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Nostalgia beats the wow-effect: Inspiration, awe and meaningful associations in augmented reality marketing

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ABSTRACT

Augmented Reality (AR) is an innovative concept that enriches consumers' perception of the real world with virtual content. Prior research has shown that AR has the potential to inspire consumers and improve marketing outcomes, yet very little is known about the mechanisms through which AR inspires users. This research decomposes the AR-inspiration relationship and shows how psychological inspiration (i.e. inspired-by) translates to behavioral inspiration (i.e. inspired-to). The Lego Playground AR app is used to empirically test the hypotheses that the "wow-effect" (awe) and nostalgia serve as important mediators to the AR initiated inspiration process. While nostalgia is found to fully mediate the link between psychological and behavioral inspiration, the "wow-effect" does not significantly mediate this relationship. This research is the first to show inspiration unfold as a granular process. The meaningful associations generated through nostalgia translate psychological inspiration into consumer action, and this understanding may allow legacy brands to leverage latent nostalgia in new AR applications to influence consumer behavior.

1. Introduction

Augmented reality (AR) overlays and integrates virtual information into a user's perception of the real world (Bimber and Raskar, 2005). Given the prospects of AR as a transforming and potentially disruptive technology (Rauschnabel et al., 2019), marketers have become increasingly interested in using AR in their campaigns. Virtual mirrors, furniture planners such as the Ikea app, virtual make-up trials, and gaming/entertainment applications such as 'Pokémon Go' are just a few of many examples of how firms increase customer engagement and excitement through AR (Beck and Crié, 2016; Heller et al., 2019; Rauschnabel et al., 2017; Rese et al., 2014; Yim and Park, 2019).

Industry forecasts support the notion of AR as a key technology for growth in the 21st century. A 2016 Deloitte report suggests that AR provides customers with new and unique ways to interact with products and services, and it allows firms to increase awareness, promote product features, and create desire (Kunkel et al., 2016). More recent reports predict that the AR market will grow by 31% annually (Technavio, 2017) to more than 120 million users in the United States by 2021 (BCG, 2018). In a 2017 industry survey by PwC, 24% of managers interviewed indicated they would make significant investments into AR by 2020 (PwC, 2017).

Marketing academics have only recently reacted to this trend with research that combines practical relevance with scientific rigor. Previous research has focused on AR's role in driving satisfaction and purchase intention through utilitarian benefits, hedonic benefits, user experience, or curiosity (e.g., Beck and Crié, 2016; Hilken et al., 2017; Javornik, 2016a; Poushneh and Vasquez-Parraga, 2017; Rauschnabel, 2018; Rauschnabel et al., 2018; Rese et al., 2017), and Rauschnabel et al. (2019) provide evidence that brands benefit from AR usage through increases in brand attitude. In addition, other authors detail how scholars may address challenges in AR research (Javornik, 2016b; Yussof et al., 2019) and suggest that managers should use AR as a strategic tool (Feng and Mueller, 2019).

However, with few notable exceptions (e.g., Rauschnabel et al., 2019), the extant marketing and consumer research literature has not tapped into the transformative nature of AR. AR is capable of generating experiences that are not only useful and enjoyable, but also able to inspire consumers. Rauschnabel et al. (2019) addressed this issue by explicitly incorporating consumer inspiration as a mediator of the relationship between the antecedents of AR app use and changes in brand attitude. However, this study has two important shortcomings.

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First, it does not distinguish between the psychological element of inspiration (i.e., being inspired *by* something or someone) and its behavioral component (i.e., being inspired *to* do something) (Böttger et al., 2017; Trash and Elliot, 2004). Second, this research does not delve deeper into inspiration theory by testing additional mediators that comprise the inspiration process. The current study aims to extend our understanding of both AR apps and the mechanisms driving the inspired-by/inspired-to linkage. Specifically, we propose and test a model that distinguishes between the psychological and behavioral elements of inspiration in the context of an established brand.

We also propose and test two mechanisms that translate inspired-by into inspired-to. In particular, we theorize, assess and compare the "wow-effect" and the activation of meaningful brand associations (here: nostalgia) to mediate this effect (see Fig. 2). Awe, or a wow-effect, is proposed as mediator between the types of inspiration because we expect that extremely salient, surprising, or different stimuli will cause individuals to update their mental schemas associated with the stimulus, which is then more likely to lead to behavioral change. Nostalgia has recently emerged as a key area of study in psychology, and a single paper has linked nostalgia to both psychological and behavioral inspiration (Stephan et al., 2015). This paper concludes that nostalgia creates social connection, which then generates psychological inspiration. The psychological inspiration then results in behavioral change.

We test these relationships through the Lego Playgrounds AR app that can be downloaded from the Apple app store[1]. Vacante (2018) provides an overview of the usage of the app, and Fig. 1 displays a photo of app use. We chose the Lego app for two reasons. First, brand awareness for Lego is very high and Lego is essentially an omnipresent household name for most Western consumers. Second, Lego bricks have been around for more than 70 years, and as Lego's Chief Marketing Officer, Julia Goldin, explains, "Every time I meet anybody and I tell them that I work at Lego, I get a big smile because everybody has a personal story to tell. They remember their first set, they remember the first time they gave (it) to their child (or) something that they built" (Handley, 2018, second paragraph). Thus, Lego as a context fits our goal of investigating the role of nostalgia in the inspiration process.

The theoretical contribution of our research is three-fold. First, we add to the emerging literature on AR marketing by going beyond previously established antecedents of inspiration derived through the use of an AR app, and we include both the psychological and the behavioral components of inspiration in our model. Furthermore, we advance the extant literature on inspiration by incorporating AR technology into the inspiration discussion. Second, we show that nostalgia, a positively valenced sentimental longing or affection for the past (Stephan et al., 2012), mediates the inspiration process by aiding information processing through existing schemas. Third, we show that psychological inspiration can trigger a wow-effect – which, contrary to nostalgia, does not translate into behavioral inspiration.

For marketing practitioners, our results are relevant for a number of reasons. First, we provide guidance for marketers about factors that constitute psychologically inspiring app experiences. Second, we show that this psychological inspiration translates into behavioral inspiration (i.e. purchase intention) because it can activate meaningful associations such as nostalgia. Third, we also show that inspirational apps can trigger what prior research calls the "wow-effect" – a form of awe and surprise. However, our findings show that the meaningful associations of nostalgia drive behavioral inspiration while awe and the wow-effect do not.

[1] For more details, see https://apps.apple.com/us/app/lego-ar-playgrounds/id1445150018.

2. Theoretical background and hypotheses

2.1. Augmented reality marketing

AR marketing has been defined as a "strategic concept that integrates digital information or objects into the subject's perception of the physical world, often in combination with other media, to expose, articulate, or demonstrate consumer benefits to achieve organizational goals" (Rauschnabel et al., 2019, p. 44). Preliminary practitioner-oriented research on AR in a marketing context shows both high potential and numerous challenges when incorporating AR into firms' marketing strategies. For example, a recent survey among managers showed that designing effective AR platforms requires a solid understanding of how consumers interact with AR (BCG, 2018). Echoing this view, Rauschnabel et al. (2019) argued that AR Marketing, being a strategic firm capability, needs adequate financial and organizational resources and a profound understanding of user behavior through the lens of different disciplines.

However, the extant literature on AR in a marketing context remains fragmented and provides only partial insights for academics and marketing managers. For example, previous research suggests that AR may enhance customers' value perceptions through higher levels of simulated physical control (Hilken et al., 2017), allow customers to develop close and intimate (rather than transactional) relationships with brands (Scholz and Duffy, 2018), enhance satisfaction (Tsai, 2019) increase affective response and behavioral intentions through increased perceptions of flow (Javornik, 2016a), and potentially enhance purchases based on social image and social norms (Rauschnabel et al., 2017). Moreover, the extant literature has also outlined the role of utilitarian, hedonic, and symbolic benefits for AR users (Poushneh and Vasquez-Parraga, 2017; Rauschnabel, 2018; Yim et al., 2017). Notwithstanding the merits of these research streams, additional research and novel approaches are needed to better understand how AR affects consumption. The current research addresses this issue by explicitly modeling psychological inspiration (inspired-by) as driving behavioral inspiration (inspired-to) with nostalgia, and awe as mediators of the effect.

2.2. Consumer inspiration: inspired-by and inspired-to

Inspiration refers to a "motivational state that compels individuals to bring ideas into fruition" Oleynick et al. (2014, p. 1), and it is typically evoked and sustained by an illuminating stimulus, such as a person, an experience, or an idea (Thrash et al., 2010). While not an emotion as such (Thrash et al., 2014), inspiration is emotion laden and typically has a positive valence (Thrash and Elliot, 2003, 2004). Inspiration is a construct that motivates us to look outward, thwarting our natural inclination to focus on the self. Furthermore, inspiration has an external focus that challenges our assumptions and expectations about what the world is and what it can be, causing us to transcend our everyday selves beyond many real or imagined limits (Shiota et al., 2017). Böttger et al. (2017) conceptualize inspiration as a construct that can foster new ideas, exploration, customer loyalty, and increase demand. They position inspiration between the reception of a marketing induced idea and the intrinsic pursuit of a consumption related goal. In a retail environment, inspiration has been identified as fundamental for increasing customer satisfaction and delight. For example, a study on European retailing trends found that European consumers show a strong need to be inspired as part of their shopping experience and actively seek inspiration in consumption (Manasseh et al., 2012). Furthermore, inspiration has been identified as a significant driver of purchase decisions, and recent research argues that the sources of inspiration are "constantly expanding due to new technologies" (Böttger et al., 2017, p. 119).

While some researchers have conceptualized inspiration as a state (Higgins et al., 1994), the current research adopts the view of inspiration

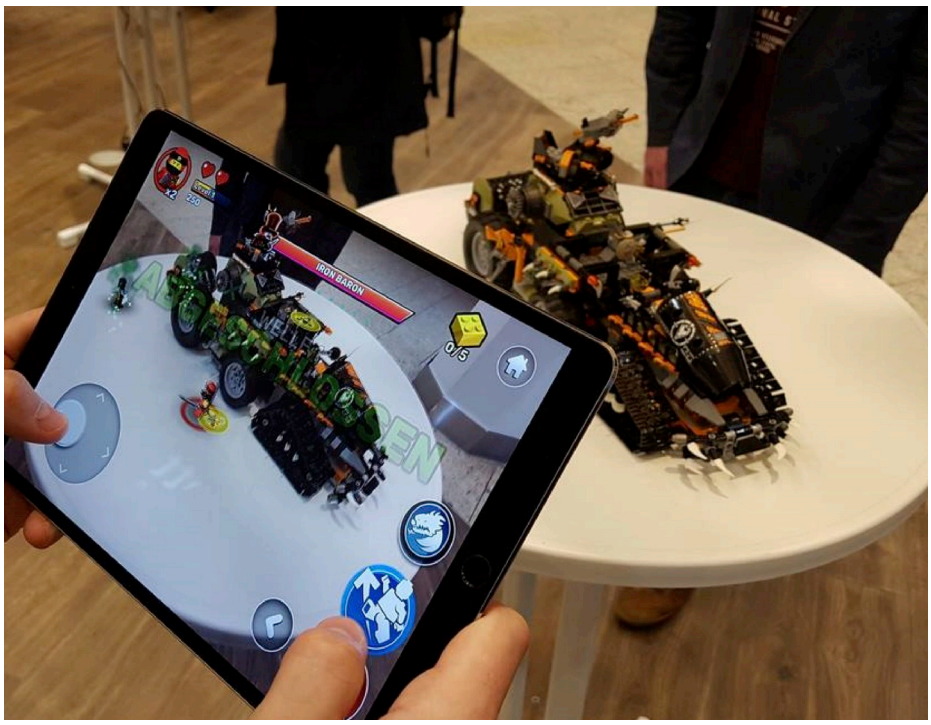

Fig. 1. Augmented Reality Marketing: Lego Studio AR app (photo taken during the data collection).

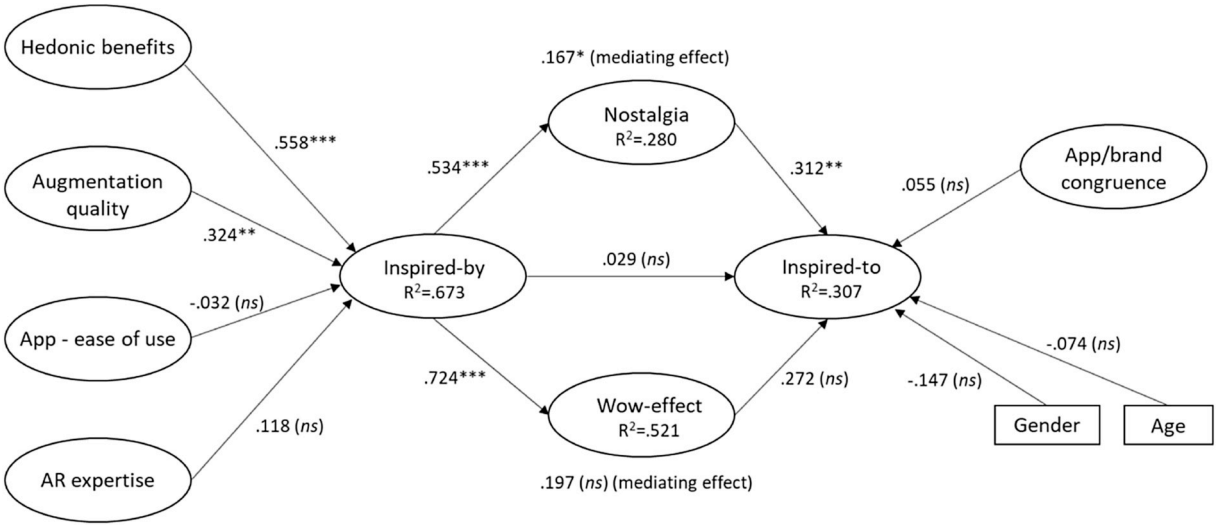

Fig. 2. Augmented reality marketing: Proposed model and results.

as a process that unfolds over time (Shiota et al., 2017). Some of the earliest work on inspiration in psychology suggested that inspiration is comprised of three core elements. Transcendence involves a focus outside the self that allows the conceptualization of outcomes that differ from the status quo. Evocation is distinct from transcendence in that any emotion or feeling is clearly tied to an external stimulus. The final element is an "approach motivation" (Higgins et al., 1994) which compels the individual to take action and is based on the other two elements (Thrash and Elliot, 2003). Subsequent research (Thrash and Elliot, 2004) collapsed these three elements into two distinct stages that can be referred to as either activation/intention, psychological/behavioral or "inspired-*by*"/"inspired-*to*" (Böttger et al., 2017; Ryan and Deci, 2000; Thrash and Elliot, 2004). Inspired-*by* is a psychological process associated with the perceived intrinsic value of the eliciting object while inspired-*to* refers to the motivation to extend or act on the qualities exemplified by the object (Shiota et al., 2017). Recent research generally agrees that both components are necessary to create a "full episode of inspiration" (Böttger et al., 2017; Shiota et al., 2017). Most importantly, the process of inspiration is broken down to include an inspired-*by* condition that temporally precedes an inspired-*to* condition. In this way, intrinsic value is transmitted from an inspiring object into future acts or creations (Thrash et al., 2010).

Although inspired-*by* and inspired-*to* may be perceived as a causal chain (Shiota et al., 2017), they are distinct processes and one may occur without the other. For instance, an individual may be inspired by the Grand Canyon, but this inspired-by may not necessarily lead to being inspired-to (Thrash and Elliot, 2004). However, though dissociable, inspired-by and inspired-to tend to co-occur (Thrash et al., 2017). That is, many events or experiences that tap into the inspired-by element (e.g., we are inspired by a great speech or an innovative new product) tend

to subsequently influence the inspired-*to* component (for example, we may feel inspired to change our lifestyle based on a great speech or buy the product based on an inspiring product review on YouTube). Importantly, previous research indicates that the inspiration process follows a sequence, implying that inspired-*by* precedes inspired-*to* (Thrash and Elliot, 2004; Shiota et al., 2017). In the context of the current research (the Lego Playgrounds AR app), we argue that both inspired-*by* and inspired-*to* will occur based on the experience with the app. That is, we expect that consumers will be inspired *by* the app, and subsequently report the sensation of being inspired *to* further engage with Lego bricks in creative ways. Thus.

H1. Psychological inspiration (inspired-*by*) is positively related to behavioral inspiration (inspired-*to*).

Hypothesis 1 describes how inspiration unfolds from a psychological perspective to a behavioral outcome. However, if the inspiration process begins with a psychological effect that is entirely within the mind of the consumer, it is indeed important to identify the antecedents that allow inspiration to occur in the first place. Understanding these antecedents contributes to marketing theory, but is also highly relevant for marketing practitioners because it will allow them to design products and services (i.e. AR apps) with attributes that foster higher levels of psychological inspiration. Several studies (e.g., Rauschnabel et al., 2019; Thrash and Elliot, 2003) have shown that hedonic benefits drive inspiration, but utilitarian benefits do not. These findings underline the essence of inspiration as a process closely related to emotion and creativity (Thrash and Elliot, 2004; Thrash et al., 2010). Therefore, we hypothesize that hedonic benefits derived from the app will be positively related to inspired-*by*.

H2. Perceived hedonic benefits from the app are positively related to psychological inspiration (inspired-*by*).

We further argue that a realistic presentation of branded content in one's environment is crucial. Following Rauschnabel et al. (2019), we define augmentation quality as the extent to which an AR app provides consumers with an experience that they perceive as being real and thus relevant for their consumption goals, and distinguish it from the perceived aesthetics of the AR app. Böttger et al. (2017) suggested that inspiration is evoked when an external stimulus leads to the intrinsic pursuit of consumption-related goals. Without a sufficient level of realism, it may be difficult to generate inspiration because consumers will not perceive the AR app as being relevant to their consumption goals. Drawing on processing fluency theory (Lee and Labroo, 2004; Schwarz, 2004), we argue that higher levels of perceived augmentation quality facilitate more fluent information processing, which has been shown to positively impact downstream variables such as attitudes and product preferences (Labroo et al., 2008). Based on this reasoning, we expect that higher levels of perceived augmentation quality will be associated with consumers' perceptions of being inspired *by* the app.

H3. Perceived augmentation quality of the app is positively related to psychological inspiration (inspired-*by*).

The technology acceptance model (TAM) has generated considerable attention in both the technology and the marketing literatures. At its core, TAM suggests that in order to gain acceptance, a technology must be perceived both as useful and as easy to use (Davis, 1989). More recent research developing a unified theory of the acceptance and use of technology has shown that "effort expectancies" or the user's expectations about the effort that they will need to invest to learn and develop the skills to use a new technology drive behavioral expectation (Venkatesh et al., 2012). Because inspiration occurs typically with little cognitive effort (Thrash and Elliot, 2003), we expect that lower levels of cognitive load (that is, higher levels of processing ease) will lead to higher levels of inspiration. In other words, we predict that the user's perception of the app's ease of use (EOU) will facilitate psychological inspiration.

H4. Perceived ease of use (EOU) for the app is positively related to psychological inspiration (inspired-*by*).

Processing fluency also serves as a theoretical framework for the hypothesized effect between AR expertise and inspiration. In general terms, consumer expertise has been defined as the "ability to perform product-related tasks successfully" (Alba and Hutchinson, 1987, p. 411). In this seminal paper, the authors outline how expertise is associated with reduced levels of cognitive effort. Further, expertise has been identified as a necessary condition for creativity (Csikszentmihalyi, 1996), which is relevant for the current research because inspiration is indeed a creative process (Thrash et al., 2010). Thus, drawing on extant literatures suggesting that higher levels of expertise are associated with less cognitive effort, increased processing fluency, and higher levels of creativity, we expect a positive relationship between AR expertise and psychological inspiration.

H5. AR expertise is positively related to psychological inspiration (inspired-*by*).

2.3. Understanding the process: nostalgia as a meaningful association

Inspiration changes the status quo updating mental maps associated with a particular stimulus (Shiota et al., 2017). Inspiration involves risk in letting go of an extant mental map in favor of a new conceptualization. An individual may offset some of the risk involved with inspiration by focusing on meaningful associations associated with the focal concept. One type of meaningful association that may be drawn upon in these situations is nostalgia.

Nostalgia has been defined as a "longing for the past, a yearning for yesterday, or a fondness for possessions and activities associated with days of yore" (Holbrook, 1993). Labeled in early research as a psychiatric disorder symptomatic of anxiety, sadness, pessimism, loss of appetite, and insomnia, recent research has reconceptualized nostalgia as a predominantly positive emotion and a nourishing and invigorating psychological resource (Sedikides and Wildschut, 2018; Sedikides et al., 2008; Stephan et al., 2012). For example, the extant literature suggests that nostalgia increases self-continuity (i.e., the connection between one's past and one's present) (Lasaleta and Loveland, 2019; Sedikides and Wildschut, 2018), self-esteem (Sedikides et al., 2008), creativity (Van Tilburg et al., 2015), consumer patience (Huang et al., 2016), and charitable behavior (Zhou et al., 2012). Of high relevance for marketers is the finding that nostalgia increases consumers' willingness to pay more for products, an effect that is triggered by nostalgia's capacity to foster perceived social connectedness (Lasaleta et al., 2014). Importantly, nostalgia can refer to personal experiences (Hepper et al., 2012; Holak and Havlena, 1998; Shin and Parker, 2017; Wildschut et al., 2010), but also to a preference towards objects (including people, places, and things) that were more common or popular when one was younger (or not even born) (Holbrook and Schindler, 1991; Schindler and Holbrook, 2003). In a similar vein, Kessous (2015) observes that nostalgic brands can relate to a consumer's personal experience ("real nostalgia") or be linked to a cultural context ("collective nostalgia"). Thus, nostalgia can occur even when a consumer did not have prior personal experience with the object or event (Lasaleta et al., 2014).

To the best of our knowledge, only one article (Stephan et al., 2015) has investigated a possible relationship between nostalgia and inspiration. In this highly relevant work, the authors question whether nostalgia may also "shape the future" and "connect people to new opportunities" (pp. 1395–1396). Addressing this literature gap, the authors found that nostalgia increases social connectedness, which subsequently fosters self-esteem and in turn increases inspiration. However, Stephan et al. (2015) employed a general measure of inspiration that blends items related to inspired-*by* (e.g., "Thinking about this event makes me feel inspired") with items related to inspired-*to* (e.g., "… inspires me to do something" [page 1398]). The current research, based on Thrash et al. (2004), aims at explicitly distinguishing these two elements of the inspiration process. We suggest that nostalgia mediates the relationship

between inspired-by and inspired-to in the context of an established brand (Lego) based on the following argument: First, consumers will be inspired by the innovative and visually appealing overlay of a virtual play-world over the existing real-world environment (Thrash and Elliot, 2004). Second, for a culturally relevant brand such as Lego, inspired-*by* triggers nostalgia, either driven by the memory of past experiences with the brand or by culturally-triggered (collective) nostalgia for the brand (Kessous, 2015). Finally, and following the main line of reasoning in Stephan et al. (2015), we predict that nostalgia positively affects consumers' goal orientation and willingness to explore new opportunities, which leads to increased levels of inspired-*to*. Thus.

H6. Nostalgia mediates the relationship between psychological inspiration (inspired-*by*) and behavioral inspiration (inspired-*to*).

2.4. Awe and the "wow-effect" in augmented reality

Awe has been conceptualized as a positively valenced emotional experience associated with feelings of wonder and amazement (Williams et al., 2018). Despite sharing some characteristics with other positive emotions, it can be clearly distinguished from anticipatory enthusiasm, amusement, attachment, love, and contentment (Griskevicius et al., 2010). Examples of awe-inducing experiences include natural wonders, panoramic views, and extraordinary pieces of music and art (Shiota et al., 2007). The positively valenced aspect of awe is emphasized by the observation that consumers frequently seek out awe inducing experiences through events including musical performances, spiritual retreats, and travel to monuments (Van Cappellen and Saroglou, 2012).

Previous research has identified perceived vastness and a need for accommodation as two characteristics likely to elicit awe (Shiota et al., 2017). Vastness refers to anything that extends the self's ordinary level of experience or frame of reference (Keltner and Haidt, 2003). Importantly, vastness can be driven by sheer physical size (as when seeing a large monument or a landscape from the top of a mountain), but a stimulus can also be vast through social impact (e.g., an inspiring leader such as Ghandi), conceptual breadth (a piece of literature), explanatory power (a new theory in physics), or sensory detail (a complex musical or visual piece) (Shiota et al., 2017). For example, a physicist or economist may perceive a mathematical equation as vast, not because the equation is literally long, but due to the vastness of the equation's explanatory power (Shiota et al., 2007).

Accommodation refers to the process of adjusting mental structures to make sense of new experience (Keltner and Haidt, 2003). Cognition theory suggests that people interpret the world through schemas or mental representations based on past experience (Piaget and Imhelder, 2014). In general, individuals interpret the environment through existing schemas, a process known as assimilation. However, accommodation is necessary when stimuli do not fit adequately into existing schema and an adjustment and updating of schema is necessary (Block, 1982; Shiota, 2007). For awe-inducing or wowing experiences, existing schema typically are not able to fully accommodate the stimulus, and an update of existing mental structures is needed.

Apart from natural (e.g., the Grand Canyon) and artistic (e.g., pieces of music and visual art) stimuli able to induce awe, recent research has also considered technological advancements in awe-related research. For example, Chirico et al. (2018) used virtual reality (VR) glasses to generate awe-inducing views of a forest, mountains, and a view on earth from deep space suggesting that VR can generate awe and a sense of presence. Moreover, Quesnel and Riecke (2018) used an interactive VR system that allowed participants to explore Earth from both the ground and from orbit, and they found that VR exploration increased both self-reported awe and physiological goose bumps recorded through an arm-mounted goose bump camera.

The current study extends these first attempts at investigating the influence of immersive technology on awe by exposing consumers to augmented reality (AR) in a retail context. Although VR and AR share some characteristics, they are fundamentally different (Chuah, 2018). Specifically, whereas VR separates the user from reality (typically through the use of special googles) and the user is fully situated in a virtual world, AR overlays digital information on the physical world and thus provides interactivity between virtual and real elements in the environment (Craig, 2013; Rauschnabel et al., 2018).

The wow-effect is a concept from extant AR research that captures users' responses to awe-inducing stimuli (Javornik, 2016b). We suggest the wow-effect as a mediator between inspired-*by* and inspired-*to* for the following reasons. Inspired-*by* relates to an appreciation of and accommodation to an evocative object (Thrash and Elliot, 2004, p. 958). Thus, the attempt to accommodate the object (e.g., a piece of art, an inspiring speech, or the exposure to a new technology) may require consumers to update existing mental representations, which is one of the fundamental processes for awe or a wow-effect to occur (Shiota et al., 2017). We predict that for sufficiently intensive experiences, such as the exposure to a novel AR technology, inspired-*by* is related to awe, and this will cause subjects to report a wow-effect. Further, we expect that the update of mental representations in response to the wow-effect, in combination with the self-transcending nature of awe (Yaden et al., 2017), will cause individuals to see things in a new way or allow them to visualize the world in a way that opens new possibilities. By breaking individuals from their existing mental frameworks or schemas, a wowing experience may facilitate positive, approach-oriented mental and behavioral change. Hence.

H7. The wow-effect mediates the relationship between psychological inspiration (inspired-*by*) and behavioral inspiration (inspired-*to*).

Table 1 summarizes the constructs used in this research, and Fig. 2 shows the conceptual model and the effects we predict in our hypotheses.

Table 1
Key constructs.

Construct	Definition	Prior Literature
Hedonic Benefits	The fun or pleasure derived from using a technology.	Venkatesh et al. (2012)
Augmentation Quality	The extent to which the user perceives the augmented content as realistic.	Rauschnabel et al. (2019)
App - Ease of Use	The degree of ease the consumer perceives when using the technology.	Lu et al. (2005); Venkatesh et al. (2012)
AR Expertise	The ability to perform AR tasks successfully.	Lu and Hsiao (2007)
Inspired-by	The psychological process associated with the perceived intrinsic value of the eliciting object. Psychological inspiration involves how the individual reacts internally to an awe inducing stimulus.	Böttger et al. (2017)
Nostalgia	A positive emotion associated with a fondness for possessions or activites from one's past.	Rauschnabel et al. (2017)
Wow-effect	The consumer experience of processing awe-inducing information. This typically requires mental accommodation and an updating of schemas to process this information.	Javornik (2016b); Feng and Xie (2019)
Inspired-to	The motivation to extend or act on the qualities exemplified by an awe inducing stimulus.	Böttger et al. (2017)
App/brand congruence	The degree to which the app fits with the focal product and brand.	Taylor and Bearden (2002); Keller and Aaker (1992)

3. Research design and methods

3.1. Sample and measures

We recruited participants for the study through mall intercepts and at a major university in Germany, and all respondents were invited to take part in an academic research project on "new media." In total, n = 145 respondents completed the survey, 91 men and 54 women. The average age was 28.9 years with a range from age 10 to age 85, with 25% of the sample younger than 18 years and 50% of the sample older than 24 years.

The Lego Playgrounds app was chosen as the test app for a number of reasons. First, Lego as both a product and a brand has existed for over 70 years. Most individuals growing up in western cultures have had some exposure to Lego over time, even if they never owned the Lego product. Instead of building a new product/brand in the mind of subjects specifically for our study, we anticipated that most subjects had prior experience with the Lego brand.

The questionnaire was displayed on laptops, and respondents used Apple iPads to iterate between the app and the questionnaire. The survey started with some general, unrelated technological questions. Next, participants used the Lego app for 3–5 min. Approximately half of the participants used the Lego app along with a physical Lego product, whereas the other half used only the app. The survey ended with questions about demographics and participants received candy as a thank you for their participation.

Simple ANOVAs between the group that used the physical Legos with the app and the group that used only the app revealed no significant differences between the two conditions with the exception of the mean response for inspired-*by* ($F = 4.216$, $p = .042$). To explore this difference, we ran a multigroup analysis in PLS based on the final model represented in Fig. 2. This analysis revealed no significant differences in relationships based on the two groups with the exception of the link between inspired-*by* and nostalgia. A simple regression showed that this link was positive and significant for both groups, but the relationship was stronger for those who used the app with the product ($\beta = .851$, $t = 6.13$, $p < .001$) than for those who used only the app ($\beta = 0.458$, $t = 3.827$, $p < .001$). Since the differences did not affect valence or significance we aggregated the groups, and the results reported in the remainder of this paper reflect the combined sample.

Whenever possible, we adopted existing items to measure the latent constructs. We used seven-point scales where higher values indicated more positive evaluations or higher levels of agreement. We assessed the psychometric characteristics of the measurement model using confirmatory factor analysis (CFA). Table 2 list the constructs and their corresponding measures, as well as descriptive statistics and reliability criteria. Table 3 presents the correlations between all latent constructs.

3.2. Analysis

We used partial least squares structural equation modeling (PLS-SEM; Fornell and Bookstein, 1982; Hair et al., 2017a) to analyze the hypothesized relationships. Our analyses employed SmartPLS version 3.2.8 (Ringle et al., 2015). As compared to covariance-based structural equation modeling (CB-SEM), PLS-SEM is more appropriate when the primary research objective focuses on prediction and the nature of the research is exploratory rather than testing an established theory or explanatory modeling (Hair et al., 2012, 2017b; Nitzl, 2016). Given the exploratory nature of our hypotheses and our focus on prediction rather than the confirmation of established theory, PLS-SEM was the more appropriate approach for our study. Moreover, PLS-SEM has shown a high level of statistical power and a favorable convergence behavior, even with relatively small samples (Hair et al., 2019; Reinartz et al., 2009).

PLS-SEM follows a composite model approach (as opposed to the common factor model assumed by CB-SEM) (Sarstedt et al., 2016). Thus,

Table 2
Measurement model.

Construct/Items	Mean	SD	Factor loadings	AVE	α	CR
Augmentation quality (adapted from Rauschnabel et al., 2019)						
I felt that the virtual characters were really there.	3.74	2.03	.819	.635	.839	.839
It seemed to me that the figures had come from the tablet to the table.	4.21	1.98	.726			
The virtual elements looked very realistic.	4.49	1.89	.842			
Hedonic benefits (adapted from Venkatesh et al., 2012)				.823	.932	.933
Using this app … … was fun.	4.97	1.68	.931			
… was entertaining.	4.98	1.79	.929			
… was amusing.	4.74	1.93	.859	.716	.834	.834
Ease of use (adapted from Lu et al., 2005; Venkatesh et al., 2012)						
Using this app …						
… was self-explanatory.	4.83	1.94	.824			
… was easy to use and user-friendly.	5.33	1.68	.868			
AR expertise (adapted from Lu and Hsiao, 2007)				.675	.862	.861
I know what augmented reality is.	4.69	2.34	.835			
I already had experience with augmented reality.	3.77	2.49	.784			
Overall, I am interested in the topic of augmented reality.	3.53	2.09	.843			
Inspired-*by* (adapted from Böttger et al., 2017)				.579	.805	.804
Using this app …						
… was inspiring.	3.53	1.85	.677			
… stimulated my imagination.	3.66	1.84	.764			
… spontaneously gave me new and unexpected idea.	4.17	1.87	.834			
Nostalgia (adapted from Rauschnabel et al., 2017)				.815	.946	.946
Using this app …						
… reminded me of nice memories from my childhood/youth.	3.66	2.13	.866			
… has awakened positive childhood memories with me.	3.69	2.12	.938			
… made me feel to be on a journey through time back to my childhood.	3.26	2.11	.838			
… made me feel nostalgic.	3.21	2.02	.963			
Wow-effect (own development based on Feng and Xie, 2019)				.723	.886	.886
Seeing this app amazed me.	3.81	1.93	.744			
When I saw this app, I often thought "wow!"	3.54	1.92	.890			
This app has thrilled me from the very beginning.	3.99	1.84	.907			
Inspired-*to* (adopted from Böttger et al., 2017)				.705	.877	.877
The app inspired me to play with Lego again.	2.99	1.87	.889			
I felt a desire to play with Lego again.	3.09	1.97	.847			
I feel motivated to build something with Lego again.	3.54	2.07	.780			
				.707	.879	.879

(*continued on next page*)

Table 2 (*continued*)

Construct/Items	Mean	SD	Factor loadings	AVE	α	CR
App/brand congruence (adapted from Taylor and Bearden, 2002; Keller and Aaker, 1992)						
The app is appropriate to supplement Lego products.	4.90	1.82	.866			
The app fits into Lego's assortment.	4.66	1.72	.809			
The game fits with the values that Lego conveys with its products.	4.16	1.86	.848			

Note: SD = Standard Deviation; AVE = Average Variance Extracted; AR = Augmented Reality; α = Cronbach's alpha; CR = Composite Reliability. All measures used seven point scales where higher values indicate greater agreement or higher evaluation. All scale items were translated to German and adjusted to reflect the Lego Playground app in a German context.

in PLS-SEM, estimates between constructs and indicators tend to be higher, while estimates among the constructs tend to be smaller than those derived from CB-SEM (Hair et al., 2017b; Rönkkö and Evermann, 2013). To address this potential issue, we used the consistent PLS algorithm (Dijkstra and Henseler, 2015) which adjusts the original regression path estimates by dividing the latent variable correlations by the geometric mean of the latent variables' reliabilities (Dijkstra and Henseler, 2015; Hair et al., 2017a). Although we concur with Hair et al.'s (2019) observation that it may be erroneous to claim that the common factor model assumed in CB-SEM is "correct" and, consequently, the composite model approach assumed by PLS-SEM is automatically biased, we opted to use PLSc because it allowed us to produce results that should be comparable to those obtained from CB-SEM. In other words, the advantage of PLSc is its ability to build a bridge between factor models and composite models (Sarstedt et al., 2014).

4. Results

4.1. Measurement model evaluation

Table 2 shows factor loadings from PLSc, convergent validity, and reliability of the scale items. Given that our measurement models are reflective (rather than formative), it is meaningful to report traditional indicators such as factor loadings, average variance extracted (AVE), and reliability based on composite reliability (CR) or Cronbach's alpha (Diamantopoulus and Winklhoefer, 2001). All factor loadings were above or close to 0.7. Likewise, both CR and Cronbach's alpha were above the commonly recommended threshold of 0.7 for all constructs (Hair et al., 2012), indicating acceptable reliability. All constructs displayed AVE values above 0.5, indicating convergent validity (Bagozzi and Yi, 1988).

Further, as shown in Table 3, discriminant validity satisfied the Fornell-Larcker (1981) criterion, except for the square root of AVE for inspired-by (0.761), which was slightly below the correlation between inspired-by and hedonic benefits (0.783). The relatively high correlation suggests that inspiration is predominantly driven by pleasure and hedonic experiences. An additional test for discriminant validity, the heterotrait-monotrait (HTMT) criterion (Hair et al., 2019), showed that all constructs (compare the numbers in brackets in Table 3) remained below the most conservative threshold of 0.85 as prescribed by Henseler et al. (2015).

4.2. Structural model evaluation and hypotheses tests

To test H1 (the effect of inspired-*by* on inspired-*to*), we first ran a model without the mediators (nostalgia and awe). This model, shown in Fig. 3, displayed good model fit (SRMR = 0.067 Henseler et al., 2016). In support of H1 (Table 4), the results showed a positive and statistically significant effect of inspired-*by* on inspired-*to* (0.357, $t = 2.369$, $p < .05$). The adjusted R^2 for inspired-*to* was 0.215. The three control variables (app/brand congruence, gender, and age) relationship to inspired-*to* was not significant. Following Hair et al. (2017a, b), we determined the predictive relevance (Q^2) of inspired-to (the only exogenous variable in Model 1) by using the blindfolding procedure implemented in SmartPLS 3 with a pre-specified distance of seven. Predictive validity was achieved with a Q^2 value for inspired-*to* substantially above zero (0.127). Further, the effect size f^2 for the influence of inspired-*by* on inspired-*to* was 0.086, indicating an effect size falling in the range between small (0.02) and medium (0.15) (Cohen, 1988).

Next, we ran the full model with all mediators (Fig. 2). The model fit was unchanged (SRMR = 0.067), and the explained variances (R^2) for the endogenous variables were 0.673 for inspired-*by*, 0.280 for nostalgia, 0.524 for the wow-effect, and 0.312 for inspired-*to*. Thus, adding the four predictor variables (hedonic benefits, augmentation quality, app-EOU, and AR expertise) and the two mediators (nostalgia and the wow-effect) to the model increased the variance explained in the dependent variable (inspired-*to*) from 21.5% to 31.2%. As in Model 1, the effects of the control variables on inspired-*to* for Model 2 were not significant.

Table 4 shows the path coefficients, bias-corrected 95% confidence

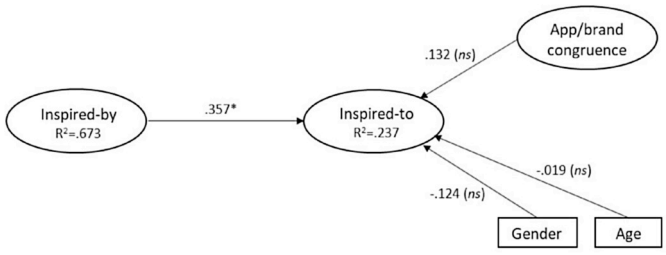

Fig. 3. How inspired-*by* translates into inspired-*to* in Augmented Reality: Results.

Table 3
Discriminant validity assessment.

	1	2	3	4	5	6	7	8	9
1 Augmentation quality	.797								
2 Hedonic benefits	.670 [.671]	**.907**							
3 Ease of use	.499 [.498]	.703 [.702]	**.846**						
4 AR expertise	.172 [.168]	.253 [.250]	.372 [.373]	**.821**					
5 Inspired-by	.702 [.698]	.783 [.779]	.566 [.562]	.302 [.299]	**.761**				
6 Nostalgia	.428 [.429]	.469 [.471]	.218 [.218]	.007 [.060]	.534 [.534]	**.903**			
7 Wow-effect	.667 [.662]	.544 [.542]	.347 [.346]	-.003 [.095]	.724 [.719]	.391 [.392]	**.850**		
8 Inspired-to	.384 [.384]	.343 [.345]	.169 [.169]	.068 [.084]	.466 [.465]	.472 [.470]	.451 [.452]	**.840**	
9 App/brand congruence	.536 [.537]	.761 [.762]	.559 [.558]	.201 [.201]	.664 [.660]	.426 [.425]	.556 [.553]	.365 [.366]	**.841**

Note: Numbers on the diagonal (in bold) are square roots of AVEs; non-diagonal numbers are latent variable correlations; non-diagonal numbers in brackets are heterotrait-monotrait (HTMT) ratios.

Table 4
Structural model results.

Relationships	Path coefficient	Bias-corrected 95% confidence interval	f^2	Support for hypotheses
Model 1 – main effect				
Inspired-*by* → Inspired-*to*	.357*	[0.064; 0.676]	.086	Yes (H_1)
Model 2 – main effects				
Hedonic benefits → Inspired-*by*	.558***	[0.293; 0.852]	.363	Yes (H_2)
Augmentation quality → Inspired-*by*	.324**	[0.106; 0.557]	.182	Yes (H_3)
App-ease of use→ Inspired-*by*	-.032	[-0.280; 0.244]	.001	No (H_4)
AR expertise → Inspired-*by*	.118	[-0.045; 0.277]	.038	No (H_5)
Inspired-*by* → Nostalgia	.534***	[0.347; 0.683]	.398	
Inspired-*by* → Awe	.724***	[0.595; 0.830]	1.102	
Nostalgia → Inspired-*to*	.312**	[0.065; 0.527]	.104	
Wow-effect → Inspired-*to*	.272	[-0.081; 0.592]	.048	
Inspired-by → Inspired-*to*	.029	[-0.371; 0.521]	.000	
Model 2 – mediating effects				
Inspired-*by* → Nostalgia → Inspired-*to*	.167*	[0.054; 0.313]		Yes (H_6) [full mediation]
Inspired-*by* → Wow-effect → Inspired-*to*	.197	[-0.05; 0.454]		No (H_7)

Results are based on a bias-corrected and accelerated (BCa) bootstrapping routine with 5000 subsamples, 145 observations per subsample, and all latent variables connected for initial calculation.
***p < .001; **p < .01; *p < .05.

intervals, effect sizes f^2, and the results of the hypotheses tests for Model 2. As predicted by H_2 and H_3, hedonic benefits (0.558, $p < .001$, $f^2 = 0.363$) and augmentation quality (0.324, $p < .01$, $f^2 = 0.182$) had a positive and statistically significant effect on inspired-*by*. However, the influence of app-EOU and AR expertise were not significant (H_4 and H_5). This finding emphasizes that the essence of inspired-*to* relates to hedonic and experiential factors, which resonates with previous conceptualizations of the construct as suggested by Böttger et al. (2017) and Thrash and Elliot (2004).

Inspired-*to* had a substantial influence on both nostalgia (0.534, $p < .001$, $f^2 = 0.398$ and the wow-effect (0.724, $p < .001$, $f^2 = 1.102$). However, whereas the effect of nostalgia on inspired-*to* was statistically significant (0.312, $p < .01$, $f^2 = 0.104$), the effect of the wow-effect on inspired-to was not significant (0.272, ns, $f^2 = 0.048$). To test the hypothesized mediating effects of nostalgia and the wow-effect formally, we inspected the indirect effects from the bootstrapping procedure in SmartPLS. In support of H_6, the indirect effect of Inspired-*by* → Nostalgia → Inspired-*to* was positive and the bias-corrected 95% confidence interval did not cross zero, indicating statistical significance (0.167; 95% CI = [0.054; 0.313]). Because the direct effect from inspired-*by* to inspired-*to* was not significant in Model 2 (0.029, *ns*, $f^2 = 0.000$), nostalgia fully mediated the relationship between inspired-*by* and inspired-*to*. (Zhao et al., 2010). However, contrary to H_7, the indirect effect of Inspired-*by* → the wow-effect → Inspired-*to* was not significant (Nitzl et al., 2016).

5. Discussion

AR marketing exposes, articulates, or demonstrates consumer benefits by integrating digital information or objects into the subject's perception of the physical world in a way that will likely impact consumers' information search and decision-making processes (Rauschnabel et al., 2019). Böttger et al. (2017) suggest that accelerated lifestyles along with the endless options for consuming products and services are compressing the customer journey to a fraction of what it once was, dramatically increasing the power and importance of consumer inspiration in the purchase process. Inspiration has been shown to be an important variable in a number of marketing settings (Böttger et al., 2017; Rauschnabel et al., 2019), and understanding inspiration as a process that can be initiated by AR will facilitate the creation of products and services that will fill important customer needs. Since marketers primarily aim to have consumers adopt their products and services, behavioral inspiration (i.e., inspired-*to*) is of ultimate importance.

5.1. Contributions to Augmented Reality Marketing Theory

From a theoretical perspective, this research is the first to show inspiration unfold as a granular process of linked events. The emotional feeling of psychological inspiration, the breathing in of a new perspective or idea, has been seen as the genesis of the inspiration process, and we disentangle the inspiration mechanism to show specific antecedents and mediators. Our research shows the importance of nostalgia in the inspiration process within the context of an established brand. Psychological inspiration is useful to a firm when manipulating perception of a product or building the brand, but this doesn't drop directly to the firm's bottom line. Marketers need to change the behaviors of consumers to remain sustainable over time. The ultimate outcome of inspiration as a behavioral motivation is the result of psychological inspiration with nostalgia serving as a transmission or catalyst.

For marketing theory, the results from this study extend the extant literature on nostalgia in a number of important ways. First, Stephan et al. (2015) show that social connection can be driven by nostalgia, and this process in turn drives inspiration. Our results suggest that AR may be an ideal technology to activate nostalgia and drive behavioral inspiration. Second, status quo bias is a phenomenon where the individual, often irrationally, chooses the status quo over some change (Samuelson and Zeckhauser, 1988). Nostalgia essentially offers an alternative to the status quo that the individual has knowledge about or has experienced before. This experience or knowledge may provide the confidence to engage in a change from the status quo. Finally, nostalgia and inspiration may seem to be opposites in many ways; however, they are linked in this study and the Stephan et al. (2015) study. This linkage makes sense from a cognitive psychology/schema perspective. Where inspiration is primarily about breaking out of existing schemas or mental maps, nostalgia is concerned with reinstituting dormant or neglected mental maps. Prospect theory (Kahneman and Tversky, 1979) suggests that a loss is perceived as greater in magnitude than a gain, so being inspired and breaking an existing schema (a type of loss) would require a significant increase in benefit than that offered by the status quo. Nostalgia may offset loss associated with breaking the existing schema as it reflects back on earlier schemas, attitudes, or mindsets. Nostalgia may offer the potential gain that allows the individual to break existing schemas and be inspired.

The current research also explores the antecedents of the granular inspiration process. These elements are primarily built on extant research that has been conducted involving AR and inspiration. Our research partially replicates effects shown in other studies involving the focal constructs, and these relationships can be viewed as a validation of the data.

Both brick and mortar and online retailers are increasingly employing AR in their operations, but we are just beginning to understand how AR impacts the consumer. Looking specifically at how AR could revolutionize online retailing, comprehending how effects transfer is extremely important (Moorhouse et al., 2018). Understanding the antecedents of psychological inspiration along with how psychological

inspiration results in changing behaviors will be crucial in a field that is predicted to grow by 31% annually in the next three years (Technavio, 2017).

Surprisingly, this research shows no significant relationship between either the app's EOU or a user's AR expertise and the inspired-*by* construct. As AR technology and applications improve, the need for prior exposure or expertise in the medium may be decreasing. Firms and developers are incentivized to make these applications as simple and intuitive as possible, and we could be at a point where these applications do not benefit from the experience of the user. While the above argument could explain the lack of significance for the AR expertise construct, it should highlight the significance of the EOU construct. It is possible that EOU serves as a hygiene factor. That is, consumers might expect a certain level of user friendliness while they do not value higher levels once the threshold is exceeded. In our sample, responses to these items are clustered near the top of the scale with 70% of the responses indicating EOU perceptions of 4 or above (the top 43% of the scale). More importantly, nearly 23% of responses were at the top level of 7.

A second unexpected, and possibly related, result delivered by this research involves the non-significance of the wow-effect as a mediator in the inspired-by to inspired-to relationship. Past research has highlighted the importance of wow and awe in the AR experience (i.e. Javornik, 2016b) so our results were surprising. We suggest three potential reasons for finding no effect here. First, and related to the discussion above, the "wow" associated with AR technology may be wearing off. The majority of individuals embedded in western culture are at least aware of AR apps like Pokémon Go. It could be that mixing the physical and virtual worlds isn't novel and doesn't elicit the same reactions that it did just a short time ago. Second, while the concept of "awe" has been around for years, rarely have researchers attempted to translate awe to the effect of a specific technology at a specific time. A more refined approach or potentially measuring physical (Quesnel and Riecke, 2018) rather than cognitive reactions might elicit different results. Finally, while awe and a wow-effect might influence psychological inspiration, it might have no impact on behavioral inspiration. The results depicted in Fig. 2 support this conceptualization.

5.2. Contributions to the management of Augmented Reality in marketing

This research identifies several implications for the developers of AR apps. First, the current research suggests that the augmentation quality of the app along with the hedonic benefits provided by the app are both important precursors to the development of inspiration. These findings resonate with Böttger et al. (2017) and Thrash and Elliot (2004), who underline the emotional and experiential nature of inspiration. Thus, hedonic and experiential qualities should be front and center in the minds of app developers if they are designing apps to inspire users.

The "wow-effect" has been discussed in research articles exploring AR (Javornik, 2016b), and our research hypothesized the "wow-effect" as a mediator to the inspiration process. However, while the link between inspired-*by* and the wow-effect was strong and significant, the link between the wow-effect and inspired-to was not significant, indicating that the wow-effect did not mediate the inspiration process. This was somewhat surprising, given the significance of awe or a "wow-effect" in extant AR research.

On the other hand, the current research did show nostalgia as a mediator of the linkage between psychological and behavioral inspiration. Nostalgia has received much attention in social psychology and consumer research in recent years (Kessous, 2015; Lasaleta et al., 2014; Sedikides and Wildschut, 2018; Shin and Parker, 2017). We have seen the concept of nostalgia evolve from a negatively viewed indicator of disorder to a positive and sought-after consumer experience (Sedikides et al., 2008; Stephan et al., 2012). Understanding how nostalgia translates psychological inspiration into behavioral inspiration will allow legacy brands to leverage past relationships to create stronger and more meaningful inspiration episodes. Marketing practitioners might utilize the findings of this research by using retro-styling to increase levels of nostalgia to drive consumer behavior (Lasaleta and Loveland, 2019). This technique should be especially successful when nostalgia is generated by brand-related and brand-relevant stimuli (as in the current research in the form of the Lego Playgrounds AR app), rather than through brand-independent stimuli. Practitioners might also leverage nostalgia by cobranding with dormant or defunct legacy brands that have the potential to translate psychological inspiration to a behavioral form. In short, the meaningful associations of nostalgia drove changes in consumer behavior while the flash of awe or wow did not.

This research does not suggest that all AR marketers should ignore the wow-effect and focus on nostalgia. As theorized, we argue that meaningful associations play an important role in translating psychological to behavioral inspiration. In the context of our study (the 70 year old Lego brand investigated through the lens of mostly adult consumers), we argue that nostalgia is such a meaningful association. A newer brand like Tesla, for example, might not have nostalgia as an option. Future research might identify other meaningful associations that might work in lieu of nostalgia. Second, although we showed that the wow-effect does not drive behavioral intention, it might trigger other desired behaviors. For example, one could speculate that the wow-effect makes people share the app and thus, increases reach.

5.3. Limitations and future research

The current study did not find a link between awe or a "wow-effect" and behavioral inspiration, but the wow-effect might play an important role in predicting other variables, such as word-of-mouth for the app and the brand. Furthermore, parallels can be drawn between the customer delight literature (Rust and Oliver, 2000) and research on the wow-effect. Exceeding customer expectations and delighting customers becomes increasingly difficult as firms close in on the asymptote. Each time a customer's expectations are exceeded, these expectations change to make exceeding them more difficult. The wow-effect or awe might present similar issues as customer expectations adjust after each exposure to new and different AR technologies. Future AR studies should explore whether customers become increasingly difficult to "wow".

The current research studied consumers using an AR app in isolation. However, some AR applications and devices can be used in social settings with other users. Future research could investigate if shared AR exposure (e.g., several friends at the same place and having simultaneous shared AR experiences) amplifies the effect of AR benefits on inspiration. Future research might also explore possible interactions between context (i.e. social vs. individual) and the nostalgia/inspiration relationship. In other words, additional studies might explore the degree to which inspiration transcends domains. For example, Klein et al. (2018) explored the inspiration of football players by an actor with limited football experience or relevance. Future research in an AR context could investigate the extent to which being inspired by a consumer-focused AR app translates to other domains, such as being inspired to develop painting or music composition skills. For a company like Lego, could being inspired by a non-Lego AR app increase consumers' desire to experiment and become creative with Lego bricks (which in turn would increase product purchases)? Future studies could explore how closely related the app needs to be to the focal product to elicit inspiration. Establishing boundary conditions to this effect would help to set guidelines for marketing practitioners.

This research explored how the users of a single AR app in the context of a single brand evaluated the experience in one country. More research is needed to determine whether these effects extend to other products or if the results are specific to the type of product used in this research. Marshall McLuhan famously stated that "the medium is the message," and this could potentially apply to research on inspiration in AR as well. AR is a very recent addition to the marketing sphere that might be awesome or nostalgic enough to elicit inspiring responses in the near term. It is possible that awe or nostalgia are relatively short-

lived and totally dependent on the novelty of the medium. Future research should explore whether future exposure to both the focal app and AR technology in general sap the awe or nostalgia and destroy the ability of these technologies to inspire the user. Likewise, replications in other countries might contribute to the emerging stream of cross-cultural AR research (e.g., Han and tom Dieck, 2019; Jung, Lee, Chung, MC tom Dieck, 2019).

Finally, this study (as well as most extant research) has measured inspired-*by* and inspired-*to* cross-sectionally. For both AR marketing theory and practice, it would be interesting to assess whether this effect also holds over time. Likewise, we measured inspired-to in the context of playing with and purchasing Lego products. Future research might explore inspired-to behaviors like brand advocacy, recommendation, or even oppositional brand loyalty.

6. Conclusion

This research outlines how AR applications can inspire users, and how psychological and behavioral inspiration can be driven by AR technology. To understand inspiration as a granular process, we hypothesized a pair of seemingly paradoxical mediators. The wow-effect centers on the idea that inspiration coincides with a need to break down existing mental schemas to psychologically accommodate for information that changes how the individual perceives specific stimuli. If inspiration demands psychological accommodation, then the more wowing or awesome a stimulus the greater the accommodation and theoretically the more inspiring the experience. On the other hand, nostalgia is essentially reactivating and restructuring dormant meaningful associations in the mind of the consumer. Instead of seeing something new for the first time, nostalgia is associated with seeing something new in a familiar construct.

Both the wow-effect and nostalgia are significantly linked to inspired-by. However, if the ultimate goal is to drive consumer behavior, nostalgia mediates the link to inspired-to while the wow-effect does not. This research shows that while either nostalgia or the wow-effect can illicit psychological inspiration, only nostalgia, with the concomitant restructuring of existing associations, has the ability to mediate psychological inspiration to behavioral change.

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References

Alba, J.W., Hutchinson, J.W., 1987. Dimensions of consumer expertise. J. Consum. Res. 13 (4), 411–454.
Bagozzi, R.P., Yi, Y., 1988. On the evaluation of structural equation models. J. Acad. Mark. Sci. 16 (2), 74–94.
BCG, 2018. Augmented reality: Is the camera the next big thing in advertising? https://www.bcg.com/publications/2018/augmented-reality-is-camera-next-big-thing-advertising.aspx.
Beck, M., Crié, D., 2016. I virtually try it… I want it! Virtual fitting room: a tool to increase on-line and off-line exploratory behavior, patronage and purchase intentions. J. Retail. Consum. Serv. 40, 279–296.
Bimber, O., Raskar, R., 2005. Spatial Augmented Reality: Merging Real and Virtual Worlds. CRC Press, Taylor & Francis Group, Boca Raton, FL.
Block, J., 1982. Assimilation, accommodation, and the dynamics of personality development. Child Dev. 53 (2), 281–295.
Böttger, T., Rudolph, T., Evanschitzky, H., Pfrang, T., 2017. Customer inspiration: conceptualization, scale development, and validation. J. Mark. 81 (6), 116–131.
Chirico, A., Ferrise, F., Cordella, L., Gaggioli, A., 2018. Designing awe in virtual reality: an experimental study. Front. Psychol. 8 (Article 2351), 1–14.
Chuah, S.H.W., 2018. Why and who will adopt extended reality technology? Literature review, synthesis, and future research agenda. Working paper. .
Cohen, J., 1988. Statistical Power Analysis for the Behavioral Sciences. Lawrence Erlbaum, Mahwah, NJ.
Craig, A.B., 2013. Understanding Augmented Reality: Concepts and Applications. Elsevier, Amsterdam, Netherlands.
Csikszentmihalyi, M., 1996. Creativity: Flow and the Psychology of Discovery and Invention. Harper, New York, NY.
Davis, F., 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Q. 13 (3), 319–340.
Diamantopoulos, A., Winklhofer, H.M., 2001. Index construction with formative indicators: an alternative to scale development. J. Mark. Res. 38 (2), 269–277.
Dijkstra, T.K., Henseler, J., 2015. Consistent partial least squares path modeling. MIS Q. 39 (2), 297–316.
Feng, Y., Xie, Q., 2019. Demystifying novelty effects: an analysis of consumer responses to YouTube videos featuring augmented reality out-of-home advertising campaigns. J. Curr. Issues Res. Advert. 40 (1), 36–53.
Feng, Y., Mueller, B., 2019. The state of augmented reality advertising around the globe: a multi-cultural content analysis. J. Promot. Manag. 25 (4), 453–475.
Fornell, C., Bookstein, F.L., 1982. Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. J. Mark. Res. 19 (4), 440–452.
Fornell, C., Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. J. Mark. Res. 18 (1), 39–50.
Griskevicius, V., Shiota, M.N., Neufeld, S.L., 2010. Influence of different positive emotions on persuasion processing: a functional evolutionary approach. Emotion 10 (2), 190–206.
Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M., 2017. A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), second ed. Sage, Los Angeles, CA.
Hair, J.F., Hult, G.T.M., Ringle, C.M., Sarstedt, M., Thiele, K.O., 2017. Mirror, mirror on the wall: a comparative evaluation of composite-based structural equation modeling methods. J. Acad. Mark. Sci. 34 (5), 616–636.
Hair, J.F., Sarstedt, M., Ringle, C.M., 2019. Rethinking some of the rethinking of partial least squares. Eur. J. Market. https://doi.org/10.1108/EJM-10-2018-0665 (in press).
Hair, J.F., Sarstedt, M., Ringle, C.M., Mena, J., 2012. An assessment of the use of partial least squares structural equation modeling in marketing research. J. Acad. Mark. Sci. 40 (3), 414–433.
Han I., D., tom Dieck C., M., 2019. Calling for user-centric VR design research in hospitality and tourism. Hospitality & Society 9 (2), 237–246.
Handley, L., 2018. How marketing built Lego into the world's favorite toy brand. https://www.cnbc.com/2018/04/27/lego-marketing-strategy-made-it-world-favorite-toy-brand.html.
Heller, J., Chylinski, M., de Ruyter, K., Mahr, D., Keeling, D.I., 2019. Let me imagine that for you: transforming the retail frontline through augmenting customer mental imagery ability. J. Retail. 95 (2), 94–114.
Henseler, J., Hubona, G., Ray, P.A., 2016. Using PLS path modeling in new technology research: Updated guidelines. Ind. Manag. Data Syst. 116 (1), 2–20.
Henseler, J., Ringle, C.M., Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. J. Acad. Mark. Sci. 43 (1), 115–135.
Hepper, E.G., Ritchie, T.D., Sedikides, C., Wildschut, T., 2012. Odyssey's end: Lay conceptions of nostalgia reflect its original Homeric meaning. Emotion 12 (1), 102–119.
Higgins, E.T., Roney, C.J., Crowe, E., Hymes, C., 1994. Ideal versus ought predilections for approach and avoidance distinct self-regulatory systems. J. Personal. Soc. Psychol. 66 (2), 276.
Hilken, T., de Ruyter, K., Chylinski, M., Mahr, D., Keeling, D.I., 2017. Augmenting the eye of the beholder: exploring the strategic potential of augmented reality to enhance online service experiences. J. Acad. Mark. Sci. 45 (6), 884–905.
Holak, S.L., Havlena, W.J., 1998. Feelings, fantasies, and memories: an examination of emotional components of nostalgia. J. Bus. Res. 42 (3), 217–226.
Holbrook, M.B., 1993. Nostalgia and consumption preferences: some emerging patterns of consumer tastes. J. Consum. Res. 20 (2), 245–256.
Holbrook, M.B., Schindler, R.M., 1991. Echoes of the dear departed past: some work in progress on nostalgia. In: Holman, R.H., Solomon, M.R. (Eds.), Advances in Consumer Research, vol. 18. Association for Consumer Research, Provo, UT, pp. 330–333.
Huang, X., Huang, Z., Wyer, R.S., 2016. Slowing down in the good old days: the effect of nostalgia on consumer patience. J. Consum. Res. 43 (3), 372–387.
Javornik, A., 2016. 'It's an illusion, but it looks real!' Consumer affective, cognitive and behavioural responses to augmented reality applications. J. Mark. Manag. 32 (9–10), 987–1011.
Javornik, A., 2016. Augmented reality: research agenda for studying the impact of its media characteristics on consumer behaviour. J. Retail. Consum. Serv. 30, 252–261.
Jung, T., tom Dieck, M.C., Lee, H., Chung, N., 2019. Moderating role of long-term orientation on augmented reality adoption. Int. J. Hum. Comput. Interact. (in press).
Kahneman, D., Tversky, A., 1979. Prospect theory: an analysis of decision under risk. Econometrica 47 (2), 263–292.
Keltner, D., Haidt, J., 2003. Approaching awe, a moral, spiritual, and aesthetic emotion. Cognit. Emot. 17 (2), 297–314.
Kessous, A., 2015. Nostalgia and brands: a sweet rather than a bitter cultural evocation of the past. J. Mark. Manag. 31 (17–18), 1899–1923.
Keller, K.L., Aaker, D.A., 1992. The effects of sequential introduction of brand extensions. J. Mark. Res. 29 (1), 35–50.
Klein, J.W., Case, T.I., Fitness, J., 2018. Can the positive effects of inspiration be extended to different domains? J. Appl. Soc. Psychol. 48 (1), 28–34.
Kunkel, N., Soechtig, S., Miniman, J., Stauch, C., 2016. Augmented and Virtual Reality Go to Work, Deloitte Report. https://www2.deloitte.com/insights/us/en/focus/tech trends/ 2016/augmented-and-virtual-reality.html.

Labroo, A.A., Dhar, R., Schwarz, N., 2008. Of frog wines and frowning watches: Semantic priming, perceptual fluency, and brand evaluation. J. Consum. Res. 34 (6), 819–831.
Lasaleta, J.D., Loveland, K.E., 2019. What's new is old again: nostalgia and retro-styling in response to authenticity threats. Journal of the Association for Consumer Research 4 (2), 172–184.
Lasaleta, J.D., Sedikides, C., Vohs, K.D., 2014. Nostalgia weakens the desire for money. J. Consum. Res. 41 (3), 713–729.
Lee, A.Y., Labroo, A.A., 2004. The effect of conceptual and perceptual fluency and brand evaluation. J. Mark. Res. 41 (2), 151–165.
Lu, H.P., Hsiao, K.L., 2007. Understanding intention to continuously share information on weblogs. Internet Res. 17 (4), 345–361.
Lu, J., Yao, J.E., Yu, C.S., 2005. Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology. J. Strateg. Inf. Syst. 14 (3), 245–268.
Manasseh, T., Müller-Sarmiento, P., Reuter, H., von Faber-Castell, C., Pallua, C., 2012. Customer inspiration – a key lever for growth in European Retail. Management Review St. Gallen 29 (5), 16–21.
Moorhouse, N., tom Dieck, M.C., Jung, T., 2018. Technological innovations transforming the consumer retail experience: a review of literature. In: Augmented Reality and Virtual Reality. Springer, Cham, Switzerland, pp. 133–143.
Nitzl, C., Roldan, J.L., Cepeda, G., 2016. Mediation analysis in partial least squares path modeling: Helping researchers discuss more sophisticated models. Ind. Manag. Data Syst. 116 (9), 1849–1864.
Nitzl, C., 2016. The use of partial least squares structural equation modelling (PLS-SEM) in management accounting research: directions for future theory development. J. Account. Lit. 37, 19–35.
Oleynick, V.C., Thrash, T.M., LeFew, M.C., Moldovan, E.G., Kieffaber, P.D., 2014. The scientific study of inspiration in the creative process: challenges and opportunities. Front. Hum. Neurosci. 8 (Article 436), 1–8.
Piaget, J., Inhelder, B., 2014. Mental images. In: Oléron, P., Piaget, J., Inhelder, B., Gréco, P. (Eds.), Experimental Psychology: its Scope and Method. Psychology Press, London, United Kingdom, pp. 85–143.
PwC, 2017. Briefing: Augmented reality. http://usblogs.pwc.com/emerging-technology/briefing-augmented-reality/.
Poushneh, A., Vasquez-Parraga, A.Z., 2017. Discernible impact of augmented reality on retail customer's experience, satisfaction and willingness to buy. J. Retail. Consum. Serv. 34, 229–234.
Quesnel, D., Riecke, B.E., 2018. Are you awed yet? How virtual reality gives us awe and goose bumps. Front. Psychol. 8 (Article 2158), 1–22.
Rauschnabel, P.A., 2018. Virtually enhancing the real world with holograms: an exploration of expected gratifications of using augmented reality smart glasses. Psychol. Mark. 35 (8), 557–572.
Rauschnabel, P.A., Felix, R., Hinsch, Chris, 2019. Augmented reality marketing: how mobile AR-apps can improve brands through inspiration. J. Retail. Consum. Serv. 49, 43–53.
Rauschnabel, P.A., He, J., Ro, Y.K., 2018. Antecedents to the adoption of augmented reality smart glasses: a closer look at privacy risks. J. Bus. Res. 92, 374–384.
Rauschnabel, P.A., Rossmann, A., tom Dieck, M.C., 2017. An adoption framework for mobile augmented reality games: the case of Pokémon Go. Comput. Hum. Behav. 76, 276–286.
Reinartz, W.J., Haenlein, M., Henseler, J., 2009. An empirical comparison of the efficacy of covariance-based and variance-based SEM. Int. J. Res. Mark. 26 (4), 332–344.
Rese, A., Baier, D., Geyer-Schulz, A., Schreiber, S., 2017. How augmented reality apps are accepted by consumers: a comparative analysis using scales and opinions. Technol. Forecast. Soc. Chang. 124, 306–319.
Rese, A., Schreiber, S., Baier, D., 2014. Technology acceptance modeling of augmented reality at the point of sale: can surveys be replaced by an analysis of online reviews? J. Retail. Consum. Serv. 21 (5), 869–876.
Ringle, C.M., Wende, S., Becker, J.-M., 2015. SmartPLS 3. Bönningstedt (SmartPLS).
Rönkkö, M., Evermann, J., 2013. A critical examination of common beliefs about partial least squares path modeling. Organ. Res. Methods 16 (3), 425–448.
Rust, R.T., Oliver, R.O., 2000. Should we delight the customer? J. Acad. Mark. Sci. 28 (1), 86–94.
Ryan, R.M., Deci, E.L., 2000. Intrinsic and extrinsic motivations: Classic definitions and new directions. Contemp. Educ. Psychol. 25 (1), 54–67.
Samuelson, W., Zeckhauser, R., 1988. Status quo bias in decision making. J. Risk Uncertain. 1 (1), 7–59.
Sarstedt, M., Hair, J.F., Ringle, C.M., Thiele, K.O., Gudergan, S.P., 2016. Estimation issues with PLS and CBSEM: where the bias lies! J. Bus. Res. 69 (10), 3998–4010.
Sarstedt, M., Ringle, C.M., Hair, J.F., 2014. PLS-SEM: Looking back and moving forward. Long. Range Plan. 47 (3), 132–137.
Schindler, R.M., Holbrook, M.B., 2003. Nostalgia for early experience as a determinant of consumer preferences. Psycholgoy & Marketing 20 (4), 275–304.
Scholz, J., Duffy, K., 2018. We ARe at home: how augmented reality reshapes mobile marketing and consumer-brand relationships. J. Retail. Consum. Serv. 44, 11–23.
Schwarz, N., 2004. Metacognitive experiences in consumer judgment and decision making. J. Consum. Psychol. 14 (4), 332–348.
Sedikides, C., Wildschut, T., 2018. Finding meaning in nostalgia. Rev. Gen. Psychol. 22 (1), 48–61.
Sedikides, C., Wildschut, T., Arndt, J., Routledge, C.D., 2008. Nostalgia: past, present, and future. Curr. Dir. Psychol. Sci. 17 (5), 304–307.
Shin, H., Parker, J., 2017. Exploring the elements of consumer nostalgia in retailing: evidence from a content analysis of retailer collages. J. Retail. Consum. Serv. 35, 1–11.
Shiota, M.N., Keltner, D., Mossman, A., 2007. The nature of awe: Elicitors, appraisals, and effects on self-concept. Cognit. Emot. 21 (5), 944–963.
Shiota, M.N., Thrash, T.M., Danvers, A.F., Dombrowski, J.T., 2017. Transcending the self: awe, Elevation, and inspiration. In: Tugade, M.M., Shiota, M.N., Kirby, L.D. (Eds.), Handbook of Positive Emotions. Guilford Press, New York, NY, pp. 362–377.
Stephan, E., Sedikides, C., Wildschut, T., 2012. Mental travel into the past: Differentiating recollections of nostalgic, ordinary, and positive events. Eur. J. Soc. Psychol. 42 (3), 290–298.
Stephan, E., Sedikides, C., Wildschut, T., Cheung, W.-Y., Routledge, C., Arndt, J., 2015. Nostalgia-evoked inspiration: mediating mechanisms and motivational implications. Personal. Soc. Psychol. Bull. 41 (10), 1395–1410.
Taylor, V.A., Bearden, W.O., 2002. The effects of price on brand extension evaluations: the moderating role of extension similarity. J. Acad. Mark. Sci. 30 (2), 131–140.
Technavio - Global Augmented Reality for Advertising Market 2017–2021, 2017. (Accessed 12 September 2019).
Thrash, T.M., Elliot, A.J., 2003. Inspiration as a psychological construct. J. Personal. Soc. Psychol. 84 (4), 871–889.
Thrash, T.M., Elliot, A.J., 2004. Inspiration: core characteristics, component processes, antecedents, and function. J. Personal. Soc. Psychol. 87 (6), 957–973.
Thrash, T.M., Maruskin, L.A., Cassidy, S.E., Fryer, J.W., Ryan, R.M., 2010. Mediating between the muse and the masses: Inspiration and the actualization of creative ideas. J. Personal. Soc. Psychol. 98 (3), 469–487.
Thrash, T.M., Maruskin, L.A., Moldovan, E.G., Oleynick, V.C., Belzak, W.C., 2017. Writer–reader contagion of inspiration and related states: Conditional process analyses within a cross-classified writer reader framework. J. Personal. Soc. Psychol. 113 (3), 466.
Thrash, T.M., Moldovan, E.G., Oleynick, V.C., Maruskin, L.A., 2014. The psychology of inspiration. Social and Personality Psychology Compass 8 (9), 495–510.
Tsai, S.P., 2019. Augmented reality enhancing place satisfaction for heritage tourism marketing. Curr. Issues Tourism 1–6.
Vacante, V., 2018, December 10. LEGO Playgrounds: a mixed reality portal of innovation. Retrieved from. https://vrscout.com/news/lego-playgrounds-mr-portal/.
Van Cappellen, P., Saroglou, V., 2012. Awe activates religious and spiritual feelings and behavioral intentions. Psychology of Religion and Spirituality 4 (3), 223–236.
Van Tilburg, W.A.P., Sedikides, C., Wildschut, T., 2015. The mnemonic muse: nostalgia fosters creativity through openness to experience. J. Exp. Soc. Psychol. 59, 1–7.
Venkatesh, V., Thong, J.Y., Xu, X., 2012. Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. MIS Q. 36 (1), 157–178.
Wildschut, T., Sedikides, C., Routledge, C., Arndt, J., Cordaro, F., 2010. Nostalgia as a repository of social connectedness: the role of attachment-related avoidance. J. Personal. Soc. Psychol. 98 (4), 573–586.
Williams, P., Coleman, N.V., Morales, A.C., Cesareo, L., 2018. Connections to brands that help others versus help the self: the impact of incidental awe and pride on consumer relationships with social-benefit and luxury brands. Journal of the Association for Consumer Research 3 (2), 202–215.
Yaden, D.B., Haidt, J., Hood, R.W., Vago, D.R., Newberg, A.B., 2017. The varieties of self-transcendent experience. Rev. Gen. Psychol. 21 (2), 143–160.
Yim, M.Y.C., Chu, S.C., Sauer, P.L., 2017. Is augmented reality technology an effective tool for e-commerce? An interactivity and vividness perspective. J. Interact. Mark. 39, 89–103.
Yim, M.Y.C., Park, S.Y., 2019. "I am not satisfied with my body, so I like augmented reality (AR)": consumer responses to AR-based product presentations. J. Bus. Res. 100, 581–589.
Yussof, F.M., Salleh, S.M., Ahmad, A.L., 2019. Augmented reality: a systematic literature review and prospects for future research in marketing and advertising communication. In: Intelligent and Interactive Computing. Springer, Singapore, pp. 459–473.
Zhao, X., Lynch, J.G., Chen, Q., 2010. Reconsidering baron and Kenny: Myths and truths about mediation analysis. J. Consum. Res. 37 (2), 197–206.
Zhou, X., Wildschut, T., Sedikides, C., Shi, K., Feng, C., 2012. Nostalgia: the gift that keeps on giving. J. Consum. Res. 39 (1), 39–50.