 = website, 1 = AR) and found that AR use had a significant positive effect ($\beta = 1.72, p < .001$). This indicates that customers using AR for creative problem solving feel significantly more engaged compared to those using a conventional website. Further regression analyses supported our hypothesized sequence of effects. In the second regression model, customer engagement, in turn, increased customer creativity ($\beta = 0.41, p < .001$). In the third regression model, customer creativity had a positive effect on anticipated satisfaction ($\beta = 0.23, p = .011$), while, notably, the effect of engagement on anticipated satisfaction remained significant ($\beta = 0.48, p < .001$). In sum, this lends initial support to H1, such that the benefits of AR use for creativity appear to stem from heightened customer engagement and subsequently raise anticipated satisfaction.

To formally test the sequential mediation posited in H1, we applied

Table 2
Sequential mediation analysis results.

Independent variables	Customer engagement	Customer creativity	Anticipated satisfaction
Constant	3.40** (0.31)	1.12* (0.54)	1.96** (0.548)
AR use	1.72** (0.22)	0.09 (0.31)	-0.36 (0.27)
Customer engagement	-	0.41** (0.12)	0.47** (0.11)
Customer creativity	-	-	0.23* (0.09)
Variety seeking	0.16** (0.04)	0.02 (0.06)	-0.03* (0.05)
R ²	0.48	0.21	0.34
MSE	0.98	1.36	1.03
F	44.12**	8.76**	12.38**
df	2, 97	3, 96	4, 95

Note. The numbers in parentheses are standard errors. This table provides unstandardized coefficients.

Significance based on two-tailed tests: ** $p < .01$, * $p < .05$.

a bootstrapping procedure with 5,000 samples to calculate the indirect effect. The results support H1; the indirect effect for the AR use → customer engagement → customer creativity → anticipated satisfaction pathway was positive and significant, as the bias-corrected confidence intervals (CI) did not include zero ($\beta = 0.16, CI [0.02, 0.37]$). The positive and significant coefficient of $\beta = 0.16$ indicates that the use of AR (versus a conventional website) sequentially increases customer engagement, customer creativity, and anticipated satisfaction. The indirect effect for the AR → customer engagement → anticipated satisfaction pathway was also positive and significant ($\beta = 0.82, CI [0.57, 1.51]$).

Overall, these results provide strong support for hypothesis H1, but also suggest that the hypothesized effects of AR-enabled customer creativity represent a partial second stage mediation from customer engagement. This implies that customer creativity is a unique process, distinct from the direct effect of customer engagement on anticipated satisfaction.

5.2. Moderated sequential mediation

To test whether the previously identified effects are stronger for customers with a more pronounced assessment orientation (H2), we tested for moderated sequential mediation using the PROCESS macro (Hayes, 2017, Model 83; Table 3). As previously described, we controlled for variety seeking in all analyses. The AR use × assessment orientation interaction term had a significant positive effect on customer engagement ($\beta = 1.19, p = .009$). This suggests that for customers using AR (versus a website), customer engagement is amplified when they have a stronger (versus weaker) assessment orientation

Table 3
Moderated sequential mediation analysis results.

Panel A: Regression results				
Independent variables	Customer engagement	Customer creativity	Anticipated satisfaction	
Constant	6.76** (1.25)	1.12* (0.54)	1.96** (0.548)	
AR use	-2.56 (1.62)	0.09 (0.31)	-0.36 (0.27)	
Assessment orientation	-0.94** (0.34)	-	-	
AR use × assessment orientation	1.19** (0.44)	-	-	
Customer engagement	-	0.41** (0.12)	0.47** (0.11)	
Customer creativity	-	-	0.23* (0.09)	
Variety seeking	0.16** (0.04)	0.02 (0.06)	-0.03* (0.05)	
R ²	0.52	0.21	0.34	
MSE	0.92	1.36	1.03	
F	25.62**	8.76**	12.38**	
df	4, 95	3, 96	4, 95	
Panel B: Conditional indirect effects analysis				
Anticipated satisfaction				
Conditional indirect effect of AR (versus website) use through customer engagement and customer creativity for				
Assessment orientation	Boot indirect effect	Boot SE	95% LCI	95% UCI
3.17	0.11	0.07	0.01	0.27
3.67	0.17	0.09	0.02	0.38
4.00	0.21	0.11	0.03	0.47

Note: The numbers in parentheses are standard errors. This table provides unstandardized coefficients. SE = standard error; LCI = lower confidence interval, UCI = upper confidence interval.

Significance based on two-tailed tests: ** $p < .01$, * $p < .05$.

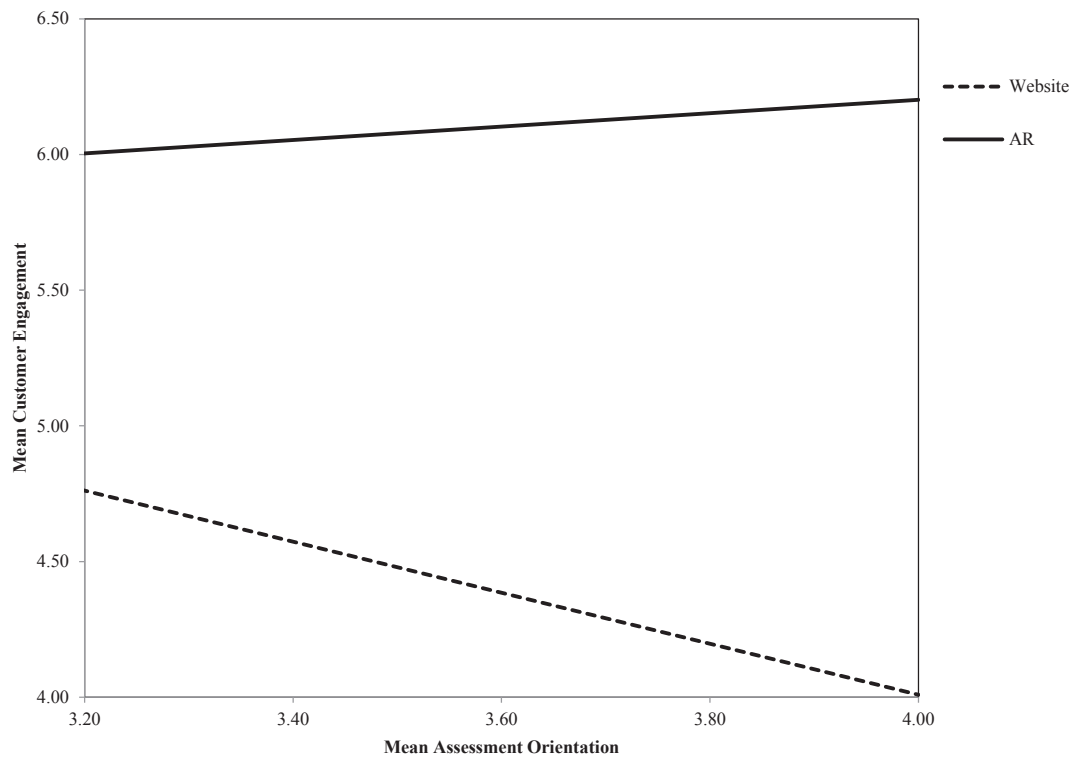


Fig. 2. The effects of AR (vs. website) use on customer engagement across different levels of assessment orientation.

(Fig. 2). To formally test whether this interaction effect extends to customer creativity and anticipated satisfaction, we tested for conditional indirect effects using a bootstrapping procedure with 5,000 samples. In support of hypothesis H2, the AR use \rightarrow customer engagement \rightarrow customer creativity \rightarrow anticipated satisfaction pathway was positive and significant (Table 3, Panel B), and this effect became stronger from low (3.17, $\beta = 0.11$, CI [0.01, 0.27]) to medium (3.67, $\beta = 0.17$, CI [0.02, 0.38]) to high (4.00, $\beta = 0.21$, CI [0.03, 0.47]) levels of assessment orientation.

6. Discussion

Augmented Reality (AR) is a unique technology with the potential to engage customers in playful, creative, and enjoyable purchase experiences. Customer creativity is an emerging topic of interest in both marketing research and practice—and it takes on even more importance in the context of AR. In this article, we demonstrate how the playful and exploratory experiences of AR use encourage a distinct type of customer creativity. Counterbalancing the perspective of customer creativity as a response to resource constraints that hinder the achievement of a desired purchase goal (e.g., Moreau & Dahl, 2005; Sellier & Dahl, 2011), the AR-enabled view of customer creativity takes a positive stance. That is, AR-enabled customer creativity represents an intrinsically satisfying activity imbued with a sense of discovery during a purchase process. The results of our study offer evidence for a sequential process of creative customer engagement, in which positive customer engagement with AR encourages customer creativity, which in turn improves anticipated satisfaction with the outcome of a purchase decision.

We use recent findings from the emerging marketing literature on AR (e.g., Heller et al., 2019a; Hilken et al., 2017; Rauschnabel et al., 2019) to propose that AR represents an enabling technology for customer creativity. We reason that by externalizing the visualization of inter-concept networks and simulation of consumption scripts (Hirschman, 1980), AR can reduce the mental imagery effort customers require to engage in creative activity. As a consequence, we suggest that

AR expands the propensity of customers to engage with a purchase decision and see themselves as creative in doing so. We also argue that AR-enabled customer creativity is an intrinsically satisfying activity for customers. This conceptualization suggests a novel managerial approach to improving customer purchase journeys.

Specifically, we show that use of AR in the early stages of the customer purchase journey positively impacts customers' responses concerning creativity in comparison to a conventional website. In our study, the use of the IKEA "Place" AR application outperformed the corresponding conventional website in terms of customers' engagement, creativity and anticipated satisfaction while designing the interior of a room. Importantly, we demonstrate that customer creativity depends on customer engagement with AR, which offers a potential metric of success for the application of AR at the front-end of the customer purchase journey. In sum, we identify a sequential mediation process, where AR use heightens customer engagement, which then drives customer creativity. Customer creativity, in turn, increases the customer's anticipated satisfaction with the outcome of a purchase decision.

By testing a moderated mediation process, we also identify an important boundary condition for anticipated purchase satisfaction resulting from creative customer engagement; namely the role of customers' assessment orientation. Our results reveal that the use of AR generally improves all customers' level of creative engagement, enabling them to benefit more from AR-enabled purchase decisions; however, the strength of this effects crucially depends on customers' assessment orientation. For highly-assessment oriented customers, AR appears to facilitate the comparison of products within the relevant decision context, thus creating greater regulatory fit, which manifests itself through stronger customer engagement, as well as resulting creativity and anticipated satisfaction.

Our research breaks ground in the area of AR-enabled customer creativity. It thus offers distinct theoretical and managerial implications that advance research and aid managers in using AR to capture previously unrealized benefits for marketing efforts.

6.1. Theoretical implications

Existing AR literature has focused predominantly on the later stages of the customer journey. Consequently, it has neglected the unique role that AR technologies can play in customer creativity and the implications AR technologies may have for customer experience and satisfaction. Numerous studies, for instance, investigate customer acceptance of AR as new technology (e.g., Huang & Liao, 2015; Rese, Baier, Geyer-Schulz, & Schreiber, 2017) or AR's impact on purchase intentions once customers have created their evoked set of products (Beck & Crié, 2018; Poushneh & Vasquez-Parraga, 2017; Smink et al., 2019). In contrast, in this research we explore a distinct interpretation of customer creativity that include the playful and enjoyable aspects of the purchase experience situated at the front-end of the customer purchase journey.

We conceptually link Hirschman (1980) dimensions of customer creativity, namely inter-concept networks and consumption scripts, with the underlying functionalities of AR (Hilken et al., 2017). These linkages allow us to demonstrate how customers can use AR to virtually display, manipulate, and arrange multiple products in a physical setting (e.g., a living room), for example when using the IKEA "Place" application. We theorize that these AR functionalities become the enablers of enhanced customer creativity. Conceptually, we reason that using AR, in comparison to a conventional website, allows customers to expand their creative activities because AR visualization support customers in processing larger inter-concept networks (e.g., how various furniture and decoration products fit together). We also reason that the interactive quality of AR leads to a more extensive experience of novel consumption scripts. Since the cost of information processing along these dimensions is largely offloaded to the AR technology, the effort of mental imagery, which is critical to customer creativity (cf. Burroughs & Glen Mick, 2004), is also reduced. Consequently, customers experience themselves as more creative when they engage in AR-enabled purchase decisions.

We also theorize that the conceptual distinction between our perspective and the resource constraint view of customer creativity in extant literature hinges on the positive customer engagement afforded by the use of AR. Incidentally, this empirically validates what Scholz and Smith (2016) propose in their conceptual study, namely that "designing immersive experiences maximize[s] consumer engagement" (p. 149). Our study introduces customer engagement as a key variable in the process of AR-enabled customer creativity, and demonstrates that AR use gives rise to a two-part process of creative customer engagement. While many studies focused on technical variables to explain ease of use, usefulness, or aesthetics of AR applications (Huang & Liao, 2015; Rese et al., 2017), our research is geared towards an improved creative customer experience during purchase decisions. Consequently, our results can inform the front-end applications of AR during the customer journey, and position customer creativity as a unique stage in this process.

According to our conceptualization, customer creativity emerges as an intrinsically satisfying activity in the early stages of the customer purchase journey. However, we also demonstrate that some customers appear to experience greater creative customer engagement from using AR than others. Our theorizing made this novel prediction in relation to regulatory mode theory by describing how high assessment-oriented customers respond to the creativity-enabling characteristics of AR applications. Specifically, in contrast to locomotion-oriented customers who focus on controlling progress towards the purchase decision (Avnet & Higgins, 2006), assessment-oriented customers derive satisfaction by making comparisons so they can find the right purchase solution (Mathmann et al., 2017). Ours is the first study to empirically link a higher assessment orientation with customer creativity based on enhanced customer engagement resulting from the use of AR. So far, the marketing literature in the field of AR has determined only a limited number of boundary conditions for customers' experiences with AR, including privacy concerns (Hilken et al., 2017; Poushneh & Vasquez-

Parraga, 2017), style of processing (Hilken et al., 2017), and use of AR at home vs. public (Rauschnabel & Krey, 2017). Our focus on customer assessment provides a deeper understanding of the boundaries of AR-enabled customer creativity, its value in purchase decisions, and implications for regulatory mode theory.

6.2. Managerial implications

Developing enhanced customer experiences through the use of novel technologies is a priority for managers (Parise, Guinan, & Kafka, 2016). Our research provides managerial recommendations about how customers experience and value AR, and how to engage customers with AR during a purchase process. While companies have focused their AR efforts on reducing decision-making uncertainty, the benefits of employing AR in the early stages of the purchase journey have been less clear. Achieving customer engagement through technology within the early stages of a purchase process is likely to result in knock-on effects that may translate into positive downstream consequences such as customer purchase and referral behavior (Kumar et al., 2010). Within this managerial frame, self-created virtual content plays an important role in shaping how a majority of customers experience the digital purchase process (Parise et al., 2016). Our findings identify the previously under-researched effect of customers' own exploration and discovery of novel solutions to purchase problems. We argue that firms can use AR to support such customer creativity using an analogy of a 'playground' approach that may improve customer experiences in several ways.

First, AR applications should be enhanced with comprehensive functionalities for customer-led prototyping that help customers combine various products and services into novel consumption scripts. For example, restaurants using AR applications like KabaQ's AR menu might offer AR enhanced menus not simply to inform the customer about products, but also to create 'playground' functionalities through which customers configure their meals, visualize them from various perspectives, and find novel ways to experience tastes and nutrition.

Second, including social effects through opportunities for customers to share and compare purchase solutions created using AR with other customers might leverage the expressive character of customer creativity. For example, shoe manufacturers such as Nike or Gucci that offer AR features for trying out various shoe designs might consider including social functionalities for customers to share their newly designed sneakers to obtain feedback from experts and peers (Hilken et al., 2020).

Third, since customer creativity is a unique benefit of AR applications, managers should communicate the benefits of the creative customer engagement enabled through this technology. For example, instead of the current slogan "New IKEA Place app makes home furnishing easier", Ikea might use a slogan like "Spark your creativity; design your new interior design with the IKEA Place app". This alternative slogan emphasizes the role of customer creativity during the purchase process.

Finally, segmentation of customer creativity based on individual differences among customers may be a viable marketing approach. Assessment-oriented customers can use AR to engage more strongly in creative activities because AR enables them to more readily make product or service comparisons to find the right purchase solution. Thus, these customers are predisposed to find the creative aspects of the AR technology more valuable. Managers might support assessment orientation through positioning AR applications as an instrument to "make the right decision". While our research focuses on measuring assessment-orientation as a trait, prior literature also suggests multiple ways to prime motivational orientations, such as, assessment as a situational state, for example through advertising (Mathmann et al., 2017) or targeted communications (Keeling, Daryanto, de Ruyter, & Wetzels, 2013). Doing so in the context of AR may enhance positive customer responses to the 'playground-effect'.

6.3. Limitations and future research

Our research is subject to a number of limitations that offer opportunities for future research. First, as our research is amongst the first to study AR-enabled customer creativity, we focus on offering detailed insights into the underlying process and mechanisms. To answer our guiding research question, we rely on testing with a specific AR application (IKEA Place) in a controlled lab setting and elicit responses from a younger, arguably tech-savvy demographic. This focus inevitably involves some trade-off in the wider generalizability of our findings. That is, our findings likely generalize to most early AR adopters, but future research should explore in how far customers with lower technology readiness (Blut & Wang, 2019) could experience different levels of both engagement and effects of the hypothesized relationships. In addition, future research could find ways to offset these potential effects by adapting AR applications to the needs of these customers, thus maximizing AR's creative potential for engaging people across all walks of life. Furthermore, as the influence of cross-cultural differences on the use and adoption of AR is well-acknowledged (Jung, Lee, & Chung, 2018), future research should leverage these insights in combination with research on different cultural understandings of creativity to provide a better understanding of creative customer engagement with AR across cultures. Specifically, norms related to 'what is creative' or a cultural focus on 'the whole versus the parts' will likely shape how customers expect to use AR. Some cultures emphasize high degrees of novelty, whereas others prefer "working off an existing idea" (Lubart, 2010, p. 267); some cultures also exhibit a tendency for analytic processing of individual components in a decision, whereas others rely on more holistic thinking in terms of interrelationships (Monga & John, 2007). As such, future research should study how different configurations of AR's features might support the establishing of creative inter-concept networks and consumption scripts (e.g., IKEA's AR app could provide either an empty canvas or example furnishings as a starting point; or customers could visualize either individual products or product bundles).

Second, while previous research has emphasized the situated nature of AR use (Chylinski et al., 2020; Hilken et al., 2018), little is known about how specific features of the physical environment and local decision context might influence customer creativity while using AR. We investigate the 'playground-effect' using an empty room that naturally prompts the customer to fill the space with furniture. As such, our findings seem particularly relevant within familiar and low-complexity AR use settings (e.g., re-designing an empty room in a customer's home). Many real-life situations, however, may involve partially furnished rooms or other contexts where customers need to match their purchase solutions to existing products. Relatedly, customer familiarity with (or ownership of) a space may not only shape creativity, but also be considered as an outcome of AR-enabled customer creativity (Carrozzini et al., 2019). Furthermore, different types of AR applications (e.g., L'Oreal's "Modiface" app enhances an image of customer him or

herself rather than the physical environment) or different decision timeframes (short- versus long-term) may shift customers' focus in creative activities. Currently, we do not know under what conditions these contextual effects may encourage or discourage customer creativity, such that future research is well advised to investigate how these and other contextual factors might impact AR use and resulting customer responses.

Third, consistent with our findings, previous research has shown that AR facilitates mental imagery processes compared to more conventional product previews such as pictures or text, which positively affects subsequent customer responses (Heller et al., 2019a; Park & Yoo, 2020). However, it is possible that the observed effects in our study are, to some extent, also driven by AR users' ability to move freely in the physical environment to investigate the AR-enhanced space. In the website condition, participants were in a similar room, but sitting and focusing their attention on images on a computer screen, which reflects the typical use of a website but entails limited physical movement. Thus, and also considering the growth of wearable AR devices (e.g., headsets or glasses; Rauschnabel, 2018), advancing research along conceptual frameworks of embodied (Tussyadiah, Jung, & tom Dieck, 2018) and situated (Hilken et al., 2017) cognition or active inference (Heller et al., 2019b) could greatly enhance the theoretical underpinnings of AR marketing for customer creativity.

Fourth, we adopt a specific view on and measurement approach to customer engagement in the context of customer creativity, which is based on most recent integrative customer engagement frameworks in marketing (e.g., Hollebeek et al., 2019). However, we acknowledge other definitions and measurement approaches; for example, marketing scholars have considered engagement predominantly in terms of behaviors (Van Doorn et al., 2010) or as a direct contribution (of value) to a firm (Pansari & Kumar, 2017). Thus, future research might consider how such distinct perspectives on customer engagement might be reconciled with customer creativity, or in turn how firms might specifically tailor their engagement marketing (Harmeling et al., 2017) with respect to AR and to stimulate creative customer engagement with products and services (Heller et al., 2020).

Fifth, this research focuses necessarily but exclusively on the positive impact of AR on purchase decisions. Similar to the majority of research in the field of AR marketing, our study pays less attention to potential negative or distracting effects of AR technologies. Future research should take a more critical perspective and understand the potential costs of AR marketing (e.g., privacy issues) while continuing to consider its benefits to customers and firms. Finally, while this study addresses a research gap in the use of AR during the early stages of the purchase journey and offers evidence for AR-enabled customer creativity, future research should more formally test the knock-on effects of these positive front-end customer behaviors and understand the interplay of AR use across the entire customer journey from exploration to actual customer purchase and recommendation behaviors.

Appendix A

Illustrative interior designs created by participants using AR



Appendix B

Overview of constructs and measurement items

Construct	Items
Assessment orientation Kruglanski et al. (2000)	<p>I never evaluate my social interactions with others after they occur. (R)</p> <p>I spend a great deal of time taking inventory of my positive and negative characteristics.</p> <p>I like evaluating other people's plans.</p> <p>I often compare myself with other people</p> <p>I don't spend much time thinking about ways others could improve themselves. (R)</p> <p>I often critique work done by myself or others.</p> <p>I often feel like I am being evaluated by others.</p> <p>I am a critical person.</p> <p>I am very self-critical and self-conscious about what I am saying.</p> <p>I often think that other people's choices and decisions are wrong.</p> <p>I rarely analyze the conversations I have had with others after they occur. (R)</p> <p>When I meet a new person, I usually evaluate how well he or she is doing on various dimensions (e.g. looks, achievements, social, status, clothes).</p>
Customer engagement adapted from Barasch et al. (2017)	<p>How much did you enjoy the experience/task?</p> <p>How much did you feel immersed in the experience/task?</p> <p>To what extent did you feel you were really part of the interior design experience?</p>
Customer creativity adapted from Goncalo et al. (2010)	<p>The interior design I came up with was highly creative.</p> <p>I probably came up with a design no one else came up with.</p> <p>My choices on the interior design shows that I am more creative than most people.</p> <p>The interior design I came up with is probably very conventional. (R)</p>
Anticipated satisfaction adapted from Parker et al. (2016)	<p>How satisfied do you expect to be with your interior design choices?</p> <p>I expect that I will be completely satisfied with my interior design choices.</p>

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