Differences in consumer knowledge and perceptions of personalized advertising: Comparing online behavioural advertising and synced advertising

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ABSTRACT

Due to technological advancements, an increasing number of messages are personalized through different sophisticated techniques, such as online behavioural advertising (OBA) and synced advertising (SA). Considering the increasing number of different types of personalization strategies that can be applied for personalization, the question rises whether consumer perceptions of these strategies differ when it comes to their knowledge about, and their perceived benefits and costs of these personalization strategies. A US national survey (N = 1,008) examined knowledge, benefits, and costs of OBA and SA. Whereas OBA has been extensively studied in the past, SA is a novel personalization strategy. Therefore, the current study updated what we know about OBA, provided new insights on SA, and was able to directly compare the two in terms of knowledge and perceptions. The results showed that consumers know more about online behavioural advertising than synced advertising. Furthermore, coding of open-ended questions provided further insights into perceived benefits and costs of the personalization strategies. Personal relevance and added advertising value were the most prevalent perceived benefits and privacy concerns are the most often prevalent perceived cost. The results inform the advertising industry, advertising literacy programs, and encourage ethical debates about the use of personalization strategies.

Introduction

An increasing amount of advertising messages are personalized to the consumer (AdAge 2018; Varnali 2019). Developments in digital technologies have enabled sophisticated strategies and mechanisms through which personalized advertising can be realized (Bright and Daugherty 2012; Malthouse, Maslowska, and Franks 2018; Segijn and Van Ooijen 2020). Personalized advertising is defined as 'strategic creation, modification, and adaptation of content and distribution to optimize the fit with personal characteristics, interests, preferences, communication styles, and behaviors' (Bol et al. 2018, 373). The current study focuses on two relatively similar, yet distinctive forms of contemporary

personalized advertising strategies that are made possible because of technological advancements, namely online behavioural advertising (OBA) and synced advertising (SA). A main difference is that OBA taps into past online behaviour (e.g. ads on Facebook about flights to Los Angeles after searching for those tickets on a travel site before visiting Facebook) and SA into *current* online and offline media behaviour (e.g. if these ads on Facebook where of brands that are simultaneously broadcasted on TV, streaming services or radio) (Segijn and Voorveld 2020).

The fast digital developments of sophisticated personalization techniques combined with the societal debate related to privacy and consumer agency (Daems, De Pelsmacker, and Moons 2019; Van Ooijen and Vrabec 2018), fuels the need to understand how different forms of personalized advertising differ in terms of consumer knowledge and perceptions (i.e. its perceived benefits, costs). Until now, however, little studies have examined whether consumers differentiate between contemporary personalization strategies in terms of their knowledge about them, and their perceptions of associated benefits and costs by directly comparing different personalization strategies.

Knowledge on how personalization works is vital for consumer empowerment. Insights in knowledge of personalization could inform advertising literacy programs. It will inform advertising literacy programs to tailor their programs on these aspects to make people more informed consumers. In addition, insight in consumer knowledge could be used as a starting point for ethical debates in the mainly self-regulated advertising industry. The current study takes an innovative approach in studying consumer knowledge of personalization strategies by measuring both objective (i.e. factual knowledge) and subjective (i.e. confidence in knowledge) consumer knowledge. This provides us with more nuanced and complete picture of consumers' knowledge of personalization.

Insight in perceived benefits and costs will provide us with more information about consumers perceptions of personalization strategies and to what extent consumers perceive both strategies differently. Additionally, insights into benefits and costs could help uncover the specific bottlenecks that may hinder effectiveness of personalized advertising in general. According to the privacy calculus model, personalized advertising is thought to be effective when the perceived benefits among consumers outweigh the perceived costs (Acquisti, John, and Loewenstein 2013; Culnan and Armstrong 1999; Dinev and Hart 2006). Therefore, insight into these perceived benefits and costs of personalized advertising is important to understand the effectiveness of personalized advertising.

Literature

Two personalized advertising strategies

The current study focuses on two specific forms of personalized advertising, namely online behavioural advertising (OBA) and synced advertising (SA). They are both visualized in Figure 1. OBA has been defined as 'the practice of monitoring people's online behaviour and using the collected behavioural data to show people individually targeted advertisements' (Boerman, Kruikemeier, and Zuiderveen Borgesius 2017, 364). An example would be when a consumer searches for a holiday destination online and later – when visiting another website – the consumer will receive an ad for flight tickets to this

Personalization Strategy	Online Behavioral Advertising	Synced Advertising
Definition	"The practice of monitoring people's online behavior and using the collected information to show people individually targeted advertisements." (Boerman, Kruikemeier, & Zuiderveen Borgesius, 2017, p. 364)	"The practice of monitoring people's current media behaviour and using the collected information to show people individually targeted ads based on people's current media behaviour across media. (Segijn,2019, p. 59)
Scenario	"Imagine that you like to travel. You visit a website about what it's like to visit the west coast. The website includes information about Los Angeles. Some time after, you visit another website. One of the ads on this second website is for Continental airlines, offering a cheap flight to Los Angeles. That ad does not come to you directly from the airline. Instead, there is an ad company that determines what ad to show you, personally, based on the first website that you visited about visiting the west coast. If you wouldn't have visited that website, this ad would not have appeared on the second website." (Based on McDonald & Cranor, 2010)	"Imagine that you like to travel. You are watching a travel show on television about the west coast. At the same time you are using your smartphone. Someone is interviewed on the travel show and is talking about visiting Los Angeles. At the same time, you receive an ad on your smartphone for flight tickets from Continental airlines to Los Angeles. That ad on your smartphone does not come to you directly from the airline. Instead, there is an ad company that determines what ad to show you, personally, based on what is said on the show. If you would have watched a different show or no television, this ad would not have appeared on your smartphone."
Infographic		

Figure 1. Online Behavioural Advertising versus Synced Advertising.

destination. This personalized advertising strategy gives consumers (visual) reminders of what they have been searching for earlier (Kim and Huh 2017), or provides consumers with advertisements that fit to their more general interests as indicated by their past internet behaviours (Boerman, Kruikemeier, and Zuiderveen Borgesius 2017; Varnali 2019). One way to facilitate personalized advertising on consumers' past online media behaviour is by means of cookies. Cookies are 'small text files that are put on users' devices, such as notebooks or smart phones, to facilitate the functionality of a website (first party, session or functional cookies) or to collect profile information for targeted advertising (third-party or tracking cookies).' (Smit, Van Noort, and Voorveld 2014, 15).

Synced advertising has been defined as 'the practice of monitoring people's current media behaviour and using the collected information to show people individually targeted ads based on people's current media behaviour across media' (Segijn 2019, 59). An example would be when a consumer watches a TV show in which a holiday destination is discussed and simultaneously receives an ad for flight tickets to this destination on their mobile device. Mobile device penetration (Pew Research Center 2018), media multitasking (Duff and Segijn 2019), and new technologies have made it possible to offer

personalized advertising based on concurrent media behaviour. One technology that has been utilized to sync ads on mobile devices with TV content is watermarking, which is a sound signal placed in media content (e.g. TV or radio show) that is recognized by mobile applications similar to Shazam (for an overview see Segijn and van Ooijen 2020). This is a legal practice because consumers are informed about this in the user agreements when downloading an app and they give the app permission to the phone's microphone (Segijn 2019). A proposed advantage of synced advertising strategy is that it increases attention to ads in a multi-media environment because of real time message coordination. Moreover, synced advertising increases advertising effectiveness by repeated exposure on memory (Hoeck and Spann 2020) and brand attitudes (Segijn and Voorveld 2020). Both forms of personalization require a form of message coordination like cross-media campaigns, in which messages are also coordinated across media (Edell and Keller 1989). A key difference between the two personalization strategies, however, is the timing of the personalized ad (Segijn 2019), which is delayed in OBA and massed in synced advertising (Segijn and Voorveld 2020; Figure 1).

Knowledge about personalization

Over the course of consumers' lives, they gain knowledge about advertising, evolving from simple to more complex knowledge and beliefs about what advertising is and how it works. This 'persuasion knowledge' enables consumers to recognize, analyse, interpret, evaluate, and remember persuasion attempts and to execute coping tactics that they believe to be effective when they encounter advertisements (Friestad and Wright 1994). As a result, persuasion knowledge makes consumers less susceptible to advertising by empowering them to resist the persuasive attempt (e.g. by rejecting the advertising message or ignoring the advertisement altogether), which may alter advertising effectiveness (Friestad and Wright 1994). Therefore, it is important to study what consumers know about (new) advertising strategies, such as SA.

So far, no studies have looked into consumer's knowledge of SA but some studies have looked into consumers' objective (actual) knowledge of OBA. For example, Smit, Van Noort, and Voorveld (2014) showed that respondents had a relatively good understanding of OBA with an average of 5 out of 8 statements answered correctly. In their study, 2022 Dutch respondents – resembling the Dutch population of 18 years and older – filled out the survey. Their results showed that most respondents (87.8%) knew that advertising contributes to online content and services being offered for free and that people's browser history could determine what ads people will see during their next visit (82.5%). In addition, they found that a little over a third of the respondents (37.7%) knew that cookies cannot relate the stored information to an individual. Similarly, a survey by McDonald and Cranor (2010) with US adult internet users, showed that most respondents were aware what cookies are (91%). However, they showed less knowledge about the function of cookies and regulations of cookies.

The current study builds on previous research by examining the current state of knowledge of OBA in the US and being the first to examine consumers' knowledge of SA. We take an innovative approach in studying consumer knowledge of personalization strategies by measuring both objective and subjective consumer knowledge. While consumers' subjective knowledge (i.e. their confidence in what they know about

a particular subject; Park and Lessig 1981) is related to their behaviour, the relationship between objective (actual) knowledge and subjective knowledge seems to be less strong (Alba and Wesley Hutchinson 2000). When comparing objective and subjective knowledge in terms of their effect on consumer behaviour, subjective knowledge may sometimes even be a stronger driver of consumer behaviour compared to objective knowledge (Pieniak, Aertsens, and Verbeke 2010). However, previous literature has mainly focused on objective knowledge of personalized advertising (McDonald and Cranor 2010; Smit, Van Noort, and Voorveld 2014). To gain more insight into the effects of knowledge regarding responses to OBA and SA, we measure both objective and subjective knowledge in this study. Moreover, we will gain a further understanding of predictors of knowledge by examining demographic variables (i.e. age, gender, education, and work experience) and their relationship to knowledge of personalization. This will provide us with more information on consumer differences and *who* advertising literacy programs should focus on.

RQ1a: What do consumers know about OBA and SA, and to what extent do they differ?

RQ1b: To what extent do gender, age, education, and work experience predict knowledge about OBA and SA?

Benefits and costs of personalized advertising

Personalized advertising has both benefits and costs for consumers (Awad and Krishnan 2006; Dinev and Hart 2006). According to the privacy calculus theory, consumers balance potential benefits and costs to maximize positive and minimize negative results. For instance, when consumers agree to the collection of personal data for online advertising purposes, they may weigh potential benefits, such as receiving relevant ads only, to potential costs, such as being concerned about their online privacy. Consumers are more likely to have positive attitudes towards personalization when the benefits outweigh the cost (Awad and Krishnan 2006; Culnan and Armstrong 1999; Dinev and Hart 2006). On the one hand, consumers may benefit from personalized advertising because it would improve media experiences (Jari 2007; McDonald and Cranor 2010). For example, it reduces the number of irrelevant ads, the time it takes to find products (McDonald and Cranor 2010; Strycharz et al. 2019b), results in more discounts (Strycharz et al. 2019b; Treiblmaier and Pollach 2007) or more informative ads (Strycharz et al. 2019b). On the other hand, receiving personalized advertisements might go at the expense of people's privacy (Awad and Krishnan 2006; Strycharz et al. 2019b; Turow et al. 2009).

Although previous research has examined the perceived benefits and costs of personalization, there is no research into the perceived benefits and costs of synced advertising, nor research that compares the perceived benefits and costs for different personalization strategies. Gaining more knowledge on how these different personalization strategies are perceived (i.e. whether they are indeed perceived as different in terms of costs and benefits by consumers) could provide an important input for the further development of personalization strategies, as well as for educational programs and the debate related to policy and ethics of personalization. Therefore, the following research question is advanced:

RQ2: What are the perceived benefits and costs of OBA and SA, and to what extent do they differ?

Method

Participants and procedure

To examine consumers' knowledge and perceptions of personalization strategies an online survey was administered. The online survey was distributed between March 31 and 8 June 2019. A request, with a link to the survey was sent to an online panel of Dynata. Informed consent was needed to progress to the survey. A total of 1,008 U.S. respondents (55.8% female, Age: $M = 50.26$, $SD = 17$, range 18–94 years) participated and passed at least three of the four attention checks. Regarding education, 0.4% had no education, 0.5% finished primary school, 18.3% high school, 20.7% completed some college but had no degree, 12.1% had an associate's degree, 2.6% a professional degree, 29.6% a bachelor's degree, 12.8% a master's degree, 3.1% a doctoral agree. Additionally, 37.5% indicated to have a full-time job, 33.3% retired, 17.1% unemployed, and 12.1% part-time. We also asked whether they had any work experience (e.g. internships, jobs) in the field of advertising, communications, or marketing or whether they knew anyone (e.g. family member, friend) who did. Of all respondents, 13.3% indicated to have work experience themselves and 9.8% indicated to know someone who has work experience in this field.

In the survey, the participants were first asked about their knowledge towards OBA and SA. The order of the sets as well as the order of statements within each set were randomized. To measure benefit-costs perceptions of OBA and SA, the respondents were asked to read two scenarios, one describing a typical OBA scenario and the other a typical SA scenario (Figure 1). The scenario of OBA was based on the scenario of McDonald and Cranor (2010). The SA scenario was written in line with the OBA scenario to make sure that only the differences in the strategy was different and the messages were the same on other levels. In short, the scenarios were about an ad for flight tickets that appeared either after searching for it online earlier (OBA) or because someone in a TV shows talks about it (SA). The scenarios were labelled as 'scenario 1' or 'scenario 2'. The respondents were asked 'What would be advantages for you as a consumer of scenario 1(2)?' and 'What would be disadvantages for you as a consumer of scenario 1(2)?' All respondents were asked to answer the open-ended question about OBA scenario before the SA scenario. At the end of the survey, the respondents were thanked for their participation and they received an incentive through the panel company for completing the survey.

Measures

Knowledge

To answer the question related to knowledge, we used the two measures objective and subjective knowledge. OBA and SA objective knowledge was measured using eight true/false statements per strategy presented in random order (See Table 1) in line with standard procedures (McDonald and Cranor 2010; Smit, Van Noort, and

Table 1. Knowledge statements OBA and SA.

	Objective knowledge			Subjective knowledge	
Statements	n	Answer	%	M	SD
Online Behavioural Advertising					
Your browser history, location history, and website navigation behavior can determine which ads you are going to see during your next website visit.	973	TRUE	89.9	4.78	3.40
Companies divide users into different personality profiles based on people's Internet behavior and they show these groups ads based on said information.	970	TRUE	88.9	4.31	3.37
Cookies are used to present you with ads based on your Internet behaviour.	972	TRUE	85.9	4.32	3.81
Information that you enter on search engines and when writing e-mails can both be used to provide you with relevant ads.	972	TRUE	79.4	3.52	4.22
Information that you post on your social media account (e.g. Facebook, Twitter, Instagram) can be used by companies to provide you with ads related to this information.	971	TRUE	90.0	4.78	3.38
When browsing the Internet, people generally see the same ads as someone else browsing the same website.	971	FALSE	65.1	1.77	5.23
It is **impossible** for companies to gather information about the device type, applications, and type of browser that you are currently using.	971	FALSE	83.5	3.87	4.22
When you own multiple devices (e.g.e.g. smartphone, tablet, laptop) it is **impossible** for companies to relate these different devices to one single user.	970	FALSE	78.4	3.07	4.42
Synced Advertising					
It is possible for companies to collect information about the shows that people watch on television, and simultaneously advertise relevant products/brands on those people's mobile devices.	983	TRUE	67.1	2.03	4.66
Companies know what people are watching/listening to because media content (TV/radio shows) sometimes contain a sound signal that can be picked up by a mobile device.	984	TRUE	52.3	0.58	4.71
Companies can advertise on one device based on information collected through another device at the same time.	982	TRUE	75.8	2.82	4.24
Technology already exists that makes it possible to receive ads on your smartphone based on your current (real-time) watching behavior on online streaming services.	983	TRUE	85.5	3.96	3.62
A company can show me an ad on my mobile device from a brand at the same time that I am watching a television commercial from that brand.	982	TRUE	64.2	1.68	4.65
It is a coincidence when people receive an ad on their mobile device that is related to what they are concurrently listening to on the radio.	984	FALSE	63.3	1.52	4.98
It is **impossible** for a mobile app to listen to a television show that people are watching, and use this information to provide those people with ads based on the show's content.	981	FALSE	67.0	1.58	4.77
It is **impossible** that words that I say out loud can trigger an ad on my mobile device related to that word.	983	FALSE	62.4	1.29	5.04

Note. N differs per item and per variable because not all respondents answered to all statements.

Voorveld 2014). Like these other studies, three of the eight statements were false. Correct answers were coded 1 and incorrect answers were coded 0 in order to calculate a sum score. The total score ranged between 0 (none correct) and 8 (all correct). The knowledge statements were asked in sets of eight for each personalization strategy separately. All statements were tested in a pilot survey for clarity among students at a large Midwestern university.

In addition, we asked participants to rate how confident they were that their answer to the statements was correct. This way we could calculate subjective knowledge. First, we recoded knowledge into correct (1) and incorrect (–1). Second, we multiplied it by the confidence score (1 *Not confident at all* – 7 *Extremely confident*). Hence, this subjective knowledge ranges between –7 and 7, in which more negative values indicate more false confidence and more positive values indicate more true confidence.

Perceived benefits and costs

Two open-ended questions related to the perceived benefits and costs of each scenario were asked after respondents were asked to read the OBA and SA scenario (see 'procedure'). An adaption of the codebook of Strycharz et al. (2019b) was used to code the open-ended answers into categories. Their codebook was constructed based on existing academic literature examining personalized advertising in the online context. The systematic literature review resulted in different benefits and concerns, which were collected and grouped. In addition to the adopted categories (Tables 2 and 3), the authors of the current study added the category 'negative affect' to the costs ('I hate it', 'it annoys me') and 'irrelevant ads' ('getting ads that are not for me', 'I am not interested'), which multiple respondents mentioned but did not fit in any of the other categories. All answers by the respondents were coded. For each benefit and costs, the coders had to select whether it was present (1) or absent (0) in the answer of the respondent. Thus, the categories were not mutually exclusive and multiple categories could be present within one answer of the respondent. The coders were asked to code the benefits and costs from the consumer's perspective (not benefits from the advertiser's perspective).

The data was coded by two independent coders of which one coded 100% and the other coded about 25% of the sample ($n = 500$). The coders were students in a strategic communication program at a large Midwestern university. They coded the information independent of each other after having had 3 rounds of coder training and practice coding. During the practice rounds any inconsistencies were discussed and solved. Pilot data was used for the practice rounds. Hence, the codings during the practice rounds were not used in the final codings. The coders were blind to the objective of the study. All codings showed sufficient to good reliability (Table 4).

Results

What do consumers know about personalized advertising?

On average, the respondents answered 6.59 OBA statements correctly ($SD = 1.56$), compared to 5.37 SA statements ($SD = 2.05$). Table 1 shows the percentage of respondents that answered the statements correctly. On most OBA statements more than 78% of the respondents gave the correct answer. An exception is the statement 'when browsing the Internet, people generally see the same ads as someone else browsing the same website', which 65.1% answered correctly. The percentages of number of respondents who correctly answered the SA statements ranged between 52.3–85.5%, with the lowest percentage for the statement 'Companies know what people are watching/listening to because media content (TV/radio shows) sometimes contain a sound signal that can be picked up by a mobile device' and the highest for 'Technology already exists that makes it possible to receive ads on your smartphone based on your current (real-time) watching behaviour on online streaming services'.

Subjective knowledge gives further insights into the knowledge of the personalized advertising strategies. A MANOVA with subjective knowledge of both personalized advertising strategies as within factor shows that respondents are more confident in correct answers for OBA ($M = 3.82$, $SD = 2.29$) than SA ($M = 1.94$, $SD = 2.69$), $F (1, 953) = 449.78$,

Table 2. Benefit codings.

Categories	Description	Illustrative examples	Codings
Convenience	Faster communication. Benefit focused on reducing effort or making things in life easier.	'Overview at a glance', 'No need to search', 'save time', 'make it easier', 'efficient', 'more accessible'	1 = present, 0 = absent
Economic benefits	Financial gain or gain in material possessions, for example coupons, discounts, vouchers.	'Better discounts', 'cheap, low costs', 'monetary incentives', 'good deals'	1 = present, 0 = absent
Personal relevance	Extent to which consumers perceive a message to be self-related or useful in achieving their goals, e.g. shopping goals.	'Seeing information that is meant for me'	1 = present, 0 = absent
Added advertising value	Higher informativeness or entertainment value	'More informative ads', 'make me think about the product', 'make me aware', 'lead to more information', 'incentives (not monetary)'	1 = present, 0 = absent
Less advertising	Seeing less advertising in general online	'Less ads', 'less clutter'	1 = present, 0 = absent
Positive affect*	Positive feelings, emotions, mood	'Makes me happy', 'it excites me'	1 = present, 0 = absent
No benefits		'None', 'No benefits for me'	666
Did not answer/ don't know		'No opinion', 'I don't know', 'idk'	777

* newly added category

Table 3. Costs codings.

Categories	Description	Illustrative examples	Codings
Privacy risk	Perceived risk of opportunistic behavior related to disclosure of personal information submitted to the internet; related to both informational privacy as well as right to self-determination.	'I do not want them to sell my data', ' being tracked', 'watched', 'people listening'	1 = present, 0 = absent
Intrusiveness	Fear of being bothered too much. Ads being disruptive/invasive but does not reflect the sense of being tracked.	'Ads keep following me', 'getting unsolicited ads', 'unwanted ads'	1 = present, 0 = absent
Message processing costs	For example, high volume of advertising, high cognitive load, high number of emails, lack of efficiency.	'I am overwhelmed with stuff I don't need', 'too much information', 'bombarded with ads'	1 = present, 0 = absent
Discrimination	Respondent is afraid that he or she will be discriminated based on their data available to companies online – financially or in terms of access.	'Higher price for me', 'disrespect', 'treat me differently'	1 = present, 0 = absent
Loss of control	Respondent feels that he or she has lost control over their data and they feel that they cannot do anything about it.	'I am unable to make choices', 'did not give consent', 'I do not know the source'	1 = present, 0 = absent
Manipulation	Respondent is afraid that using personal data companies will be able to manipulate him or her, e.g. push them into buying what does not interest them or is not beneficial.	'They influence my purchase behavior', 'They influence my thinking', 'Persuasion'	1 = present, 0 = absent
Stereotyping	Respondent feels fear of being categorized based on their personal data; that he or she loses control of what others think about them.	'It's like fitting you in a frame'	1 = present, 0 = absent
Negative affect*	Negative feelings, emotions, mood	'Creepy', 'unnerving', 'annoying', 'irritating', 'dislike', 'hate'.	1 = present, 0 = absent
Irrelevant ads*	Receiving ads for things you are not interested in or are not meant for you.	'Getting ads that are not for me', 'I am not interested'	1 = present, 0 = absent
No benefits		'None', 'No benefits for me'	666
Did not answer/ don't know		'No opinion', 'I don't know', 'idk'	777

* newly added category

Table 4. Intercoder reliability of the benefits and costs.

Variable	Krippendorff's alpha	Percent agreements
Benefits		
Convenience	0.82	96.6
Economic benefit	0.88	97.0
Personal relevance	0.72	91.4
Added advertising value	0.72	91.6
Less advertising	-	99.4
Positive affect	-	95.8
Costs		
Privacy issues	0.82	91.4
Intrusiveness	0.62[a]	94.2
Processing cost	0.71	97.2
Discrimination	-	99.4
Loss of control	-	94.0
Manipulation	0.66[a]	98.0
Stereotyping	-	99.8
Negative affect	-	85.8
Irrelevant ads		81.4

Note. We could not calculate Krippendorff's alpha for all categories because of limited variance.
[a]Low Krippendorff's alpha scores are caused by limiting codings in the categories.

$p < .001$, $\eta^2 = .32$. Regarding OBA, respondents are most truly confident about the statement that 'Your browser history, location history, and website navigation behaviour can determine which ads you are going to see during your next website visit.' ($M = 4.78$, $SD = 3.40$) and that 'information that you post on your social media account (e.g. Facebook, Twitter, Instagram) can be used by companies to provide you with ads related to this information' ($M = 4.78$, $SD = 3.38$). They are the least confident in their answer to the statement 'when browsing the Internet, people generally see the same ads as someone else browsing the same website', which can be explained by the lowest percentage of correct answers (65.1%). Regarding SA, respondents are most confident in their answer that 'technology already exists that makes it possible to receive ads on your smartphone based on your current (real-time) watching behaviour on online streaming services.' is true ($M = 3.96$, $SD = 3.62$). They are the least confident in their answer to the statement 'companies know what people are watching/listening to because media content (TV/radio shows) sometimes contain a sound signal that can be picked up by a mobile device.' ($M = 0.58$, $SD = 4.71$), which only 52.3% answered correctly. Thus, this low score could be explained by overconfidence in the wrong answer.

Finally, we looked at the relationship between the demographic variables (i.e. gender, age, education, and whether someone works in the advertising, marketing, communication industry themselves, or whether they know someone (e.g. family member, friend) who works in that industry), and how that affects knowledge of the personalization strategies (Table 5). The results show that education is a consistent predictor of objective and subjective knowledge for both personalization strategies. The higher the education the more knowledge (OBA objective knowledge $b^* = .19$, $p < .001$, OBA subjective knowledge $b^* = .17$, $p < .001$, SA objective knowledge $b^* = .12$, $p < .001$, SA subjective knowledge $b^* = .11$, $p = .001$). In addition, age is a significant predictor of OBA knowledge, meaning that the older people are the more they know about OBA (OBA objective knowledge $b^* = .15$, $p < .001$, OBA subjective knowledge $b^* = .15$, $p < .001$). Gender is a significant predictor in SA knowledge, in that men know more than women (SA

Table 5. Multiple regressions explaining knowledge and confidence in knowledge of OBA and SA.

	OBA		SA	
	Objective	Subjective	Objective	Subjective
Gender (1 = female)	−.02	−.06	−.08*	−.09*
Age	.15***	.15***	−.05	−.06
Education	.19***	.17***	.12***	.11**
Work (self, 1 = yes)	−.00	.01	.03	.05
Work (other, 1 = yes)	.01	−.02	−.02	−.04
F Value	14.258	14.179	4.796	5.289
Degrees of freedom	5, 959	5, 949	5, 969	5, 957
p-value	<.001	<.001	<.001	<.001
Adjusted R2	0.065	0.065	0.019	0.022

Note. The table presents standardized regression coefficients. *** p <.001, ** p <.01, * p <.05.

objective knowledge $b* = −.08$, $p = .017$, SA subjective knowledge $b* = −.09$, $p = .010$). Finally, whether you work in the industry or know someone who works in the industry does not affect your knowledge on either personalization strategies.

Mentioned benefits and costs

Benefits

Table 6 presents an overview of the perceived benefits and costs of both OBA and SA. Overall, OBA and SA do not significantly differ in terms of perceived benefits, chi-square (5) = 10.54, $p = .061$. Personal relevance (28.5%), added advertising value (26.3%), economic benefits (24%), and convenience (18.4%) were mentioned often as benefits of OBA. Respondents indicated that it is relevant to them because 'you learn of a product or service directly related to an area of interest.' It was also seen to add value because 'it would help me in that I can get information about better choices', it helps them 'being reminded that I was looking at something', and it might 'help you plan your trip'. Economic benefits consist of 'possibly getting cheap tickets' and 'save money through

Table 6. Benefits and costs of personalized advertising.

	OBA		SA	
Benefits	n	%	n	%
Personal Relevance	208	28.5%	121	27.4%
Added advertising value	192	26.3%	141	32.0%
Economic benefits	175	24.0%	78	17.7%
Convenience	134	18.4%	86	19.5%
Positive affect	17	2.3%	10	2.3%
Less advertising	3	0.4%	5	1.1%
	729	100%	441	100%
Costs				
Privacy risk	402	52.5%	443	54.8%
Intrusiveness	85	11.1%	90	11.1%
Negative affect	69	9.0%	107	13.2%
Message processing costs	72	9.4%	36	4.5%
Loss of control	57	7.4%	56	6.9%
Irrelevant ads	36	4.7%	53	6.6%
Manipulation	32	4.2%	14	1.7%
Discrimination	13	1.7%	8	1.0%
Stereotyping	0	0.0%	1	0.1%
	766	100%	808	100%

discounts'. Convenience consisted of 'saving time to plan a trip' and respondents mention that they 'don't have to search for it'.

Added advertising value (32%), personal relevance (27.4%), and convenience (19.5%) were mentioned most often as benefits of SA. Examples of added advertising value mentioned by the respondents were: 'it could put the idea in your head' and 'it could offer information'. It is perceived is relevant because it consists of 'receiving an ad that is immediately relevant to something you have interest in.' especially 'if you were actually watching this show because you are interested in traveling to Los Angeles, you would be happy to get the information received on your smartphone.' Finally, respondents thought it was convenient because 'It helps make your travel plans without doing a lot of additional searches online' and 'You would not have to find a website to get tickets. It is already there.'

Costs

Overall, the differences between OBA and SA in terms of perceived costs were significantly different, chi-square (8) = 33.73, $p < .001$. The results of the perceived costs showed that the privacy risks category was mentioned most often as a cost of OBA (52.5%) and SA (54.8%). Respondents often mentioned that 'it feels as if privacy was violated' or that it 'feels like you are being spied on'. Another cost of OBA was intrusiveness (11.1%). It might give people 'unwanted info' and perceived as an 'interruption'. Intrusiveness was also often (11.1%) mentioned as a cost of SA. For example, a respondent mentioned that it is 'so invasive that you can't even watch a show without being pinged with an ad.' Finally, message processing costs was more associated with the OBA (9.4%) than the SA (4.5%) scenario ('too many ads'), while 'irrelevance of the ad' more with SA (6.6%) than the OBA (4.7%) scenario ('I might just be watching TV and have no interest in traveling or doing anything related to what happens to be on TV').

Negative affect

A new category – negative affect – was mentioned 9% for OBA and 13.2% for SA (Table 6). Therefore, we further examined the new category 'negative affect' (Table 7) to get a better understanding of what feelings are evoked by the personalized advertising strategies. The kind of negative affect evoked by the personalization strategies was marginally significantly different, chi-square (9) = 15.65, $p = .075$. SA was associated with creepiness (40.4%)

Table 7. Negative affect per personalization strategy.

Negative affect		OBA		SA	
		n	%	n	%
Creepiness	Creepy, spooky, freaky, scary, chilling	22	31.9%	44	40.4%
Annoyance	Annoying, irritating, bothersome, frustrating	16	23.2%	17	15.6%
Discomfort	Unsettling, unnerving, uneasy, uncomfortable, weird, disturbing	11	15.9%	10	9.2%
Dislike	Dislike	9	13.0%	14	12.8%
Hate	Hate, angry, mad	4	5.8%	5	4.6%
Careless	Don't care	3	4.3%	0	0.0%
Sad	Sad, upset disappointing	2	2.9%	2	1.8%
Worried	Worried, concerning, freaked out, frightening, unsafe	1	1.4%	6	5.5%
Unacceptable	Unacceptable, inappropriate, uncool, not okay, bad, wrong	0	0.0%	6	5.5%
Distrust	Distrust, paranoid, wary, leery	1	1.4%	5	4.6%
Total		**69**	**100%**	**109**	**100%**

more than OBA (31.9%), but on the other hand it was associated less with annoyance (15.6%) compared to OBA (23.2%).

In response to the OBA scenario, creepiness (31.9%), annoyance (23.2%), discomfort (15.9%), and dislike (13.0%) were mentioned most often. For example, respondents mentioned: 'It is like "big brother" watching – spooky.' (creepiness), 'I might have been just dreaming about a vacation and these ads will annoy me.' (annoyance), 'Just knowing a different company popped up makes me uncomfortable a little' (discomfort), and 'my privacy is being misused I don't like it' (dislike).

In response to the SA scenario, creepiness (40.4%), annoyance (15.6%), and dislike (12.9%) were most often mentioned. For example, respondents wrote: 'It feels kind of creepy to have something show up on my phone based on what I was watching on TV.' (creepiness), 'You might not want to travel to LA and just be getting an annoying ad that you do not want' (annoyance), and 'I don't like the idea of people knowing what I'm doing without me even using my device.' (dislike).

Notably, some mentioned that the SA scenario was unacceptable (5.5%, 'Ads based on the TV show you're watching? This is unacceptable.'), which was not mentioned in response to the OBA scenario (0%). Also, consumers seem to be more worried about SA (5.5%, 'The implications of my phone being able to "hear" my surrounds are … worrisome.') than OBA (1.4%) practices, whereas some consumers did not seem to care about the OBA practices (4.3%, 'This would mean that there's tracking going on. I don't really care for that.' vs. 0% for SA).

Discussion

The fast-paced development of digital technologies has enabled more sophisticated strategies and mechanisms through which personalized advertising can be realized (Bright and Daugherty 2012; Malthouse, Maslowska, and Franks 2018; Segijn and van Ooijen 2020). Because of these differences in types of personalization, especially concerning their degree of intrusion in the personal sphere of the consumer, the question arises whether there are differences in knowledge and perceptions of these different strategies amongst consumers. The current study examined consumer perceptions of online behavioural advertising (OBA) and synced advertising (SA).

First, we studied consumers' objective and subjective knowledge of both personalized advertising strategies. In general, consumers had a good understanding of OBA with an average of approximately 7 out of 8 statements answered correctly. Consumers were the least aware that not everyone sees the same ads when browsing the same website. Regarding SA, consumers had an average of 5 out of 8 statements correctly answered but they were less confident in their (correct) answers related to the SA strategy than OBA strategy. Consumers were the least aware of watermarking as a data collection technique. However, 85.5% indicated to know that it is possible to receive ads based on what you are watching through online streaming services concurrently. In addition, we found a significant difference in subjective knowledge in that consumers were more confident about their knowledge towards OBA than SA. The difference in knowledge might be explained by the difference in novelty and prevalence of the two strategies. Whereas OBA has been around for a while, SA is still a relative new form of personalization.

Moreover, we looked whether demographic variables could predict knowledge in personalization. Education was a consistent predictor of both types of knowledge for both personalization strategies. The higher the education, the more statements participants answered correctly and were confident about their answer. In addition, we found that age was a significant predictor of OBA knowledge and gender of SA knowledge. Knowledge about personalization strategies, like persuasion knowledge (Friestad and Wright 1994), grows with age. However, because SA is a relatively new personalization strategy, people have developed relatively little knowledge about this strategy, regardless of age. This may not be the case for OBA because this strategy has been used for some time already. Further research is necessary to validate this claim and to further examine the role of gender in SA knowledge.

Second, we examined the perceived benefits and cost of both personalized advertising strategies. Added advertising value is the most often mentioned benefit of synced advertising. Participants indicated that this form of personalized advertising could give you information that you otherwise would not have found, and it might give you new ideas. However, it was also seen as a personalized advertising strategy that could show irrelevant ads. The participants indicated that just because they watch a certain show in which a product is mentioned, it does not mean that they are interested in the product. Conversely, personal relevance was the most often mentioned category in response to the OBA scenario because ads are based on their interests or previous search behaviours. Thus, although both strategies are conceptualized as a form of personalized communication, the data used as input (e.g. OBA preferences vs. SA concurrent media behaviour) may lead to different perceptions in relevance of the ads. Whereas OBA shows products that (are related to products that) have been searched or purchased before, this is not a given for SA. In addition, OBA was associated with benefits more than SA, where more than twice the amount of participant indicated to perceive no benefits of SA than in OBA. Future research should examine whether this is due to the nature of SA, or that this is due to a lower knowledge about SA that might be caused by the novelty of this advertising strategy.

On the flipside, a large group of consumers indicated privacy risks as costs of both personalized advertising strategies, followed by it being intrusive, and they expressed negative affect related to personalization strategies. Creepiness was mostly associated with these forms of personalized advertising and was higher for SA compared to OBA. This difference may be explained due to the real-time character of SA. Whereas consumers are targeted with ads at the same time as they are using topic-relevant media, this may induce the perception that they are being watched, which can be perceived as 'creepy' (Moore et al. 2015). With OBA these perceptions of being watched are less prevalent (Segijn and van Ooijen 2020). In addition, the results showed that consumers are more worried about SA and find it more unacceptable, while some consumers do not seem to care about OBA practices. These findings are in line with previous research that showed that the personalization techniques used for SA could elicit feelings of being watched (Segijn and van Ooijen 2020). In addition, consumers indicated to experience annoyance, discomfort and to dislike the personalization strategies. In this regard personalized advertising seems to be similar compared to more traditional forms of advertising, which has found to elicit irritation (De Pelsmacker and Van den Bergh 1999). On the other hand, SA seems to be associated less with annoyance compared to OBA. This might

be explained by SA (media multitasking) being facilitated by media multitasking, which has been found to reduce advertising irritation compared to sequential media use (OBA) (Beuckels, Cauberghe, and Hudders 2017). Future research (e.g. in-depth interviews, focus groups) could further investigate these differences and the consequences of these nuances for advertising effectiveness.

Limitations

These results, however, need to be interpreted considering its limitations. The results related to knowledge need to be carefully interpreted because they could vary depending on what statements are asked. However, the consistent positive relationship between education and knowledge makes us more confident that this is a valid measure. Similarly, to ask about perceptions of personalized advertising two scenarios were presented. The responses may vary depending on the examples used. Perceptions might be depending on the context, such as receiving personalized health or political messages (Bol et al. 2018) or how relevant the product/brand is perceived (Bleier and Eisenbeiss 2015). In addition, we presented the OBA scenario before the SA one, and asked about the perceptions in that order as well, which could have influenced the results. Future research is needed to examine if the order would have mattered. Furthermore, because OBA has been around for some time, it is likely that respondents relied on their personal experience. However, because SA is relatively new, it is likely that respondents had to rely on imagination to answer their questions related to this scenario. This could have caused a difference in responses and therefore the results should be carefully interpreted. Finally, we tested whether demographics variables influenced knowledge. However, many more variables could play a role in predicting knowledge of personalization, such as media related factors (e.g. internet competency, Kim and Huh 2017) or psychological factors (i.e. need for cognition; Winter, Maslowska, and Vos 2020). Future research could further examine other factors that could predict knowledge of personalization.

Theoretical implications

The results of this study advance theory by differentiating between personalized advertising strategies from the consumer perspective. The results of this study showed that consumers perceive different forms of personalized advertising as different in terms of perceived benefits and costs. This is important because consumer perceptions of personalized advertising can influence the effectiveness of these ads (Acquisti, John, and Loewenstein 2013; Culnan and Armstrong 1999; Dinev and Hart 2006).

    Furthermore, because we used open-ended questions to measure perceived benefits and costs, we were able to get more insights into the categories. Based on the answers of the respondents, we added two new categories to the perceived costs, namely negative affect and irrelevant ads. The latter appeared to be specific to synced advertising because ads are personalized based on media content rather than direct preferences. This is an important finding because one of the reasons that personalized advertising is seen as an effective advertising strategy is the increased relevance to the consumer (De Keyzer, Dens, and De Pelsmacker 2015). Synced advertising seems to be an exception because personalization takes place on the media behaviour level instead of the consumer level.

Although a consumer might have chosen to watch a certain show, it does not mean that the content of the show matches the consumers' preferences. Therefore, synced advertising might include more irrelevant ads from the consumer perspective than any other form of personalization. These results advances insight on categories used as input for the privacy calculus theory for different personalized advertising strategies. Future research should also consider these categories, for example in closed-ended questions in quantitative research examining the perceived benefits and costs.

Finally, by measuring knowledge in two ways (i.e. objective and subjective), we had more insight in people's actual knowledge of these strategies. Subjective knowledge is defined as the combination of objective knowledge and confidence in knowledge (Park and Lessig 1981; Raju, Lonial, and Glynn Mangold 1995). We measured this by combining objective knowledge with confidence scores. Although the number of statements that were correctly answered was not that different between the personalized advertising strategies, the confidence in knowledge was significantly lower for SA compared to OBA. We suggest that future research examining knowledge of advertising strategies should take the confidence in knowledge into account to calculate subjective knowledge and get a more complete picture of knowledge.

Managerial implications

The results of this study also have implications for the advertising industry (Strycharz et al. 2019a). Because consumers are more likely to have a positive attitude towards personalized advertising when benefits outweigh the cost, insights on specific perceived benefits and costs per personalization strategy are important for a successful personalization campaign. For example, the perceived benefits provide insights for what purposes the different personalization techniques are most appropriate. Thus, OBA is for example an appropriate strategy when a consumer is already looking for a certain product and needs a reminder to buy it (personal relevance), while SA is more appropriate to make consumers aware and think about the product (added advertising value). Furthermore, these results help to identify which of these benefits are less associated with the personalization strategy. It may help to emphasize these benefits or make consumers aware of other benefits that are not yet associated with it to increase consumers acceptance of the personalization strategy. For example, that personalization could lead to less advertising clutter might be something that could be communicated. In addition, privacy risks are perceived as the number one cost for both personalized advertising strategies. This should encourage debate related to privacy and transparency of data collection in the mainly self-regulated industry.

Finally, the results of this study have implications for advertising literacy programs. The results provide insights in what is known in the general population and what should consumers perhaps be more educated on (Table 1). For example, a large group of consumers is not aware that advertisers make use of watermarking (i.e. a sound signal placed in media content that can be recognized by an application on smartphones) in synced advertising. Thus, advertising literacy programs should adopt these newer personalization techniques (for an overview see Segijn and van Ooijen 2020). Additionally, the results provide information on misconceptions. For example, a third of the consumers falsely believed that consumers will see the same ads when visiting the same website. This

result can be used as input for advertising literacy programs to counter misinformation. Moreover, this result is in line with the results of Smit, Van Noort, and Voorveld (2014) which studied this in 2014 in a European sample. That not much has changed since then, might be an indication that this is what literacy programs should focus on. Additionally, the results showed the low levels of confidence in respondent's knowledge of personalized advertising strategies. Advertising literacy programs could build consumer empowerment and therefore make them more confident informed consumers. Finally, we found that younger people have less knowledge about personalization. This is worrisome because previous research has shown the susceptibility to personalized advertising by adolescents (Walrave et al. 2018). Therefore, it might be worthwhile to start educating this group on advertising literacy of personalized advertising.

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Disclosure statement

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References

Acquisti, A., L. K. John, and G. Loewenstein. 2013. "What Is Privacy Worth?" *The Journal of Legal Studies* 42 (2): 249–274. doi:10.1086/671754.

AdAge. 2018. "How Personalization Will Evolve in 2018." https://adage.com/article/epsilon/personalization-evolve-2018/312048

Alba, J. W., and J. Wesley Hutchinson. 2000. "Knowledge Calibration: What Consumers Know and What They Think They Know." *Journal of Consumer Research* 27 (2): 123–156. doi:10.1086/314317.

Awad, N. F., and M. S. Krishnan. 2006. "The Personalization Privacy Paradox: An Empirical Evaluation of Information Transparency and the Willingness to Be Profiled Online for Personalization." *MIS Quarterly* 30 (1): 13–28. doi:10.2307/25148715.

Beuckels, E., V. Cauberghe, and L. Hudders. 2017. "How Media Multitasking Reduces Advertising Irritation: The Moderating Role of the Facebook Wall." *Computers in Human Behavior* 73: 413–419. doi:10.1016/j.chb.2017.03.069.

Bleier, A., and M. Eisenbeiss. 2015. "The Importance of Trust for Personalized Online Advertising." *Journal of Retailing* 91 (3): 390–409. doi:10.1016/j.jretai.2015.04.001.

Boerman, S. C., S. Kruikemeier, and F. J. Zuiderveen Borgesius. 2017. "Online Behavioral Advertising: A Literature Review and Research Agenda." *Journal of Advertising* 46 (3): 363–376. doi:10.1080/00913367.2017.1339368.

Bol, N., T. Dienlin, S. Kruikemeier, M. Sax, S. C. Boerman, J. Strycharz, N. Helberger, and C. H. de Vreese. 2018. "Understanding the Effects of Personalization as a Privacy Calculus: Analyzing Self-Disclosure across Health, News, and Commerce Contexts." *Journal of Computer-Mediated Communication* 23 (6): 370–388. doi:10.1093/jcmc/zmy020.

Bright, L. F., and T. Daugherty. 2012. "Does Customization Impact Advertising Effectiveness? An Exploratory Study of Consumer Perceptions of Advertising in Customized Online Environments." *Journal of Marketing Communications* 18 (1): 19–37. doi:10.1080/13527266.2011.620767.

Culnan, M. J., and P. K. Armstrong. 1999. "Information Privacy Concerns, Procedural Fairness, and Impersonal Trust: An Empirical Investigation." *Organization Science* 10 (1): 104–115. doi:10.1287/orsc.10.1.104.

Daems, K., P. De Pelsmacker, and I. Moons. 2019. "Advertisers' Perceptions regarding the Ethical Appropriateness of New Advertising Formats Aimed at Minors." *Journal of Marketing Communications* 25 (4): 438–456. doi:10.1080/13527266.2017.1409250.

De Keyzer, F., N. Dens, and P. De Pelsmacker. 2015. "Is This for Me? How Consumers Respond to Personalized Advertising on Social Network Sites." *Journal of Interactive Advertising* 15 (2): 124–134. doi:10.1080/15252019.2015.1082450.

De Pelsmacker, P., and J. Van den Bergh. (1999). "Advertising Content and Irritation." *Journal of International Consumer Marketing* 10 (4): 5–27. doi:10.1300/J046v10n04_02.

Dinev, T., and P. Hart. 2006. "An Extended Privacy Calculus Model for E-Commerce Transactions." *Information Systems Research* 17 (1): 61–80. doi:10.1287/isre.1060.0080.

Edell, J. A., and K. L. Keller. 1989. "The Information Processing of Coordinated Media Campaigns." *Journal of Marketing Research* 26 (2): 149–163. doi:10.1177/002224378902600202.

Friestad, M., and P. Wright. 1994. "The Persuasion Knowledge Model: How People Cope with Persuasion Attempts." *Journal of Consumer Research* 21 (1): 1–31. doi:10.3389/fpsyg.2015.01201.

Hoeck, L., and M. Spann. 2020. "An Experimental Analysis of the Effectiveness of Multi-Screen Advertising." *Journal of Interactive Marketing* 50: 81–99. doi:10.1016/j.intmar.2020.01.002.

Jari, V. 2007. "What Is Personalization? A Conceptual Framework." *European Journal of Marketing* 41 (5/6): 409–418. doi:10.1108/03090560710737534.

Kim, H., and J. Huh. 2017. "Perceived Relevance and Privacy Concern regarding Online Behavioral Advertising (OBA) and Their Role in Consumer Responses." *Journal of Current Issues & Research in Advertising* 38 (1): 92–105. doi:10.1080/10641734.2016.1233157.

Malthouse, E. C., E. Maslowska, and J. U. Franks. 2018. "Understanding Programmatic TV Advertising." *International Journal of Advertising* 37 (5): 769–784. doi:10.1080/02650487.2018.1461733.

McDonald, A. M., and L. F. Cranor. 2010. "Americans' Attitudes About Internet Behavioral Advertising Practices." In *Proceedings of the 9th Annual ACM Workshop on Privacy in the Electronic Society*, 63–72. WPES '10. New York, NY, USA: ACM. doi:10.1145/1866919.1866929.

Moore, R. S., L. Melissa, K. J. Shanahan, and B. Mack. 2015. "Creepy Marketing: Three Dimensions of Perceived Excessive Online Privacy Violation." *Marketing Management* 25 (1): 42–53.

Park, C. W., and V. P. Lessig. 1981. "Familiarity and Its Impacts on Consumer Decision Biases and Heuristics." *Journal of Consumer Research* 8: 223–230. doi:10.1086/208859.

Pew Research Center. 2018. "Mobile Fact Sheet." http://www.pewinternet.org/fact-sheet/mobile/

Pieniak, Z., J. Aertsens, and W. Verbeke. 2010. "Subjective and Objective Knowledge as Determinants of Organic Vegetables Consumption." *Food Quality and Preference* 21 (6): 581–588. doi:10.1016/j.foodqual.2010.03.004.

Raju, P. S., S. C. Lonial, and W. Glynn Mangold. 1995. "Differential Effects of Subjective Knowledge, Objective Knowledge, and Usage Experience on Decision Making: An Exploratory Investigation." *Journal of Consumer Psychology* 4 (2): 153–180. doi:10.1207/s15327663jcp0402_04.

Segijn, C. M. 2019. "A New Mobile Data Driven Message Strategy Called Synced Advertising: Conceptualization, Implications, and Future Directions." *Annals of the International Communication Association* 43 (1): 58–77. doi:10.1080/23808985.2019.1576020.

Segijn, C. M., and H. A. M. Voorveld. 2020. "A First Step in Unravelling Synced Advertising Effectiveness." *International Journal of Advertising* 1–20. doi:10.1080/02650487.2020.1778279.

Segijn, C. M., and I.Van Ooijen. 2020. "Perceptions of Techniques Used to Personalize Messages across Media in Real Time." *Cyberpsychology, Behavior and Social Networking* 23 (5): 329–337. doi:10.1089/cyber.2019.0682.

Smit, E. G., G. Van Noort, and H. A. M. Voorveld. 2014. "Understanding Online Behavioural Advertising: User Knowledge, Privacy Concerns and Online Coping Behaviour in Europe." *Computers in Human Behavior* 32: 15–22. doi:10.1016/j.chb.2013.11.008.

Strycharz, J., G. van Noort, E. Smit, and N. Helberger. 2019b. "Consumer View on Personalized Advertising: Overview of Self-Reported Benefits and Concerns." In *Advances in Advertising Research X*, edited by E. Bigne and S. Rosengren, 53–66. Wiesbaden: Springer Gabler.

Strycharz, J., G. van Noort, N. Helberger, and E. Smit. 2019a. "Contrasting Perspectives – Practitioner's Viewpoint on Personalised Marketing Communication." *European Journal of Marketing* 53 (4): 635–660. doi:10.1108/EJM-11-2017-0896.

Treiblmaier, H., and I. Pollach. 2007. "'Users' Perceptions of Benefits and Costs of Personalization." In *ICIS 2007 Proceedings*. https://aisel.aisnet.org/icis2007/141

Turow, J., J. King, C. J. Hoofnagle, A. Bleakley, and M. Hennessy. 2009. "Americans Reject Tailored Advertising and Three Activities that Enable It." https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1478214.

Van Ooijen, I., and H. U. Vrabec. 2018. "Does the GDPR Enhance Consumers' Control over Personal Data? An Analysis from a Behavioural Perspective." *Journal of Consumer Policy* 42 (1): 91–107. doi:10.1007/s10603-018-9399-7.

Varnali, K. 2019. "Online Behavioral Advertising: An Integrative Review" *Journal of Marketing Communications* 1–22. June, 1–22. doi: 10.1080/13527266.2019.1630664.

Walrave, M., K. Poels, M. L. Antheunis, E. Van den Broeck, and V. N. Guda. 2018. "Like or Dislike? Adolescents' Responses to Personalized Social Network Site Advertising." *Journal of Marketing Communications* 24 (6): 599–616. doi:10.1080/13527266.2016.1182938.

Winter, S., E. H. Maslowska, and A. L. Vos. 2020. "The Effects of Trait-based Personalization in Social Media Advertising." *Computers in Human Behavior*. doi:10.1016/j.chb.2020.106525.