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The Gamification of Branded Content: A Meta-Analysis of Advergame Effects

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ABSTRACT

Advergames are generally believed to be an effective advertising format due to their gamified and engaging nature. The empirical evidence for this, however, is inconclusive, with several studies reporting nonsignificant or contradicting results. The current study aimed to address this research gap by providing a meta-analysis of five advergame effects (i.e., ad attitude, memory, persuasion, choice behavior, persuasion knowledge). A systematic search procedure was used and 38 relevant data sets were identified. The results indicate that, generally, (1) consumers have a more positive attitude toward advergames than other types of advertising; (2) brand and product information seems less likely to be remembered by consumers when it is communicated via an advergame versus different types of advertising; (3) advergames seem to be persuasive and (4) drivers of choice behavior; and (5) compared to other types of advertising, advergames are less likely to be recognized as advertising; finally, a metaregression model showed that (6) consumers' age mitigates the persuasiveness of advergames, meaning that younger consumers seem more susceptible to the persuasive effect of advergames than older consumers are.

Gamification, the use of game thinking and game mechanics to solve problems and influence real-world behaviors, is more popular than ever. In less than a decade, this practice evolved into a multibillion-dollar industry (TechSci Research 2019). Among the first to adopt gamification principles were advertisers and brands who use it to enhance the effectiveness of their advertising messages (Terlutter and Capella 2013). Today, the commercial use of gamified advertising is widespread, and forecasts indicate that its popularity is continually increasing. Technavio (2020) recently projected that, despite uncertainties concerning the global economy, the gamified advertising market will continue to grow by about 20% annually over the next five years—by almost $11 billion total. In this article, we focus on one of the more popular types of gamified advertising: the advergame.

Advergames are fully gamified advertising messages and can be defined as a type of advertising that leverages game thinking and game mechanics to drive engagement with a brand—to ultimately reach a commercial goal. In their seminal publication on the gamification of advertising, Terlutter and Capella (2013) laid the groundwork for the scientific exploration of advergames. They identified various important psychological and behavioral outcomes of advergaming. In the current study, we aim to expand on their work by utilizing meta-analytical methods to systematically quantify five of these advergame effects: ad attitude, memory, persuasion, choice behavior, and persuasion knowledge activation. This quantification attempt is essential because the empirical evidence for the effectiveness of advergames remains inconclusive.

For the most studied effect of advergaming, persuasion, we also examine the moderating role of age. Including age as a moderating variable offers a unique opportunity to test whether age influences people's susceptibility to advergames—in other words, whether young consumers are potentially more susceptible to advergames than are their adult counterparts.

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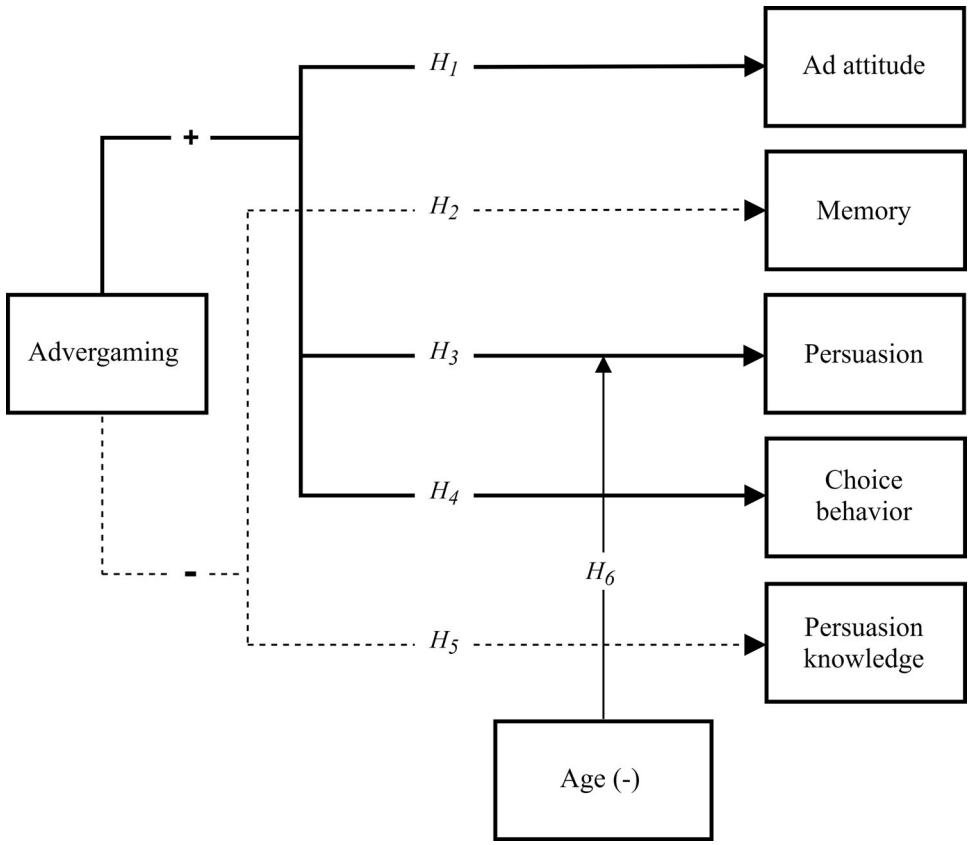

Figure 1. Our conceptual model: The predicted positive effects are indicated with solid, bold lines and predicted negative effects with dotted lines.

Mizerski et al. (2017) recently pointed out that the empirical evidence for the often-assumed link between this age-dependent susceptibility to persuasion and actual brand responses remains inconclusive, despite a heavy focus on children's responses to advergames.

In sum, with our study, we expect to contribute to the overall understanding of advergaming in two distinct ways. First, building on the work of Terlutter and Capella (2013), this work contributes to the advertising literature by offering meta-analytical estimates of advergame effects. Considering the inconclusive findings across studies, these estimates will be relevant both for researchers studying the effectiveness of advergames and for practitioners who use advergames to reach their commercial goals. Second, by including age as a potential moderator of advergame persuasiveness, we hope to contribute to the overall understanding of age-dependent susceptibility to persuasion and actual brand responses.

Theoretical Background

To visualize the structure of our article, we have included a conceptual model in Figure 1. This figure shows that we first discuss the hypotheses for the five psychological and behavioral outcomes of advergaming: ad attitude (hypothesis 1), memory (hypothesis 2), persuasion (hypothesis 3), choice behavior (hypothesis 4), and persuasion knowledge activation (hypothesis 5). Following those discussions, we examine the potential moderating role of age in the persuasiveness of advergames (hypothesis 6).

Do Consumers Have Positive Attitudes toward Advergames?

Due to their gamified nature, advergames are generally believed to be more engaging than nongamified advertising. It is unclear, with empirical evidence being inconclusive, whether consumers actually like advergames more so than other types of advertising. This is most clearly exemplified by considering two recent studies (i.e., Evans, Wojdynski, and Hoy 2019; Waiguny, Nelson, and Terlutter 2014) that reported opposing results. Where Evans, Wojdynski, and Hoy (2019) found that their participants liked the advergames they played less than the video commercials they watched, Waiguny, Nelson, and Terlutter's (2014) study showed the opposite and reported more positive attitudes toward their stimulus advergame than toward their stimulus video.

In general, most people are believed to be critical of advertising and thus express negative or ambivalent attitudes toward advertising (Obermiller and Spangenberg 2000). These often-negative attitudes are believed to be driven, for the most part, by consumers' general skeptical beliefs toward advertising. However, other beliefs have also been found to play a key role in the formation of attitudes toward specific types of advertising. For gamified advertising in particular, perceived hedonic value has been identified as an important belief driving positive ad attitudes (Poels, Janssens, and Herrewijn 2013).

Gamified advertising differs from nongamified advertising in that it utilizes game mechanics and game thinking to engage consumers with its advertised message. Gamifying content aims to make engaging with this particular content more enjoyable (Altmeyer et al. 2019) and thus likely increases the content's overall hedonic value. In the context of advergames, this means that by gamifying an advertising message, the hedonic value of the advertised message would likely increase, which subsequently would result in more positive attitudes toward this type of advertising. In sum, we therefore expect that consumers have a more positive attitude toward advergames than toward other types of advertising.

H1: Advergames have a more positive effect on ad attitude compared to nongamified advertising.

Do Advergames Improve Retrieval of Commercial Information from Memory?

Although the gamified nature of advergames is generally considered its strength, it seems likely that there are situations in which it might become its weakness. Most empirical evidence on the effects of advergaming on memory suggests that consumers are less likely to remember commercial information (e.g., brand logos) when this information is embedded in an advergame than when it is embedded in a different advertising format (e.g., Daems, De Pelsmacker, and Moons 2019; Huh et al. 2015).

These findings can largely be explained within the paradigm of the limited capacity model of motivated mediated message processing (Lang 2000). In short, this model suggests that people's cognitive capacity is limited and that the number of cognitive tasks an individual can perform at the same time requires (and competes for) this finite capacity. For example, to recall a brand after being exposed to it in an advertisement, one must first have allocated cognitive capacity to the processing (i.e., encoding and storing) of this brand information while being exposed to it. If no cognitive capacity is allocated to the processing of the information, perhaps because the viewer was distracted, the information cannot be recalled afterward.

For people playing advergames, this means that to remember any embedded brand information, players will have to allocate cognitive capacity to the encoding and storing of this information while playing. Under the assumption of limited cognitive capacity, this could be problematic, because playing a game often requires a constant (and reactive) allocation of cognitive capacity (Lee and Faber 2007). For advergames, this means concretely that the game mechanics (which are a fundamental part of what constitutes an advergame) are expected to direct players' attention (and allocation of cognitive capacity) away from the embedded commercial information whenever this information is not an integral part of the gameplay.

Ultimately, the gamification of advertising is thus expected to negatively affect players' processing of the advertising message, which would be reflected by limited retrieval of commercial information from memory for people playing advergames.

H2: Advergames have a less positive effect on brand memory compared to nongamified advertising.

Are Advergames Persuasive?

Advergames are considered particularly persuasive because, more than most other types of advertising, they are able to engage consumers with their commercial content. In this study, the term *persuasion* is used when discussing an integrated advertising effect representing both affective (e.g., brand attitude) and conative (e.g., purchase intention) responses to advertising. In meta-analyses, integrating affective and conative advertising effects is common practice and is warranted because these effects are often comparable in direction and, to a certain extent, in size (Eisend and Tarrahi 2016). Examples of meta-analyses that take the same approach are Eisend and Hermann (2019), O'Keefe (2013), and Jeong and Hwang (2016). While ad attitude is sometimes also included as a component of persuasion, in the current study we decided to treat ad attitude as a separate outcome variable. This decision enabled us to account for the entertaining nature of advergames as a type of advertising.

In the literature, the persuasiveness of advergames has been explained from various theoretical angles. A widely accepted explanation of the persuasiveness of advergames is rooted in their entertaining and emotionally stimulating design. Emotional responses elicited while playing advergames are believed to transfer over to the embedded advertising cues, which

in turn would explain the persuasiveness of advergames. These emotional responses are often defined on the dimensions pleasure and arousal, where pleasure indicates the valence of an emotional response and arousal indicates its intensity (Russell and Barrett 1999). Both dimensions have been linked to increased persuasion in studies into entertaining advertising formats (like advergames). But the effect of each dimension is explained by a conceptually similar yet unique psychological mechanism.

First, pleasure is believed to drive affective psychological responses (e.g., brand attitude) via direct affect transfer (Mitchell and Nelson 2018). This psychological mechanism explains how people attribute positive affect that they experience in a particular context to a stimulus that is embedded within this context. In the context of advergames, it would suggest that people attribute the positive affect experienced while playing an advergame to the brand that is embedded in the game. Second, arousal is believed to drive primarily conative psychological responses (e.g., purchase intention) via excitation transfer (Mitchell and Nelson 2018; Zillmann 1971). This psychological mechanism works similarly to affect transfer; however, in this case, not positive affect but residual excitement from playing an advergame is (mis)-attributed to the brand or product that was embedded into the game, making the brand seem more exciting.

Notably, a third mechanism, evaluative conditioning, has also been considered by some researchers (e.g., Gross 2010; Waiguny, Nelson, and Marko 2013) to explain the persuasive effects of advergames. Based on priming theory, evaluative conditioning is grounded in the notion that attitudes are formed via automatic associations. Both activating and building these associations are believed to be automatic cognitive processes and require no active attention. In the context of advergames, Waiguny, Nelson, and Marko (2013) showed that content valence of an advergame can become associated with the embedded brand. Furthermore, they suggest that evaluative conditioning is especially important for explaining the implicit effects of advergames. In sum, when considering the affective processes affect transfer, excitations transfer, and evaluative conditioning, we expect that, overall, advergaming has a positive effect on persuasion.

H3: Advergames have a more positive effect on persuasion compared to nongamified advertising and nonbranded messages.

Do Advergames Influence Choice Behavior?

In addition to driving affective and conative psychological responses (i.e., being persuasive), we expect advergames also to influence actual choice behavior. This expectation is grounded in social cognitive theory (Bandura 1986), which suggests that people tend to learn new behaviors through observation and reinforcement. More specifically, people are believed to adopt behaviors that they observe to be being accepted and rewarded within a particular context. Such a context could be a group of people but also an advergame (Terlutter and Capella 2013).

Behavior displayed in advergames often mimics real-world commercial behavior, like picking up product packages or looking for the target brand. A comprehensive content analysis by Lee et al. (2009) revealed that in about half of the advergames they examined, collecting product packages and brand logos was essential to completing the game. In 20% of the advergames, this behavior was not essential but did offer players an in-game bonus of some kind. This implies that people playing advergames are often not just observing in-game commercial behavior (i.e., collecting product packages) but also being rewarded for it. Drawing on social cognitive theory, we therefore expect that the integration of in-game commercial choice behavior, and the deliberate reinforcement thereof, enforces real-life commercial choice behavior among players of advergames.

H4: Advergames have a more positive effect on choice behavior compared to nongamified advertising and nonbranded messages.

Are Advergames Recognized As Advertising?

As an advertising technique, advergames are often criticized. For example, Skiba, Petty, and Carlson (2019) argue that advergames are, in essence, deceitful and suggest that the gamified design of advergames intentionally distracts players from the commercial nature of the message. This could be problematic because when advergames are not recognized by consumers as advertising, they are not processed as such either. To recognize the persuasive intent of an advertisement, consumers need to have both access to persuasive motives of the persuasive agent as well as cognitive capacity to process these motives (Campbell and Kirmani 2000). This means that consumers need to both observe clear cues that suggest the message might be advertising (e.g., brand or product placements) as well as have sufficient cognitive capacity to encode and process them. Consumers are believed to have difficulty meeting either of these two requirements when playing advergames due to the often covert and interactive design of advergames.

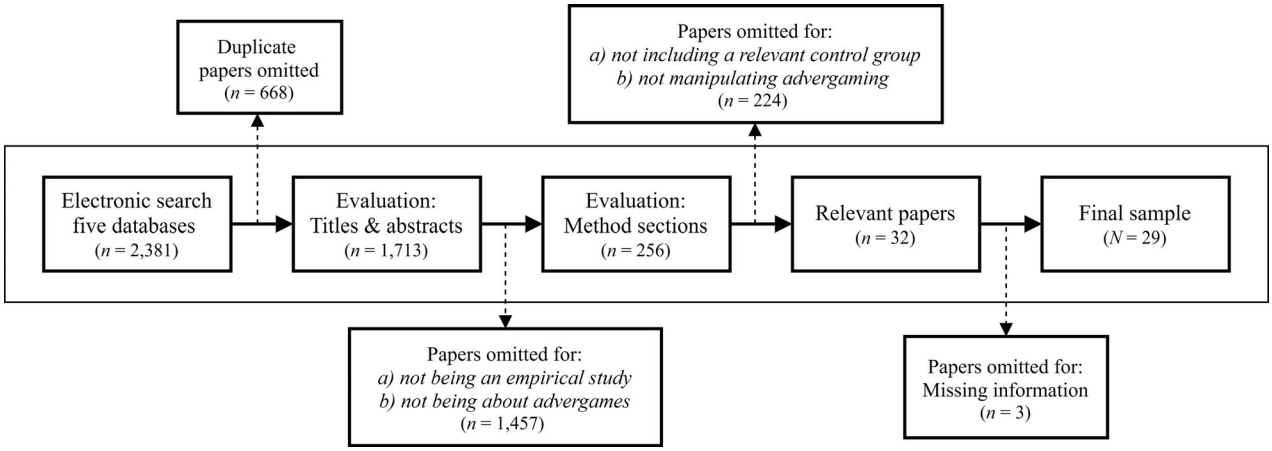

Figure 2. Flowchart visualization of our systemic search process.

Advergames generally contain less clear advertising cues than more traditional types of advertising. Drawing on the persuasion knowledge model (Friestad and Wright 1994), this suggests it is potentially not always clear to players that they are being persuaded when playing an advergame. Because recognizing advertising cues is a prerequisite for the autonomous activation of persuasion knowledge (Campbell and Kirmani 2000), the absence of clear advertising cues would, thus, likely compromise the processing of an advergame as a persuasive message (Evans and Park 2015).

Recognizing the commercial nature of advergames might be further complicated by their interactive (and cognitively demanding) design, which limits the cognitive capacity available while playing them. Lee and Faber (2007) showed that, as a consequence of the limited availability of cognitive capacity, the successful encoding of embedded advertising cues (like brand logos and product placements) can be hindered while playing a game. They explain that the encoding and processing of advertising cues becomes a secondary cognitive processing task and competes for capacity with the now primary task players are performing, which is playing the advergame. This means that we expect consumers, while playing advergames, to be less likely to correctly identify advergames as advertising. Ultimately, this would be reflected in lower levels of persuasion knowledge activation for consumers playing advergames when compared to consumers exposed to more traditional types of advertising.

H5: Advergames have a less positive effect on persuasion knowledge activation compared to nongamified advertising.

Are Children More Susceptible to Advergames?

More than most other types of advertising, advergames seem to particularly appeal to younger consumers (Rathee and Rajain 2018). Consequently, brands are regularly criticized for using advergames targeting children to promote potentially harmful products, like high-calorie foods (Staiano and Calvert 2012). In the early 1980s, the American beer brand Budweiser was criticized for advertising alcohol to minors with its first advergame-like arcade game, called *Tapper*. In this game, players took the role of a bartender serving Budweiser beer to thirsty patrons (Nelson 2016). The controversy surrounding the game eventually led to Budweiser pulling the game from American arcades.

Unsurprisingly, early advergame studies focused heavily on the effects of advergames on younger consumers like children (e.g., Mallinckrodt and Mizerski 2007; Mcilrath 2007) and adolescents (e.g., Redondo 2012; Verhellen et al. 2014). Most of these studies found that children were susceptible to covert advertising messages (Wang and Mizerski 2019). However, in a recent overview paper on children as consumers, Mizerski et al. (2017) argued that even though children are generally believed to be more susceptible to persuasive attempts than adults, the empirical evidence for the link between this age-dependent susceptibility to persuasion and actual brand responses remains inconclusive.

Furthermore, Friestad and Wright (1999) suggest that, over time, people develop their general persuasion knowledge through direct experience with particular types of advertising. This general persuasion knowledge can be described as people's personal knowledge on advertising tactics and motives and enhances their ability to recognize and cope with persuasive tactics in advertising messages. Following this logic, we would expect people to become less susceptible to (and potentially more skeptical of) advertising over time. We thus expect age to have a negative effect on the overall persuasiveness of advergames.

Table 1. Overview dependent and moderator variables.

Variable	Hypothesis	Definition	Operationalization	Description Data
Dependent				
Ad attitude	1	Captures people's affective response toward the advertisement (e.g., advergame)	Game attitude, entertainment, excitement, ad attitude, treatment liking	14 ES across 6 data sets
Memory	2	Captures people's recall and recognition of the advertised message	Brand recall, brand recognition, top-of-mind brand recall, memory of brand information (name/logo), product recall	19 ES across 8 data sets
Persuasion	3	Captures people's affective (brand attitude) and conative (purchase intention) responses toward the advertised message	Brand attitude, brand image (traits), brand personality, brand preference, purchase intention, purchase request, pester intent, reuse intention, word-of-mouth intention	86 ES across 32 data sets
Choice behavior	4	Captures people's choice behavior of brands and products	Snack choice, brand choice, pester behavior, product selection, purchase behavior	20 ES across 9 data sets
Persuasion knowledge	5	Captures people's understanding and consideration of the target brand's persuasive intent	Persuasion knowledge activation, recognition persuasive intent, commercial/noncommercial discrimination, critical processing, recognition selling intent	29 ES across 7 data sets
Moderator				
Age	6	Captures the average age of the participant in a particular data set	Average age (in years) for participants in a particular data set	33/38 data sets reported age information; median = 11.98, range = 6.53, 45.92
Control				
Reference group type	—	Captures the type of reference group used for comparison	Dummy-coded reference group information: "nonbranded" (e.g., control group, pretest) vs. "branded" (e.g., different advertising format)	37/86 effect sizes were coded "branded" (43.0%)

Note. ES = individual effect size.

H6: The persuasive effect of advergames is weakened by age.

Methodology

Search and Selection Procedure

We started by identifying all relevant papers for this meta-analysis with a systematic literature search, performed in June 2020. Going forward, we use the term *paper* for any document with original analysis and findings (e.g., journal article, working paper, conference paper). To avoid including duplicate effect sizes, our analysis is based on data sets. Note that some papers analyze more than one distinct data set (e.g., a paper describing several experiments), while some data sets are discussed in more than one paper (e.g., an empirical study that is included as a chapter in a doctoral dissertation and as a published journal paper). A visual overview of the search process is included as Figure 2.

An initial broad search string was formulated: "advergam* OR adver gam* OR brand* gam*". This string was used to conduct a comprehensive keyword search across five electronic databases (i.e., PsycINFO, Business Source Premier, Communication & Mass Media Complete, Web of Science, and Sociological Abstracts) for which we had imposed no restrictions regarding publication dates of the papers. The corpus retrieved from this initial search consisted of 2,381 academic papers (of which 1,713 were unique) published between 1969 and June 2020.

We used a two-step identification procedure to retrieve all papers that would be included in our meta-analysis. First, we read titles and abstracts of the 1,713 papers to determine broadly whether a particular paper would be potentially relevant to include. A paper had to meet two criteria to be considered for closer inspection: (a) it had to describe an empirical study and (b) the study should examine advergame effects on one of the five outcome variables. Definitions and operationalizations of the outcome (and moderator) variables can be found in Table 1.

To assure that only those papers describing advergame effects were considered, we carefully evaluated the stimulus materials (or the description thereof) of all potentially relevant studies. In practice, this meant that we validated that the stimulus games included only brand cues from a single brand or parent brand. By doing this, we excluded papers that used stimulus games which were conceptually "games containing in-game advertising" rather than "advergames." In

Table 2. Overview of selected studies, ordered by year of publication.

Paper Characteristics			Data Set Characteristics			Study Design Characteristics	
Year	Author(s)	Data Set(s)	*N*	M_{age}	Country	Reference Group	Outcome Variable(s)
2005	Deal	1	37	·	US	Banner ad	Memory
2007	Mallinckrodt and Mizerski	1	295	6.53	US	Control	Persuasion, choice behavior
	McIlrath	1	185	8.66	US	Banner ad, pop-up ad, control	Persuasion, choice behavior, persuasion knowledge
2008	Gurău	1	200	·	FR	Pretest	Choice behavior
	Wise et al.	2	20	40.00	US	Pretest	Persuasion
			20	—	—		
	Ahn	1	171	19.97	US	Control	Persuasion
2009	Pempek and Calvert	1	30	9.50	US	Control	Choice behavior
2011	Rosado and Agante	1	133	9.30	PT	Control	Persuasion
	Jung et al.	1	152	22.90	US	Banner ad	Ad attitude, persuasion
	Ortega-Ruiz and Velandia-Morales	1	40	·	CO	Product placement on TV	Memory
2012	Redondo	1	405	13.13	ES	Control	Persuasion
2014	Bellman et al.	1	233	45.92	AU	TV ad	Memory, persuasion
	Verhellen et al.	1	125	11.98	BE	TV ad, web ad, control	Persuasion, choice behavior, persuasion knowledge
	Waiguny et al.	2	51	8.88	AT	TV ad, control	Ad attitude, memory, persuasion, choice behavior
			149	·	—		
2015	Huh et al.	1	147	40.90	US	Print ad, web ad	Memory
	Wang et al.	2	95	·	US/TW	Pretest	Persuasion
			107	·	—		
2016	Hudders et al.	1	78	8.32	BE	TV ad	Persuasion, persuasion knowledge
2017	Neyens et al.	1	940	9.8	BE	TV ad	Ad attitude, memory, persuasion, choice behavior, persuasion knowledge
	Vanwesenbeeck et al.	4	70	11.03	BE	Pretest	Persuasion
			63	—	—		
			64	—	—		
			66	—	—		
	Folkvord et al.	2	211	9.00	NL	Control	Persuasion
			351	8.90	ES		
	Farias	1	152	22.90	CL	Banner ad	Persuasion
2019	Agante and Pascoal	1	104	7.81	PT	Control	Persuasion
	Daems et al.	1	576	12.57	BE	Control	Ad attitude, memory, persuasion, persuasion knowledge
2019	Evans et al.	2	97	32.60	US	Web ad	Ad attitude, persuasion, persuasion knowledge
			82	—	—		
2018	Wanick et al.	2	30	26.90	BR	Pretest	Persuasion
			34	—	UK		
2020	Van Berlo et al.*	1	98	14.95	NL	Control	Persuasion
	Smith et al.	1	156	8.70	AU	Control, banner ad, in-game video ad	Choice behavior
	Folkvord et al.	1	95	8.45	NL	Control	Persuasion
2021	Van Berlo et al.	1	81	22.04	NL	Control	Persuasion

Note. Duplicate data set information is indicated with long dash (—) and missing information with a dot (·). AT = Austria; AU = Australia; BE = Belgium; BR = Brazil; CL = Chile; CO = Colombia; ES = Spain; FR = France; NL = Netherlands; PT = Portugal; TW = Taiwan; UK = United Kingdom; US = United States.
*Van Berlo, Van Reijmersdal, and Rozendaal (2020).

particular, we identified several papers that inconsistently operationalized advergames (e.g., Vashisht and Sreejesh 2015; Vashisht and Pillai 2017) and had to exclude these papers after close inspection of the stimulus materials. In most cases, the stimulus games were labeled advergames but were conceptually games containing in-game advertising. Notably, some of these papers were included in a recent review paper of advergame effects by Vashisht, Royne, and Sreejesh (2019). At the end of the first step of our screening process, we were left with a short list of 256 potentially relevant papers on advergame effects.

These 256 papers were read attentively to determine whether they could be included in this meta-analysis. To assure that effects could be compared across studies, we aimed to identify all relevant experimental advergame research. For a paper to be relevant, it had to describe an experimental study with (a) at least one advergame condition as well as (b) at least one nonadvergame condition (as reference). This means that if a paper did not describe an experiment, but, for example, described a survey or a content analysis, the paper was omitted. Furthermore, if a paper did describe an experiment, but the experiment did not include a nonadvergame condition for reference, then the paper was also omitted.

Ultimately, the systematic search resulted in the identification of 32 papers that met all criteria. In addition, we considered several pieces of gray literature that were made available by their authors. These included two unpublished dissertations (Lee 2013; Van Berlo, Van Reijmersdal, and Rozendaal 2020), two book chapters (Waiguny and Terlutter 2011; Van Berlo, Van Reijmersdal, and Rozendaal 2020), and statistical information on variables that were left unreported in the published materials (e.g., Bellman et al. 2014; Jung, Kyeong, and Kellaris 2011; Van Berlo, Van Reijmersdal, and Rozendaal 2017).

Final Sample and Coding

All collected materials were coded following instruction by Eisend (2017). We extracted all available descriptive information on the sample, advergame, and the individual effect sizes reported in the papers. When information essential for the meta-analysis was not reported in a paper, the authors were contacted. Essential pieces of information included the group sizes of the experimental and control group(s) and the mean and standard deviation of the outcome variables for each of these groups. Unfortunately, two authors could not be reached, and one other was no longer able to retrieve the missing information. This led to the exclusion of three papers (i.e., Panic, Cauberghe, and De Pelsmacker 2013; Rifon et al. 2014; Yang and Wang 2008). A final set of 29 papers, covering 38 data sets, remained. Descriptive information on the data sets can be found in Table 2.

Effect-Size Computation

For each outcome variable, we estimated a meta-analytical model following suggestions by Schmidt and Hunter (2015) with point-biserial correlations as common effect size. A total of 168 individual effect sizes were calculated across the five outcome variables. From the coded information we could estimate most point-biserial correlations and their corresponding variance directly.

In some cases, we had to estimate a different effect size first and then apply an algebraic transformation in order to transform the previously estimated effect size into a point-biserial correlation. More concretely, transformations were performed on the standardized mean change scores for within-subjects effects (Morris 2008) and on odds ratios when only percentages were reported. To facilitate the transformations from standardized mean change scores into point-biserial correlations we used the *R* packages "psychmeta" (Dahlke and Wiernik 2019) and "metafor" (Viechtbauer 2010). For the transformation of odds ratio estimates into point-biserial estimates, the Ulrich–Wirtz approximation (Ulrich and Wirtz 2004) was used. This approximation of the point-biserial correlation is recommended when only limited odds ratio information is available (Sánchez-Meca, Marín-Martínez, and Chacón-Moscoso 2003). Furthermore, this approximation accounts for the artificially dichotomized nature of the outcome variables (Bonett 2007).

Type of Reference Group

To assure the robustness of our meta-analytical models, we included effect-size estimates from a wide range of studies. For the advergame effects on ad attitude, memory, and persuasion knowledge, these effect-size estimates were comparable in that they were all exclusively from studies that compared advergames with other types of advertising (e.g., TV commercials, banner ads). For the effect-size estimates of the advergame effects on persuasion and choice behavior, this was not the case.

When estimating the advergame effects on persuasion and choice behavior, we included effect sizes from both studies that compared advergames with other types of advertising and studies that compared

Table 3. Advergame effects: Integrated effect sizes and heterogeneity estimates.

	Integrated Effect Sizes*					Heterogeneity†			Publication Bias			
Output Variables	k	N	$\bar{r}_c$	s^2	95% CI	Q	τ^2	SE	z_i	p_i	z_{ii}	p_{ii}
Ad attitude	6	1,568	**.20**	.04	[.03, .37]	**72.26**	.04	.03	−0.33	.735	−0.56	.573
Memory	8	1,669	**−.16**	.03	[−.29, −.03]	**59.26**	.03	.02	1.90	.058	1.73	.083
Persuasion	32	5,048	**.11**	.02	[.05, .16]	**119.98**	.02	.01	0.39	.694	1.20	.230
Choice behavior	9	2,177	**.16**	.01	[.08, .25]	**30.70**	.01	.01	1.15	.250	0.42	.677
Persuasion knowledge	7	1,721	**−.18**	.02	[−.30, −.07]	**34.12**	.02	.01	−1.74	.082	−0.75	.453

Note. Point-biserial regression coefficients and Q statistics in bold are significant. The statistics to estimate publication bias are the z score and corresponding p value for the (1) Egger's regression test (Sterne and Egger 2005) and the (2) rank correlation test (Begg and Mazumdar 1994). *k = amount of data sets; N = total sample size; $\bar{r}_c$ = attenuated integrated effect size (point-biserial correlation); s^2 = variance of attenuated integrated effect size; 95% CI = 95% confidence interval of the attenuated integrated effect size; †Q = weighted sum of squared differences between individual study effects and the attenuated integrated effect size; τ^2 = variance of the effect-size parameters across the population of studies; SE = standard error of τ^2.

advergames with nonbranded messages (e.g., pretest, control group). Including both types of comparisons allows for a more robust estimation of the integrated effect sizes. Also, effect-size estimates for advergame effects are expected to be comparable across the two types of comparison, in that they are expected to be positive irrespective of whether they are from studies comparing advergames with a branded message or a nonbranded message.

Individual Effect-Size Correction

Once all effect-size estimates were expressed as the common effect size (i.e., point-biserial correlations), we started with correcting the effect-size estimates for artifacts (i.e., study imperfections). We first corrected the effect sizes for small-sample bias because some effect-size estimates were based on samples as small as 20 observations. This correction, which is suggested by Schmidt and Hunter (2015), accounts for the fact that estimates from smaller samples (compared to larger samples) less closely reflect their population estimates. We used the following formula:

$$r_c = \frac{r_{obs}}{\left(\frac{2n-2}{2n-1}\right)} \tag{1}$$

Afterward, to account for systematic error in the estimates of the dependent variable (i.e., measurement error), we estimated, per study, attenuation factors for each outcome variable. The following formula was used:

$$a = r_{YY}^2, \tag{2}$$

where r_{YY} represents the reliability coefficient of the outcome variable. When a study did not report the reliability of an outcome variable, we instead used the mean reliability (across data sets) for that outcome variable.

To estimate our integrated effect sizes, we estimated composite effect sizes per study for each of the outcome variables and assigned weights following the Hunter–Schmidt procedure (Schmidt and Hunter 2015). This procedure takes into account both the sample size and attenuation factor of a study for weighting and prioritizing studies with larger sample sizes and more reliable measurements. Furthermore, this weighting procedure is found to render more accurate random-effects meta-analytical estimates than the often-used weighting procedures based on inverse variance (Marín-Martínez and Sánchez-Meca 2010). The following formula was used to calculate the weights:

$$w_i = N_i a_i^2 \tag{3}$$

with $i = 1, 2, 3, \ldots, I$ effect sizes. Afterward, we used the weights (Equation 3) and corrected effect-size estimates (Equation 1) to estimate the integrated effect sizes:

$$\bar{r}_c = \sum \frac{w_i r_{c_i}}{\sum w_i} \tag{4}$$

For each of the integrated effect sizes heterogeneity statistics and 95% confidence intervals (CIs) were estimated.

Moderator Analysis

To examine the moderating role of age in the effect of advergaming on persuasion, we also estimated a meta-regression model. The model specifications were similar to those of the main effects models. However, following suggestions by Bijmolt and Pieters (2001), we modeled the errors nested within studies to account for the dependency between effect sizes from the same studies. This hierarchical linear model (HLM) approach is considered best practice for estimating moderating effects with a metaregression model (Bijmolt and Pieters 2001). The following general model was used:

$$r_{ij} = \gamma_{00} + \gamma_{01} * X_{age_j} + u_{0j} + e_{ij}, \tag{5}$$

with $j = 1, 2, 3, \ldots, J$ data sets and X_{age_j} as the average age of participants in the jth data set.

Table 4. Metaregression estimates explaining variance in the integrated effect size for persuasion.

Main Analysis	*b*	SE	*z*	95% CI	σ^2 (σ)	*ES*	*k*	*Q*	Q_M
Reference group type	.04	.04	1.16	[−.03, .11]	.02 (.13)	83	29	233.69*	11.21*
Age	**−.01**	<.01	−3.31	[−.01, <.00]					
Exploratory analyses†									
Sex (% female)	<.01	<.01	0.33	[−.01, .01]	.02 (.13)	83	29	233.67***	10.97*
Brand type (real vs. fictitious)	.08	.09	0.90	[−.10, .26]	.02 (.13)	83	29	231.95***	12.11**
Game-product congruity	.07	.07	1.13	[−.05, .20]	.02 (.14)	72	28	203.55***	12.24**
Exposure time (min.)	<.01	.01	0.32	[−.02, .03]	.01 (.12)	54	24	138.89***	4.57
Advertising cue prominence									
(1) Brand cue interactivity	**.13**	.07	2.04	[.01, .26]					
(2) Brand cue centrality	−.14	.09	−1.63	[−.32, .03]	.02 (.14)	71	27	196.31***	14.76**
(3) Product cue interactivity	<.01	.10	<0.01	[−.20, .20]					
(4) Product cue centrality	−.03	.09	−0.36	[−.22, .15]					

Note. Regression coefficients in bold are significant at least at the $\alpha = .01$ level. σ^2 = random variance component; *ES* = individual effect sizes; *k* = amount of data sets; *Q* = weighted sum of squared differences between individual study effects and the integrated effect size; Q_M = omnibus test moderators; †all exploratory analyses are controlled for reference group type and age.
*p <.05; **p <.01; ***p <.001.

Results

Main Effects

As shown in Table 3, significant integrated effects were found for each of the five outcome variables. The data support hypotheses 1 through 5.

Advergame Effect on Ad Attitude

In line with our first hypothesis, we found a positive integrated effect for advergaming on ad attitude ($\bar{r}_c$ = .20). This means that, overall, consumers have more positive attitudes toward advergames than toward other types of advertising.

Advergame Effect on Memory

When estimating the effect of advergaming on memory, we found a negative integrated effect ($\bar{r}_c$ = −.16). These findings indicate that consumers seem less likely to remember brand and product cues when these are incorporated in advergames compared to when these are incorporated in other types of advertising.

Advergame Effect on Persuasion

As hypothesized, we found a significant positive integrated effect for advergaming on persuasion ($\bar{r}_c$ = .11). This indicates that playing advergames can have a positive effect on consumers' brand attitudes and purchase intentions of the advertised brand.

Advergame Effect on Choice Behavior

In addition to the positive effects of advergaming on persuasion, the meta-analysis also shows that advergaming has a significant positive integrated effect on choice behavior ($\bar{r}_c$ = .16). This means that consumers who play an advergame are more likely to choose the gamified brand (or its products) afterward.

Advergame Effect on Persuasion Knowledge

Similar to the effect on memory, we found a significant negative integrated effect for advergaming on the activation of persuasion knowledge ($\bar{r}_c$ = −.18). This finding suggests that consumers, overall, seem to activate less persuasion knowledge when playing advergames as compared to when they are exposed to other types of advertising. In other words, consumers are less likely to recognize and process advergames (when compared to other types of advertising) as commercial messages.

Publication Bias

To assess the validity of our findings, we approximated the potential influence of publication bias in our meta-analytical estimates. For each model, we performed an Egger's correlation test (Sterne and Egger 2005) and a rank correlation test (Begg and Mazumdar 1994) to test for the association between the observed effect sizes and the precision of the corresponding studies. A significant association, in this case, could be considered an indication of publication bias. As shown in Table 3, however, none of the test statistics were significant, meaning that we did not find evidence for publication bias in our estimates. All in all, the results give no indication that publication bias might have influenced our estimations, which reflects the high validity of our findings.

Moderation Effects

Moderating Effect of Age on the Persuasiveness of Advergames

We estimated a metaregression model to examine the moderating role of age in the persuasiveness of advergames. The results, as displayed in Table 4, indicate that age is a significant negative moderator of the persuasiveness of advergames, b = −.01, SE < .01, 95%

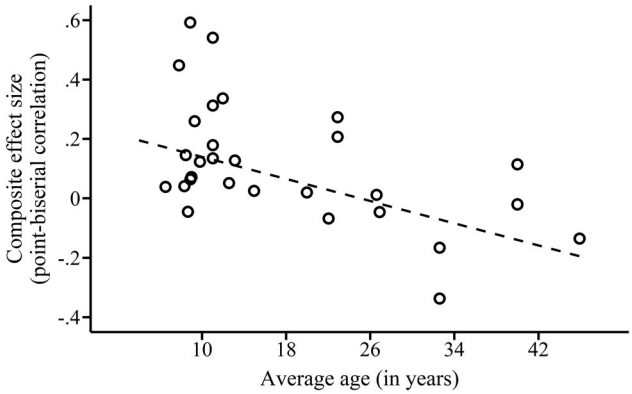

Figure 3. Scatter plot of the composite effect-size estimates for persuasion, plotted over the average age per study. The dashed line is the regression line for the effect of age on the effect-size estimate of persuasion.

CI [−.01, < .00].[1] This means, as visualized in Figure 3, that consumers become less susceptible to the persuasive effect of advergames with age—in other words, that older consumers are generally less persuaded by advergames than younger consumers are. The data support hypothesis 6.

Notably, the results in Table 4 also show that the effect of reference group type is nonsignificant. This finding means that when estimating the integrated persuasion effect of advergaming, the branded effect-size estimates do not differ from the nonbranded ones and are thus comparable.

Exploratory Analyses

We ran several exploratory analyses to examine the potential moderating effects of variables that have been used in prior research (e.g., Gross 2010; Wanick et al. 2018; Van Reijmersdal, Rozendaal, and Buijzen 2012; Yegiyan and Lang 2010). The moderators that we considered for our exploratory analyses were sex of the player, brand type (real versus fictitious), game-product congruity, exposure time, and advertising cue prominence. For each of these moderators, a separate metaregression model was estimated in which reference group type and age were included as control variables. Note that for the model examining the role of advertising cue prominence we considered four indicators: brand cue interactivity, brand cue centrality, product cue interactivity, and product cue centrality.

Sex of the player and average exposure time were study-related moderators, and this information was thus retrieved directly from the relevant papers. For the remaining moderators, two individual coders coded several characteristics of the stimulus advergames (whenever this information was available). The initial agreement rate was above 80%, and disagreements were resolved through consensus-based discussion. More information about the moderator variables can be found in Table 5.

As shown in Table 4, we found a significant effect for only one of the indicators of advertising cue prominence: brand cue interactivity. This indicates that being able to interact with a brand cue, while playing an advergame, increases the persuasiveness of the advergame. For the other exploratory moderators all coefficients were nonsignificant.

Discussion

Drawing on more than a decade of experimental advergame research, this study contributes to the overall understanding of advergaming in two distinct ways. First, by utilizing meta-analytical methods, the study provides insights into the overall effectiveness of advergames and addresses inconsistencies in the literature. More concretely, the study offers insights into the magnitude and significance of five important advergame effects: ad attitude, memory, persuasion, choice behavior, and persuasion knowledge activation. Second, by examining the role of age as a moderator of advergame persuasiveness, the study offers clear empirical evidence indicating a link between age-dependent susceptibility to persuasion and actual consumer responses. Six main conclusions can be drawn from this meta-analysis.

The Overall Effectiveness of Advergames

First, we found that consumers generally show more positive attitudes toward advergames than toward other types of advertising. These findings support our expectation that the gamification of an advertising message enhances consumers' attitudes toward this message. In a larger advertising context, these results strengthen the notion that perceived hedonic value beliefs can play a crucial role in the formation of attitudes toward experiential advertising formats by partially mitigating the negative effect of general skeptical advertising beliefs on these ad attitudes.

Second, we found that advergaming has a negative effect on memory. The results showed that consumers are far less likely to recognize and recall brands or products when they are exposed to them in an advergame compared to when they are exposed to them in a different advertising format. These findings, which are in line with the limited capacity framework (Lang 2000), challenge the popular belief that advergames

Table 5. Overview moderator variables exploratory analyses.

Moderator Variable	Description and Operationalization	Coding Scheme
Sex (% female)	Captures the percentage of female participants in a sample.	% female (continuous variable)
Brand type (real vs. fictitious)	Captures whether a real (generally known) or fictitious brand (generally unknown) was used in a study.	Brand type: (1) Real (0) Fictitious
Game-product congruity	Captures whether the gameplay of an advergame and the brand category of the target brand are related (e.g., a car racing advergame from a car brand).	Game-product congruity: (1) High (0) Low
Exposure time (min.)	Captures the average time a participant was exposed to the advergame (i.e., average play time).	Exposure time in minutes (continuous variable)
Advertising cue prominence (1) Brand cue interactivity (2) Brand cue centrality (3) Product cue interactivity (4) Product cue centrality	Captures the prominence of two types of integrated advertising cues: brand logos and branded products. Prominence is expressed in both cue interactivity and cue centrality. Cue interactivity captures the degree to which a player is able to engage with (e.g., pick up, move, throw, collect) an advertising cue (logo or product) while playing. Cue centrality captures the visual centrality of a cue placement and is determined via an approach, based on the rule of thirds, proposed by Yegiyan and Lang (2010).	Cue interactivity: (1) High (0) Low Cue centrality: (1) High (when an advertising cue is placed centrally—in the middle region of a rule-of-thirds grid) (0) Low (when an advertising cue is placed peripherally—outside of the middle region of a rule-of-thirds grid)

are effective advertising tactics for promoting brand awareness (e.g., Taylor 2019).

Third, we found that advergaming promotes both persuasion and choice behavior. As expected, the gamified nature of advergames drove affective, conative, and behavioral brand outcomes. These findings are in line with those of three recently published meta-analyses on advergames (and other digital advertising tactics) that promote unhealthy eating behaviors among children (Folkvord and Van 't Riet 2018; Qutteina, De Backer, and Smits 2019; Russell, Croker, and Viner 2019). All three studies underline the effectiveness of advergames for driving unhealthy dietary-related choices among children. In addition, Folkvord and Van 't Riet (2018) also found a positive effect of advergaming on attitudes toward (and intention to purchase) unhealthy food products. Our results extend these findings and contribute to the advergaming literature by offering meta-analytical evidence for the overall effectiveness of advergames in a commercial context and for the promotion of non-food-related products across a broader age range.

Fourth, we examined the effect of advergaming on the activation of persuasion knowledge and found that, when compared to other types of advertising, consumers were generally less likely to recognize advergames as advertising. These findings are in line with our expectations. However, from the results it remains unclear whether the observed decrease in persuasion knowledge activation can be attributed to the lack of clear persuasive cues in advergames or to the limited cognitive capacity consumers have available to process advertising cues while playing advergames.

Age As Key Moderator of Advergame Persuasiveness

Fifth, we found that age mitigates the persuasive effects of advergames. Younger consumers seem more susceptible to advergames than older consumers—which is reflected by more positive affective and conative brand responses to advergames for younger consumers. This result contributes to the understanding of young consumers and offers clear evidence in support of a positive relationship between age-dependent susceptibility to persuasion and positive affective and conative brand responses. Moreover, these findings are in line with the persuasion knowledge model (Friestad and Wright 1994, 1999) and support the notion that people's understanding of and abilities to cope with particular types of advertising develop over time.

Additional Moderators of Advergame Persuasiveness

In addition to the effect of age on the persuasiveness of advergames, we also tested the effects of several moderators that were included in prior research. The results of these exploratory analyses indicate that brand cue interactivity increases the persuasiveness of advergames. No significant effects were found for the remaining exploratory moderating variables. One should take into consideration, however, that not all studies reported sufficient information on the moderating variables for their data to be included when

estimating the exploratory moderation models. These models, therefore, could have been potentially underpowered. With this in mind, examining the confidence intervals of the nonsignificant coefficients could offer additional insight.

Four of the effects (i.e., sex, exposure time, product cue interactivity, and product cue centrality) show confidence intervals that center around the null, which suggests that even if there would be a true effect for these variables, the effect is likely not meaningful. For these variables we can thus conclude with a high degree of confidence that they do not seem to affect the general persuasiveness of advergames. The remaining three effects (i.e., the type of brand, game-product congruity, and brand cue centrality) show confidence intervals that are not evenly centered around the null but instead include either predominantly positive values (in the case of type of brand and game-product congruity) or predominantly negative values (in the case of brand cue centrality). Although this should not be interpreted as evidence for the moderating roles of these variables, it does prevent us from concluding that these variables have no meaningful true effect on the persuasiveness of advergames and could be considered an invitation for further investigation in the future.

Implications

Implications for Researchers

This meta-analysis contributes in various ways to the overall understanding of advergames as gamified advertising, and several important implications for theory and practice can be identified. For researchers, the most important implication concerns the underlying mechanisms of advergame effects. Where the gamified nature of advergames has long been considered primarily its strength, this study shows that it seems more appropriate to consider it a double-edged sword.

When looking at the overall effects of advergames, the outcomes of affective processes (e.g., brand attitude, emotional response) seem predominantly positive, where the outcomes of cognitive processes (e.g., memory retrieval, persuasion knowledge activation) seem predominantly negative. This means that, despite being evidently effective for driving affective (and subsequently behavioral) responses, advergames, more than other types of advertising, seem to be cognitively demanding. This suggests that the actual playing of the advergame distracts from the embedded branded information. Gamifying content thus comes at a (cognitive) cost and hinders the allocation of cognitive resources required for the (critical) processing of the actual gamified message. More concretely, these findings suggest that the gamification of advertising seems to stimulate the affective processing of the advertised message while at the same time hindering its cognitive processing, and thus limits the encoding and storage of the embedded brand information.

Furthermore, during our systematic review of the advergame literature we found that in several papers the advergames that were used did not match the conceptual definition of an advergame as outlined by Terlutter and Capella (2013). More concretely, we found stimulus games labeled as an advergame which were conceptually games containing in-game advertising. This inconsistent conceptualization of advergaming is problematic because advergames and in-game advertising clearly differ. Nelson and Waiguny (2012) state that it is imperative to make a clear distinction between advergames and games containing in-game advertising, because the intentions for the games are clearly different: Advergames are primarily developed with commercial intent, where games containing in-game advertising generally are not. In light of our findings, we therefore reiterate the importance of making a clear conceptual and operational distinction between different types of gamified advertising when studying the effects of gamification in an advertising context.

Implications for Practitioners

For advertising practitioners, our meta-analysis offers several important implications. Overall, as advertising, advergames seem to be liked better by consumers than other types of advertising. This could be considered positive for practitioners, when taking into account that consumers often express negative or ambivalent attitudes toward advertising, which could potentially lead to increased ad avoidance behavior (Jung 2018). Furthermore, in terms of advertising effectiveness, the results of the meta-analysis also demonstrate that advergames are especially useful for driving affective and behavioral commercial outcomes. Practitioners are therefore advised to consider using advergames in particular when they have advertising goals like driving brand attitudes, purchase intention, or choice behavior. Moreover, to improve the persuasiveness of the advergame, practitioners are advised to require players to interact with brand cues (e.g., logos) while playing—for example, by including a brand logo as a collectible item in an advergame.

Notably, practitioners who are primarily interested in promoting brand awareness should take into account that the gamified nature of advergames could pose a clear limitation in this respect. When compared to other types of advertising, brand information in advergames seems less likely to be remembered by consumers. While this does not mean that consumers never remember the brands they encounter in advergames, practitioners should take into account that the gamified nature of advergames likely directs consumers' attention away from the embedded brand information and potentially disrupts the processing of the commercial message.

Limitations and Suggestions for Future Research

All in all, this study offers important implications for theory and practice. However, several limitations should be addressed. First, as with many meta-analyses, not all relevant papers could ultimately be included, primarily due to missing statistical information. Initially, we observed that about one-third of the papers we wanted to include did not report the minimal amount of information needed to be included in our meta-analysis—information such as the sample sizes of the experimental groups and descriptive information (i.e., means and standard deviations) of the dependent variables per experimental group. Another one-third of the papers did contain the information that was minimally required to be included but lacked other important information that could be used to improve our estimations or to test for moderations—information like a clear description of the stimulus material and the sample (e.g., age or sex) and reliability estimates of the measurement scales that were used. Considering these observations, it seems important to stress that when conducting research, the reporting of accurate and complete statistical information is paramount for the facilitation of future meta-analytical research.

Second, the number of currently available data sets could also be considered a limitation. Even though the data allow for a robust estimation of the five integrated advergame effects (and the moderating role of age in the persuasiveness of advergames), they unfortunately do not allow for further differentiation within these integrated effects. This means that even with this being potentially relevant to consider in the context of advergaming, we currently cannot robustly differentiate the persuasive effect of advergaming in terms of affective and cognitive attitude dimensions; nor can we robustly compare the effects of advergaming with that of other specific advertising formats. Fortunately, the study of advergaming and gamified advertising is ongoing, and future (meta-analytical) studies are encouraged to further differentiate the effects of advergames whenever the data allow for this.

Our third limitation is related to the larger field of advertising research and, in particular, the comparative nature of many advergame studies. From a methodological position, we should critically reflect on what it actually means to compare consumer responses to advergames with consumer responses to other advertising formats in experimental studies. When contrasting the effectiveness of an advergame with, for example, a TV commercial from the same brand in a single experimental study, it seems impossible to isolate (and thus manipulate) only a single differentiating factor between the two brand expressions. Manipulating only a single factor is a crucial part of experimental methodology and is essential for being able to draw inferences about the causality of a finding.

This problem could partially be mitigated by adopting multiple message designs. By exposing participants to multiple stimuli within one study for a particular type of message (e.g., advergame, TV commercial), broader theoretical inferences can be drawn (Reeves, Yeykelis, and Cummings 2016). A recent example of a study using this particular design is Evans, Wojdynski, and Hoy (2019), who used eight different advergames and eight different web advertisements as stimulus material. Going forward, it thus seems advisable to consider multiple message designs when comparing different types of advertisements.

The Future of Advergame Research

Traditionally, advergames were developed as arcade games (Nelson 2016) and later gained popularity as desktop-based games. Today, however, advergames are developed for most platforms (e.g., mobile, desktop, virtual reality) and in different formats (e.g., casual games, interactive advertisements, simulation games). With desktop-based (adver)gaming being in decline (Entertainment Software Association 2019), other platforms have gained (or are gaining) popularity. In the United States, for example, smartphones are currently the most used devices for gaming, implying that mobile advergames are a likely type of advergame that consumers will come across. However, virtual reality (VR) and augmented reality (AR) are also increasingly becoming more relevant platforms for advertisers to reach their consumer base (Alcañiz, Bigné, and

Guixeres 2019). Here lies an opportunity for future advergame research, because this plethora of novel advergame types is currently not reflected in the literature. Our systematic review revealed that there is a clear focus on desktop-based advergames and that other platforms, like mobile and VR, have received only limited academic attention (for exceptions, see Catalán, Martínez, and Wallace 2019; Okazaki and Yagüe 2012; Van Berlo, Van Reijmersdal, and Rozendaal 2020; Van Berlo et al. 2021; Van Berlo, Van Reijmersdal, and Rozendaal 2020). This is unfortunate, because when compared to more traditional desktop-based advergames these novel types of advergames show a variety of new affordances that could be used to enhance people's overall consumer experiences while playing them (Flavián, Ibáñez-Sánchez, and Orús 2019), for example, location-based reward systems in mobile advergames or consumer–product interactions with virtual products in VR advergames.

All in all, these affordances offer a range of new opportunities for the study of gamified advertising. This future research will help us better understand the workings of gamification in a commercial context and increase our understanding of the potential of gamified advertising in the future.

Note

1. A second metaregression model was estimated as a robustness test. For this model, only effect-size estimates were considered from branded comparisons. The results were comparable to those displayed in Table 4, indicating that the moderating effect of age is robust: $ES = 39$, $b = -.01$, SE $< .01$, 95% CI $[-.02, < .00]$.

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