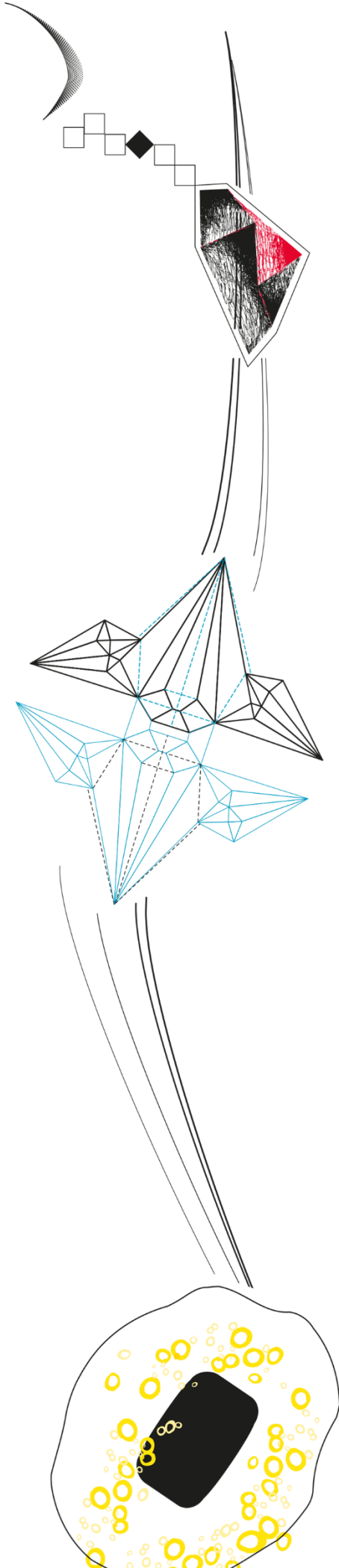




ONLINE BEHAVIORAL ADVERTISING: LUCRATIVE OR CREEPY?

An experimental study into the effects of level of personalization, data source creepiness and information disclosure on Online Behavioral Advertising effectiveness.

Master Thesis
Jelle Scholten
S1736140

First supervisor: Dr. I. van Ooijen

Second supervisor: Dr. S. A. de Vries

Institution: University of Twente

Faculty: Faculty of Behavioral, Management
and Social Sciences

Department: Communication Science

Date: 29-10-2019

UNIVERSITY OF TWENTE.

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Abstract

Aim. Advertisers are tailoring ads to the behavior and characteristics of consumers. For this, consumer data are needed, which are collected from browsing behavior and social media, but also from instant messaging platforms. Yet, it remains unclear how consumers will react to ads based on their private conversations on instant messaging platforms. Therefore, the aim of this study is to experimentally investigate the effects of level of personalization, data source creepiness, and information disclosure on OBA effectiveness, and add new insights about these effects to existing theory. Furthermore, the mediating effect of perceived intrusiveness and perceived vulnerability is tested.

Method. An online experiment, using a scenario-based 2 (level of personalization: high vs. low) $\times$ 2 (data source creepiness: less creepy vs. creepier) $\times$ 2 (information disclosure: presence vs. absence) between-subjects design was executed among 282 Dutch participants.

Findings. The results of this study show that a high level of personalization causes more Online Behavioral Advertising effectiveness than a low level of personalization. No mediating effects of perceived intrusiveness and perceived vulnerability were found. Also, the expected negative effect of data source creepiness was not found. Surprisingly, consumers did not mind to see an advertisement that was based on a creepy data source, unless it was accompanied by information disclosure.

Conclusion. It seems that consumers do not mind to see an ad that is based on a creepy data source, unless you make them aware of this. Yet, this is not an invitation for advertisers to use such sources without mentioning it. Lower OBA effectiveness when the creepy data source was mentioned in a disclosure, can also indicate that consumers do not like these data to be used for a personalized ad. Advertisers and academics should be wary of concerns that are present among consumers and should seriously consider whether the use of data sources that are perceived as creepy is a lucrative and ethical practice.

Keywords: Online Behavioral Advertising effectiveness; data source creepiness; personalization; information disclosure; consumer perceptions.

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1. Introduction

Today's digital world has made it possible to collect vast amounts of consumer data, such as names, e-mail addresses, website visits, products bought and search history (Boerman, Kruikemeier, & Zuiderveen Borgesius, 2017). Data can be used by advertisers to personalize and target ads to the behavior and characteristics of consumers. This is called Online Behavioral Advertising (OBA). Consumers are exposed to thousands of advertisements every day (Strick, Van Baaren, Holland, & Van Knippenberg, 2009), hence OBA is praised by the industry, as it helps to stand out from more generic ads. In the academic literature, the general view about OBA is more nuanced. On the one hand, research shows that it can lead to more clicks and purchases, as the ads are more relevant to the consumers (Boerman et al., 2017). On the other hand, it has been shown that OBA practices negatively influence consumer perceptions, such as perceived intrusiveness and perceived vulnerability (Aguirre, Mahr, Grewal, De Ruyter, & Wetzels, 2015; Bleier & Eisenbeiss, 2015; Smit, Van Noort & Voorveld, 2013; Strycharz, Van Noort, Smit, & Helberger, 2019; Van Doorn & Hoekstra, 2013; Van Noort, Smit, & Voorveld, 2013).

Most of the research in the field of OBA focuses on how negative consumer perceptions are formed. For instance, Aguirre et al. (2015) show that covertly collecting data leads to more negative feelings towards an ad, Bleier and Eisenbeiss (2015) uncover that trust plays a major role for organizations that use personalized advertising and Van Noort et al. (2013) show that information disclosure can be used to reduce negative perceptions. However, personalized advertisements in this work were mainly based on data retrieved from sources such as online shopping behavior and demographic characteristics (Boerman et al., 2017). Aguirre et al. (2015) already focus on a different source in their scenario-based experiment, namely instant messaging apps. Such apps are gaining popularity as opposed to the more open social media platforms (Connelly & Osborne, 2017). Large amounts of data can be collected from conversations on these platforms and used to personalize and target advertisements. One question remaining is whether it is ethically responsible to use these data.

One of the parties that is already collecting conversational data from their 'Messenger' app is Facebook. They use these data for their personalized advertisements (Mehta, 2019). However, it is not clearly demonstrated by academic literature how consumers react to ads that are based on such data. It can be expected that ads based on conversations in instant messaging apps are perceived as creepier than ads based on regular browsing behavior, as using information from a private conversation can be seen as an invasion of personal space and privacy (Moore, Moore, Shanahan, Horky, & Mack, 2015). Instant messaging apps are gaining

popularity, so it is important to know whether there is a discrepancy in the perceived creepiness of data sources. The novelty of this study lies in the exploration of the relationship of creepy data sources and OBA effectiveness. It tries to show that consumers do not want the advertising industry to use every data source that is available. Data sources that are considered too creepy or as unethical to use, might negatively influence OBA effectiveness.

A way to reduce the negative effect of OBA on consumer perceptions, is disclosing information about the data collection and personalization process (Aguirre et al., 2015). Current research shows that consumers like companies to be transparent about OBA (Boerman et al., 2017). However, it is not known how consumers will react to information disclosure when it mentions a creepy data source, such as a private conversation. Therefore, the aim of this study is to experimentally investigate the effect of level of personalization (high vs. low), data source creepiness (less creepy vs. creepier) and information disclosure (presence vs. absence). In line with this, the following research question can be formulated:

RQ1: *To what extent is OBA effectiveness influenced by level of personalization, data source creepiness and information disclosure?*

As OBA practices negatively influence consumer perceptions, the mediating effects of perceived intrusiveness and perceived vulnerability are taken into account. This leads to the second research question:

RQ2: *To what extent are the effects of level of personalization, data source creepiness and information disclosure on OBA effectiveness mediated by perceived intrusiveness and perceived vulnerability?*

To answer the research questions, the existing literature on OBA will be described and hypotheses will be formed. Afterwards, the research method is explained, followed by the results and an extensive discussion.

2. Theoretical Framework

2.1 Level of personalization

By tracking online behavior, companies know more and more about their (potential) customers. The data that is collected during this process can be used to target customers with relevant ads. Boerman et al. (2017) embrace this in their definition of OBA: “the practice of monitoring people’s online behavior and using the collected information to show people individually targeted advertisements” (p. 364). With online behavior, the authors mean browsing behavior, search actions, app usage, products bought, clicks, media usage and online communication, such as e-mails or text messages (Boerman et al., 2017).

One of the primary aspects of OBA is personalization. Personalization is used by organizations to deliver the right content at the right moment to consumers (Tam & Ho, 2006). Bol et al. (2018) define personalization as “the strategic creation, modification, and adaptation of content and distribution to optimize the fit with personal characteristics, interests, preferences, communication styles, and behaviors” (p. 373). One of the main benefits of personalization is that advertisements are more relevant and adapted to a specific consumer. Therefore, consumers pay more attention to personalized advertisements than to generic ads (Bang & Wojdyski, 2016). This enhances the effectiveness of the ad.

The level of personalization of an ad is determined by the type of personal data and the amount of personal data that is used to create an advertisement (Boerman et al., 2017). A highly personalized advertisement uses a greater amount of consumer-specific data than a low personalized advertisement. Bleier and Eisenbeiss (2015) describe two dimensions of personalization, namely depth and breadth. Depth is the extent to which an advertisement reflects the interests of the consumer. Breadth can be defined as how completely or extensively an advertisement reflects these interests (Bleier & Eisenbeiss, 2015).

Following this line of reasoning, a highly personalized advertisement would have high depth and narrow breadth, while a less personalized advertisement would have low depth. For instance, when a consumer visits an online shopping website, a lot of data are being generated by his or her behavior (e.g. products that are looked at, products that are added into the shopping cart, certain links that are clicked). When this person leaves the website, a highly personalized ad would contain the shop’s logo and a product that the person is interested in. A less personalized ad would merely contain the shop’s logo. In this way, more consumer data is needed to create highly personalized ads than to create less personalized ads.

Findings about the effectiveness of personalized advertisements are mixed. While a high level of personalization enhances the effectiveness of an ad through providing relevant

information to the customer, the personalization in itself might cause negative consumer responses (Boerman et al., 2017). These negative responses can be explained by psychological ownership theory, which states that people often have a feeling that they have ownership over external objects (Pierce, Kostova, & Dirks, 2001). Highly personalized ads can give consumers the perception that they have lost control and ownership over an external object, namely their personal data (Edwards, Li, & Lee, 2002), which is a violation of their freedom of choice (Boerman et al., 2017). This leads to several negative perceptions, such as feelings of intrusiveness (Van Doorn & Hoekstra, 2013) and feelings of vulnerability (Aguirre et al., 2015). These feelings negatively influence OBA effectiveness. Trust cues can be used to overcome this negative effect (Van Noort et al., 2013). However, without such cues, less personalized ads may lead to more OBA effectiveness than highly personalized ads that are presented by itself. This leads to the following hypotheses:

- H1:* Less personalized advertisements lead to more OBA effectiveness than highly personalized advertisements.
- H2:* The effects of level of personalization on OBA effectiveness are mediated by (a) perceived intrusiveness and (b) perceived vulnerability.

2.2 Data source creepiness

In order to personalize an advertisement, companies need to gather and use consumer data. However, it is not clearly demonstrated how consumers respond to the usage of various types of consumer data and which data sources they find creepy (Boerman et al., 2017). According to Moore et al. (2015), marketing becomes creepy when it breaches a consumer's personal space by invading privacy, showing signs of stalking behavior or violating social norms. This causes fear and discomfort. When consumers perceive a marketing effort such as a personalized advertisement to be creepy, the effect of the effort will become negative (Moore et al., 2015). The definition of creepy marketing can be applied to the sources of consumer data as well. In this study, data source creepiness is defined as the extent to which the usage of a data source induces fear and discomfort among consumers. Some data sources show more resemblance of creepiness than others. For example, reading along with someone's emails can be seen as stalking behavior, which leads to fear and discomfort. This implies that there could be a difference in consumer responses towards the use of different data sources.

Another data source that can be characterized as creepy is conversational data from an instant messaging app. Users of an instant messaging app may have the expectation that their conversations within the app stay private. Therefore, using information from a conversation

that happened in such an app could be seen as an invasion of privacy, which induces fear and discomfort. It could even be argued that using conversational data is unethical, as consumers did not disclose this information on an open platform and did not opt-in for the usage of this data. Information from a private conversation is more specific and distinctive for an individual consumer. Personalizing advertisements by using such information could lead to an ad that is seen as too specific and therefore creepy (Moore et al. 2015), which will lead to negative advertising effects. In contrast, advertisements that are based on browsing behavior do not necessarily identify a unique consumer (Van Doorn & Hoekstra, 2013), which makes the source less creepy. Also, consumers often opt-in for this sort of tracking through cookie notifications (Boerman et al., 2017).

Another important reason to investigate the effects of data collected from instant messaging apps in comparison with browsing behavior, is that these apps are gaining popularity in contrast to more open social media (Connelly & Osborne, 2017). This raises the possibility that data gathered from these platforms will be used for OBA more and more in the future and it is important to measure consumer responses to this development. As creepy data sources induce fear and discomfort, it can be expected that consumers experience higher levels of intrusiveness or vulnerability when they are exposed to advertisements based on creepier data sources, than when they are exposed to advertisements based on less creepy data sources. Additionally, it can be expected that a lower level of personalization makes an advertisement less distinctive and adapted to the consumer (Bleier & Eisenbeiss, 2015). This means that the consumer might not realize that he or she is exposed to OBA, which makes the data source less evident and important. When the advertisement is highly personalized, the consumer realizes quicker that he or she is exposed to OBA (Baek & Morimoto, 2012). As a highly personalized advertisement stands out more, it might let the data source that has been used for the personalization stand out more as well. This leads to the following interaction hypothesis:

H3: The negative effect of a high level of personalization on OBA effectiveness is stronger when a creepy data source is used than when a less creepy data source is used.

The negative effect of a creepy data source on OBA effectiveness can be explained by the negative effects on consumer perceptions. A creepier data source could raise people's realization that their private data is being used to show them personalized advertisements. This can give them a perceived loss of control, which enlarges their perceived intrusiveness and perceived vulnerability (Edwards, Li, & Lee, 2002). According to this line of reasoning, the following hypothesis can be proposed:

H4: The interaction effect of level of personalization and data source creepiness on OBA effectiveness is mediated by (a) perceived intrusiveness and (b) perceived vulnerability.

2.3 Information disclosure

To overcome the negative effects of OBA, companies can disclose information about the collection of personal data by means of information icons (Boerman et al., 2017). These icons have been developed by the industry itself and help to raise awareness and transparency about data collection. However, some studies show that consumers rarely notice the icons, as they are often unfamiliar with them and do not always understand their intent (Ur, Leon, Cranor, Shay, & Wang, 2012; Van Noort et al., 2013). This means that an icon in itself may not always be effective. Still, Van Noort et al. (2013) state that an explanatory text (e.g. naming the data on which the ad is based) may help to increase the effectiveness of disclosure icons. Information disclosure is expected to lead to more positive feelings towards an advertisement, as consumers like the company's transparency (Van Noort et al., 2013).

An additional value of information disclosure is that the transparency can weaken the negative effects of personalization on consumer perceptions. Aguirre et al. (2015) show that feelings of vulnerability are not aroused when a highly personalized advertisement is accompanied by an information icon. Furthermore, transparency does not only lead to more positive feelings towards an advertisement, but also towards the advertiser (Van Noort et al., 2013). This would imply that personalization has a positive effect when it is accompanied by a disclosure icon. Opposingly, using a disclosure icon in combination with a low personalized advertisement, might cause a negative effect. The disclosure icon raises persuasion knowledge and shows consumers that they have been targeted (Baek & Morimoto, 2012), but the ad is less relevant to them than a highly personalized ad. When a consumer realizes that he or she is targeted, but the advertisement is not relevant, negative perceptions are raised (Boerman et al., 2017). Thus, the following two hypotheses are proposed:

H5: The use of a high level of personalization whereby information disclosure is present leads to more OBA effectiveness than the use of a high level of personalization whereby information disclosure is absent.

H6: The use of a low level of personalization whereby information disclosure is absent leads to more OBA effectiveness than the use of a low level of personalization whereby information disclosure is present.

The negative effect of a highly personalized ad whereby information disclosure is absent can be explained by consumer perceptions. When consumers are exposed to a highly

personalized ad without information about the data on which the ad is based, they can experience negative feelings and perceptions, especially when the data is gathered covertly (Aguirre et al., 2015). Showing information disclosure can serve as a token of a company's goodwill to inform consumers (Van Noort et al., 2013). This can reduce the perceived intrusiveness and perceived vulnerability. Therefore, it can be expected that the effect of information disclosure on OBA effectiveness is mediated by consumer perceptions, which leads to the following hypothesis:

H7: The interaction effects of level of personalization and information disclosure on OBA effectiveness are mediated by (a) perceived intrusiveness and (b) perceived vulnerability.

As it can be expected that less creepy data sources induce less negative feelings among consumers than creepy data sources, it could be the case that the presence or absence of information disclosure will not make a difference when you base the ad on less creepy data. In contrast, the absence of disclosure in combination with the use of a creepier source, could arouse more negative feelings among consumers. A creepy data source can already lead to negative effects, but the absence of a disclosure icon can give consumers the feeling that their data is being used covertly (Aguirre et al., 2015). Furthermore, the level of personalization can also have a role in this, as a highly personalized advertisement can arouse more OBA awareness than a low personalized advertisement (Bleier & Eisenbeiss, 2015). This could make the data source that is being used in the presence of a disclosure icon more important.

Therefore, it can be expected that there is a three-way interaction effect between the independent variables. A highly personalized advertisement, which is based on a less creepy data source and which is accompanied by information disclosure, would be the most preferable situation for both consumers and advertisers. One of the reasons for this is that the advertisement is highly relevant to the consumer (Boerman et al., 2017). Also, the data source does not arouse a large amount of feelings of intrusiveness and vulnerability among consumers, as it is less creepy (Moore et al., 2015). Lastly, the information disclosure notifies the consumer about the ad and the data source. This also causes the consumer to experience less negative feelings (Aguirre et al., 2015). Furthermore, the disclosure raises persuasion knowledge (Baek & Morimoto, 2012), which makes it easier for a consumer to resist to the persuasive tactics of the advertiser (Friestad & Wright, 1994). So, an ad that meets these conditions will serve as the most positive outcome for consumers. For advertisers this outcome is positive too, as lower negative feelings will expectedly lead to more OBA effectiveness. This leads to the following hypotheses:

- H8:* The use of a high level of personalization leads to more OBA effectiveness, but only in combination with a less creepy data source and the presence of information disclosure.
- H9:* The three-way interaction effect of level of personalization, data source creepiness and information disclosure on OBA effectiveness is mediated by (a) perceived intrusiveness and (b) perceived vulnerability.

The conceptual model that follows from these hypotheses is visualized in Figure 1.

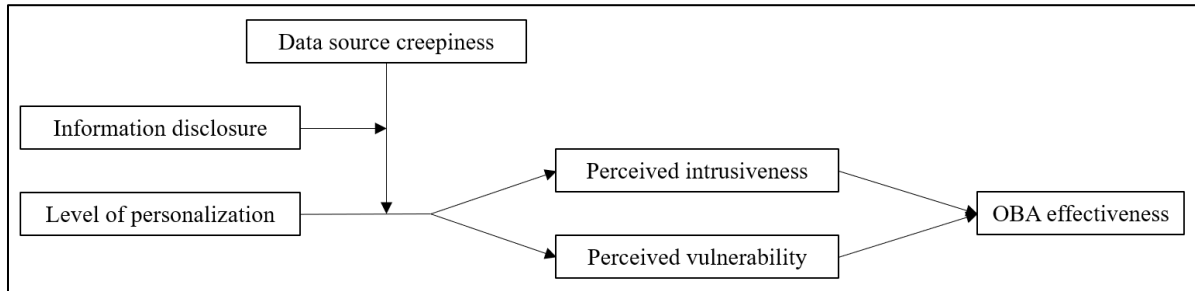


Figure 1. Conceptual model of the variables related to OBA effectiveness.

3. Method

3.1 Design

A scenario-based 2 (level of personalization: high vs. low) $\times 2$ (data source creepiness: less creepy vs. creepier) $\times 2$ (information disclosure: presence vs. absence) between-subjects design was executed. The scenario that was created to test the hypotheses involved a fictional bank, named DGI Bank. A fictional organization was used to prevent bias caused by former reputation or brand preference (Laufer & Jung, 2010). Two pre-tests were conducted before the main study was designed.

3.2 Pre-test 1

The first pre-test involved a scenario-based between-subjects experiment with two conditions (level of personalization: high vs. low), a questionnaire about the trust and attitude towards fictitious bank names and a scale to test the creepiness of various data sources. In total, 43 Dutch respondents participated, of which 53% were male ($N = 23$). Respondents' age ranged from 20 to 35 with a mean age of 23.33 ($SD = 5.76$).

Firstly, respondents read a scenario which stated that they were looking for a mortgage (high personalization) or a car loan (low personalization). After searching for information, they were exposed to an ad from a bank, containing a text about mortgages and a button to plan a meeting. It was chosen to manipulate the scenario instead of the advertisement, to prevent confounding effects. Yet, the level of manipulation was not correctly manipulated in this first pre-test as there was no significant difference in the perceived personalization of the ad. More elaboration on the experiment can be found in Appendix A.

To prevent effects caused by the context and name in the main study, the perceived trustworthiness of- and purchase intention towards three different fictitious bank names were rated by respondents. The items used to measure trustworthiness and purchase intention can be found in Table A1 in Appendix A. All items were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree". Table A2 in Appendix A shows the trust and attitude scores towards the three names. Paired sampled t-tests have shown that there are no significant differences between the trust and attitude scores of the bank names. The name DGI Bank was chosen for the main study, as the trust and purchase intention scores for this name were the closest to the average scores.

Lastly, as current literature gave no clear description of which data sources are seen as most and least creepy, respondents were asked to indicate the amount of fear and discomfort that they would experience towards the use of various data sources. The creepiness of the data

Table 1

Mean scores and standard deviations of the creepiness of different data sources.

Data source	Creepiness	
	<i>M</i>	<i>SD</i>
1. Microphone of a mobile phone that picks up conversations	6.65	.61
2. Whatsapp conversations	6.58	.73
3. E-mail conversations	6.51	.63
4. Facebook Messenger conversations	6.33	.92
5. Conversations with a voice assistant	5.81	1.44
6. Location data	4.63	1.65
7. Behavior on social media	3.81	1.53
8. Demographic data	3.70	1.61
9. Search behavior in Google	3.49	1.74
10. Purchase history in a webshop	3.28	1.70
11. Products that have been looked at in a webshop in the past	2.88	1.43
12. Advertisements that have been clicked in the past	2.63	1.43

sources was measured on a 7-point Likert scale ranging from “completely not” to “very strongly”. Table 1 shows the creepiness scores for the different data sources. The list of data sources that was used is based on a brainstorm session held with several experts on the topic of OBA and on manipulations that were used in existing literature. For each respondent, the list was randomly ordered. The data source with the highest creepiness score was the microphone of a mobile phone ($M = 6.65$, $SD = .61$) and the data source with the lowest creepiness score was an advertisement that has been clicked in the past ($M = 2.63$, $SD = 1.43$).

3.3 Pre-test 2

As the level of personalization manipulation did not differ significantly across conditions in the first pre-test, a second pre-test was conducted. This time, not the scenario but the advertisement was manipulated. A within-subjects experiment was conducted with 3 conditions. In total, 21 Dutch respondents agreed to participate in the study, of which 62% were male ($N = 13$). Respondents' age ranged from 17 to 52, with a mean age of 23.76 ($SD = 6.79$).

During the study, respondents read that they were looking for a mortgage and searched for information online. Afterwards they were exposed to three advertisements. These ads were shown on their own, not on a certain website. The subjects presented in the ads were mortgage advice, opening a bank account and getting advice for stock trading. The former was a high personalized ad, while the latter two are less personalized. After looking at the ad, respondents were asked to answer statement regarding the level of personalization of the ad, based on the four-item scale adapted from Dijkstra (2005), measured on a 7-point Likert scale ranging from “strongly disagree” to “strongly agree”. All statements are listed in Table B1 in Appendix B.

Table 2

Paired samples t-test outcomes for the level of personalization manipulation checks.

	<i>df</i>	<i>t</i>	<i>p</i>
HP-LP1	20	9.52	< .001
HP-LP2	20	11.17	< .001
LP1-LP2	20	2.23	.038

Note: HP = High personalization (mortgage ad); LP1 = Low personalization 1 (bank account ad); LP2 = Low personalization 2 (stock trading ad).

The high personalized mortgage ad had a mean score of 5.96 ($SD = .80$). The low personalized bank account ad had a mean score of 2.54 ($SD = 1.24$) and the low personalized stock trading ad had a mean score of 2.10 ($SD = 1.17$). The three advertisements' personalization scores differed significantly, as can be seen in Table 2. Thus, the level of personalization was successfully manipulated in the second pre-test.

Next to this, respondents' trust in- and attitude towards Facebook were measured on a 7-point Likert scale ranging from "strongly disagree" to "strongly agree". A full list of items used can be found in Table B1 in Appendix B. Aguirre et al. (2015) state that the negative effect of OBA is larger on websites that have low trust. Results show that the trust in Facebook was indeed low ($M = 2.70$, $SD = 1.20$), while the attitude towards Facebook was neutral ($M = 4.27$, $SD = 1.20$). Thus, Facebook was chosen as the platform on which the advertisements would be shown during the main study.

3.4 Stimulus materials and procedure

After conducting the pre-tests, the stimuli for the main study were developed. The experiment involved eight different scenarios. Respondents were randomly assigned to one of the scenarios in which the independent variables were manipulated. In these scenarios, respondents read that they were looking for mortgage advice. The way in which they searched for advice, was dependent upon the data source manipulation. In the low creepiness condition, respondents read that they were searching online for information about mortgages and clicked on an advertisement leading to the website of the DGI Bank. In the high creepiness condition, respondents read that they asked a friend about mortgages through Whatsapp. This friend informed the respondent that he has a mortgage at the DGI Bank. It was chosen not to use the microphone of a mobile phone as the high creepiness condition, as there is quite some ambiguity about the technical possibility to eavesdrop through people's phones (Martinez, 2017). At the end of the scenario, respondents read that they still needed mortgage advice, but that they did not take action yet. Afterwards, the scenario stated that respondents visited Facebook and saw an ad. In this ad, the level of personalization was manipulated. Respondents either saw an ad

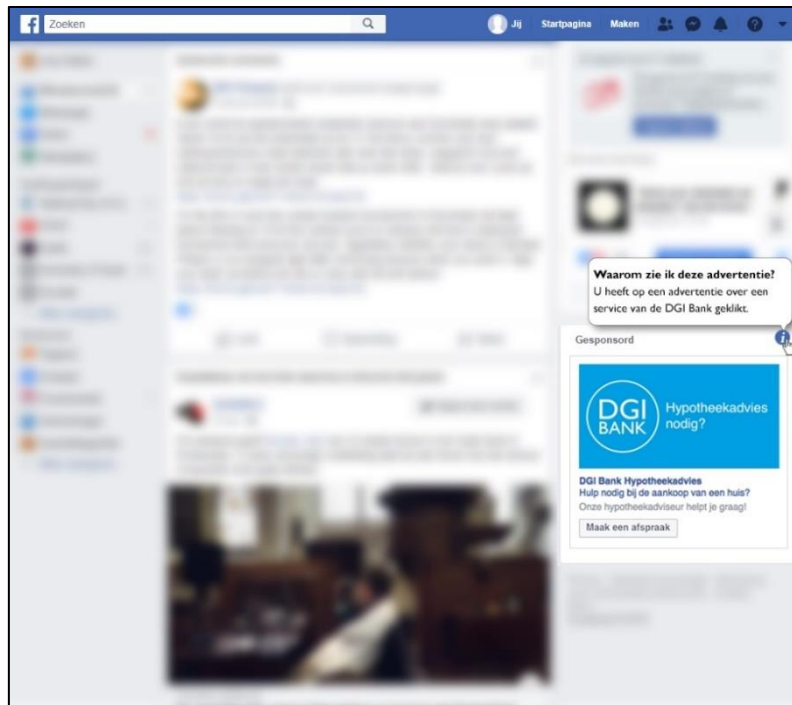


Figure 2. Example of a condition with a high personalized ad, low creepiness and presence of disclosure.

about mortgage advice (high personalization) or saw an ad about stock trading advice (low personalization). In this same screen, information disclosure was manipulated by either including or excluding an information icon above the advertisement. The icon contained information about the data source on which the ad was based. Figure 2 shows an example of an advertisement. After the reading the scenario and looking at the advertisement, respondents were asked to answer statements regarding the dependent variables.

To make sure that respondents read the scenarios extensively, they were notified that they needed to answer questions about the content of the scenario later. These questions were asked at the end of the survey, as a manipulation check.

3.5 Participants

Dutch people that are familiar with the use of instant messaging apps and online shops were selected as the participants for this study. To reach participants, a convenience sampling approach was used. Furthermore, a snowballing technique was used by asking respondents to share the survey within their own network. A total of 297 Dutch respondents participated in the research. Yet, data of 15 respondents had to be discarded, as they clicked through the pages with the stimulus materials too quickly, implying that they did not read the scenario and did not look at the ad. Therefore, data from 282 responses were used for the analyses. Of these 282 participants, 59% were female ($N = 167$). Respondents' age ranged from 15 to 62, with a mean

Table 3
Overview of respondents' demographic data per condition.

Condition	Age		Gender		Edu						Facebook user				Total	
	M	SD	Male	Female	Uni	HPE	SVE	PUE	SGSE	PVSE	A	B	C	D	N	%
			N	N	N	N	N	N	N	N	N	N	N	N		
1. HP-HC-PoD	25.05	8.79	17	20	25	6	0	3	3	0	26	4	6	1	37	13.12
2. LP-HC-PoD	27.49	10.72	18	17	24	9	0	1	0	1	29	5	1	0	35	12.41
3. HP-HC-AoD	25.75	7.89	17	19	21	7	3	1	2	2	31	4	0	1	36	12.77
4. LP-HC-AoD	30.82	12.79	13	21	14	12	3	3	1	1	24	6	2	2	34	12.06
5. HP-LC-PoD	26.77	10.38	10	25	18	11	2	4	0	0	30	4	1	0	35	12.41
6. LP-LC-PoD	24.44	6.80	17	17	20	8	1	3	1	1	27	6	1	0	34	12.06
7. HP-LC-AoD	28.67	10.92	10	26	16	14	2	4	0	0	30	4	1	1	36	12.77
8. LP-LC-AoD	27.80	11.89	13	22	24	6	0	3	1	1	30	2	1	2	35	12.41
Total	27.08	10.24	115	167	162	73	11	22	8	6	227	35	13	7	282	100

Note: HP = High personalization; LP = Low personalization; LC = Low creepiness; HC = High creepiness; PoD = Presence of disclosure; AoD = Absence of disclosure; Uni = University; HPE = Higher professional education; SVE = Secondary vocational education; PUE = Pre-university education; SGSE = Senior general secondary education; PVSE = Pre-vocational secondary education; A = Yes; B = Yes, but I rarely use it; C = No, I deleted my account; D = No, and I never had an account.

age of 27.08 ($SD = 10.24$). A full overview of demographic characteristics of the respondents per experimental condition is listed in Table 3.

3.6 Manipulation checks

A manipulation check was conducted to test whether the stimulus materials were correctly manipulated. All items were measured on a 7-point Likert scale ranging from “Strongly disagree” to “Strongly agree”. The level of personalization manipulation was tested with four items (“The advertisement was directed to me personally”, “I recognized my personal situation in the advertisement”, “The advertisement took into account the problem I faced” and “The advertisement took into account my personal situation”, $\alpha = .82$). Independent samples t-test results show that the mean scores of respondents in the high personalization condition ($M = 4.65$, $SD = 1.38$) were significantly higher than the mean scores of respondents in the low creepiness condition ($M = 3.39$, $SD = 1.65$, $t(267.71) = 6.94$, $p < .001$). Therefore, the level of personalization was correctly manipulated.

Next to this, two items (“The scenario mentioned that I searched the internet for a mortgage” and “The scenario mentioned that I talked to a friend about a mortgage via Whatsapp”, $\alpha = .90$) were used to check the data source creepiness manipulation. The latter item was reversely coded before conducting the analyses. Respondents in the low creepiness condition agreed with the statements with a mean score of 1.83 ($SD = 1.15$), while respondents in the high creepiness condition agreed with the statements with a mean score of 6.35 ($SD = .93$). These scores differ significantly ($t(269.89) = 36.34$, $p < .001$), thus the data source was successfully manipulated.

Lastly, the information disclosure manipulation was checked with one item (“The advertisement contained a pop-up with the text: why do I see this advertisement?”). Respondents in the presence of disclosure condition indicated that they saw a disclosure icon ($M = 6.12$, $SD = 1.47$), while respondents in the absence of disclosure condition indicated that they did not see an icon ($M = 2.53$, $SD = 1.38$). These scores are significantly different ($t(280) = 21.12$, $p < .001$), which implies that the information disclosure manipulation was successful. After performing the three manipulation checks, respondents that answered the statements incorrectly were not removed from the sample, as this can lead to serious bias in the final results (Aronow, Baron, & Pinson, 2016).

3.7 Measures

3.7.1 Mediators

After reading the scenario and looking at the advertisement, respondents were asked to answer several statements. All statements were measured on a 7-point Likert scale ranging from “Strongly disagree” to “Strongly agree”. The full list of items and their reliability scores can be found in Table C1 in Appendix C. First, perceived intrusiveness was measured with nine items, adapted from Bleier and Eisenbeiss (2015), and perceived vulnerability was measured with the scale by Aguirre et al. (2015), consisting of five items.

3.7.2 Dependent variables

The dependent variable in this investigation, OBA effectiveness, was operationalized by measuring click-through intention and purchase intention. Click-through rates are often used in practice to evaluate the effectiveness of an advertisement (Aguirre et al., 2015). Therefore, the intention to click-through on an advertisement is a relevant variable to measure OBA effectiveness with in an experimental setting. Furthermore, purchase intention is a relevant variable that is often measured in past research related to consumer behavior and it can serve as the outcome of an advertisement (Van Doorn & Hoekstra, 2013). The click-through intention was measured with a one-item scale adapted from Yoo (2007), and purchase intention was measured with the scale by Grewal et al. (1998), consisting of three items. Also, to control for the influence of Facebook as a platform, respondents’ trust in Facebook was measured with the five item scale by Walsh et al. (2009), and respondents’ attitude towards Facebook was measured with the six item scale by Chen and Wells (1999). This did not cause any individual differences in effects.

3.7.3 Covariates

The bank used in the scenario was a fictitious bank. Still, respondents could have had pre-existing attitudes towards the banking sector in general. To overcome effects caused by possible differences in such attitudes, trust in the advertiser was included in the model as a covariate. Trust was measured using a five-item scale by Walsh et al. (2009).

As it could be the case that the hypothesized effects would be stronger for respondents with higher privacy concerns, this variable was measured as a covariate as well. Respondents’ privacy concerns were measured with a four-item scale adapted from Sheng, Nah, and Siau (2008).

4. Results

4.1 Preparatory tests

Before conducting analyses to test the hypothesized effects, it was tested whether the covariates could be used. Trust in the advertiser was not significantly different across conditions, which implies that scores were evenly distributed among the groups. Respondents' privacy concerns, however, were significantly different between the two data source creepiness conditions. Therefore, trust in the advertiser was included as a covariate in all analyses, while privacy concerns was not included as a covariate in further analyses. An analysis of covariance was performed to test the effect of the covariate. Results show that trust in the advertiser significantly predicts click-through intention ($F(1, 273) = 72.87, p < .001$) and purchase intention ($F(1, 273) = 148.76, p < .001$) scores.

To identify outliers, the standardized residuals were calculated by means of two ANCOVA's, including the independent variables, covariate and (separate) dependent variables from this study. Two cases had a notable standardized residual value, namely 3.00 and -3.04. However, these cases were still included in further analyses, as it is acceptable to include cases with a standardized residual value between -3.29 and 3.29 (Field, 2014).

4.2 The main effect of level of personalization

To test the hypothesized effects, Hayes' process macro was used. The model that was executed to test the effects was model 12, with level of personalization, data source creepiness and information disclosure as independent variables, perceived intrusiveness and perceived vulnerability as mediators, click-through intention and purchase intention as dependent variables and trust in the advertiser as covariate. It was decided to use the process macro instead of a multivariate analysis of covariance, because the whole conceptual model could not be included in a MANCOVA. As only one dependent variable can be included in the process model, it was executed twice to test the effects on both dependent variables. The explained variance of the full model was statistically significant for click-through intention ($R^2 = .29, F(10,271) = 11.29, p < .001$) and purchase intention ($R^2 = .46, F(10,271) = 22.71, p < .001$). The mean scores and standard deviations of click-through intention and purchase intention for each of the conditions can be found in Table 5.

Results show that the direct effects of level of personalization on click-through intention ($\beta = 5.46, t(271) = 3.15, p < .01$) and purchase intention ($\beta = 3.43, t(271) = 2.53, p < .05$) were both significant. A separate analysis of covariance shows that the click-through intention ($M_{\text{High}} = 3.07, SD_{\text{High}} = 1.79; M_{\text{Low}} = 2.32, SD_{\text{Low}} = 1.51; F(1, 273) = 16.17, p < .001$) and the

Table 5

Descriptive statistics for the dependent variables.

Dependent variable	Level of personalization		Data source creepiness		Information disclosure	
	High	Low	Less creepy	Creepy	Presence	Absence
Click-through intention	$M = 3.07$ $SD = 1.79$	$M = 2.32$ $SD = 1.51$	$M = 2.71$ $SD = 1.69$	$M = 2.70$ $SD = 1.71$	$M = 2.65$ $SD = 1.65$	$M = 2.75$ $SD = 1.75$
Purchase intention	$M = 3.55$ $SD = 1.52$	$M = 2.90$ $SD = 1.44$	$M = 3.28$ $SD = 1.56$	$M = 3.18$ $SD = 1.47$	$M = 3.21$ $SD = 1.49$	$M = 3.26$ $SD = 1.55$

purchase intention ($M_{\text{High}} = 3.55$, $SD_{\text{High}} = 1.52$; $M_{\text{Low}} = 2.90$, $SD_{\text{Low}} = 1.44$; $F(1, 273) = 16.86$, $p < .001$) were significantly higher among respondents who were exposed to an ad with a high level of personalization than among respondents who were exposed to an ad with a low level of personalization. These results indicate that hypothesis 1 is not supported, but the opposite of the hypothesized effect is supported.

As a second step in the mediation model, the effects of level on personalization on perceived intrusiveness and perceived vulnerability were tested. However, the effects of level of personalization on perceived intrusiveness ($\beta = -1.69$, $t(273) = -1.17$, $p = .24$) and perceived vulnerability ($\beta = -.84$, $t(273) = .50$, $p = .62$) turned out to be statistically insignificant. Table C2 in Appendix C presents the correlations of perceived intrusiveness, perceived vulnerability, click-through intention and purchase intention. As the independent variable does not influence one of the mediating variables, no further steps were taken to analyze the mediation effect. This implies that hypotheses 2a and 2b could not be supported.

4.3 Interaction effects

4.3.1 Level of personalization $\times$ Data source creepiness

Process results show that the direct effects of data source creepiness on click-through intention ($\beta = 3.27$, $t(271) = 1.88$, $p = .06$) and purchase intention ($\beta = 2.46$, $t(271) = 1.80$, $p = .07$) were both marginally significant. The interaction of level of personalization and data source creepiness also was a statistically significant predictor of click-through intention ($\beta = -2.75$, $t(271) = -2.51$, $p < .05$) and a marginally significant predictor of purchase intention ($\beta = -1.61$, $t(271) = -1.88$, $p = .06$). Figures 3 and 4 show plots of these interaction effects. An ANCOVA was executed to test the simple effects between conditions. Results show that there are no significant differences between the combined conditions of level of personalization and data source creepiness on click-through intention and purchase intention. Therefore, hypothesis 3 could not be supported.

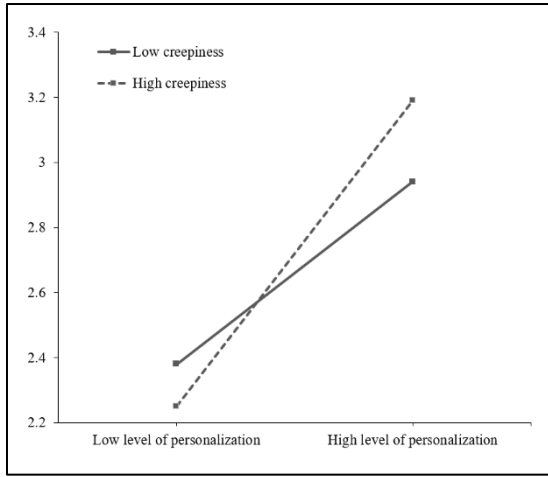


Figure 3. Interaction effect of level of personalization and data source creepiness on click-through intention.

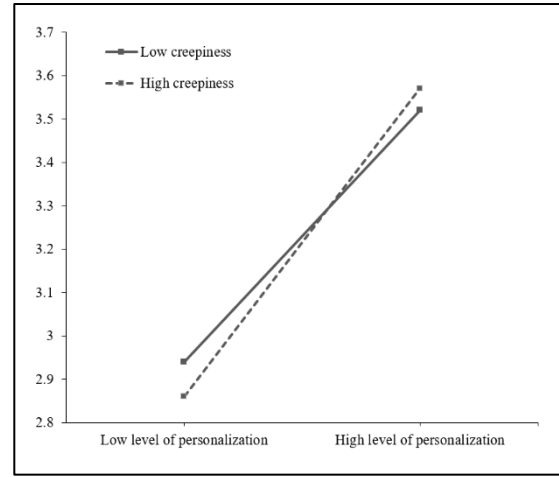


Figure 4. Interaction effect of level of personalization and data source creepiness on purchase intention.

Furthermore, the mediated interaction effect was tested. The interaction effects on perceived intrusiveness ($\beta = .42$, $t(273) = .46$, $p = .64$) and perceived vulnerability ($\beta = .20$, $t(273) = .19$, $p = .85$) were insignificant. Therefore, further steps were not taken to test the mediation effect, which implies that hypotheses 4a and 4b are not supported.

4.3.2 Level of personalization $\times$ Information disclosure

The direct effect of information disclosure on click-through intention ($\beta = 3.47$, $t(271) = 1.99$, $p < .05$) was found to be statistically significant and the direct effect on purchase intention ($\beta = 2.54$, $t(271) = 1.85$, $p = .06$) was marginally significant. The interaction effects of level of

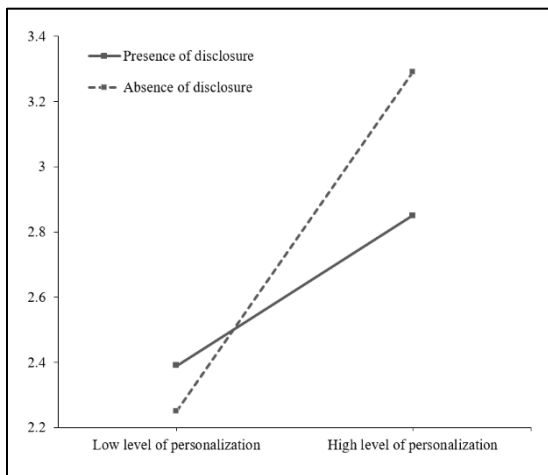


Figure 5. Interaction effect of level of personalization and information disclosure on click-through intention.

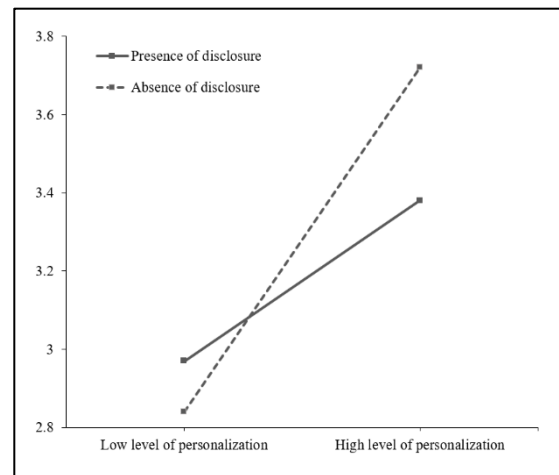


Figure 6. Interaction effect of level of personalization and information disclosure on purchase intention.

personalization and information disclosure on click through intention ($\beta = -2.83$, $t(271) = -2.59$, $p < .05$) and purchase intention ($\beta = -1.76$, $t(271) = -2.05$, $p < .05$) were both statistically significant. Figures 5 and 6 show plots of these interaction effects. ANCOVA results reveal that there were marginally significant differences in click-through intention ($F(1, 141) = 3.01$, $p = .09$) and purchase intention ($F(1, 141) = 2.96$, $p = .09$) for two conditions. Respondents that were exposed to an ad with a high level of personalization in the absence of disclosure, showed significantly higher click-through intentions ($M_{\text{High} \times \text{Absence}} = 3.29$ vs. $M_{\text{High} \times \text{Presence}} = 2.85$) and purchase intentions ($M_{\text{High} \times \text{Absence}} = 3.72$ vs. $M_{\text{High} \times \text{Presence}} = 3.38$) than respondents exposed to an ad with a high level of personalization in the presence of information disclosure. Thus, information disclosure interacts with level of personalization, but only when there is a high level of personalization. As the absence of disclosure causes higher click-through intentions and purchase intentions than the presence of disclosure in a high level of personalization condition, the opposite of hypothesis 5 is supported. No effects were found for the low level of personalization conditions, so hypothesis 6 is not supported.

The interaction effects of level of personalization and information disclosure on perceived intrusiveness ($\beta = .64$, $t(273) = .70$, $p = .48$) and perceived vulnerability ($\beta = .20$, $t(273) = .19$, $p = .85$) turned out to be statistically insignificant. Further steps were not taken to analyze the mediated interaction effects. Therefore, hypotheses 7a and 7b are not supported.

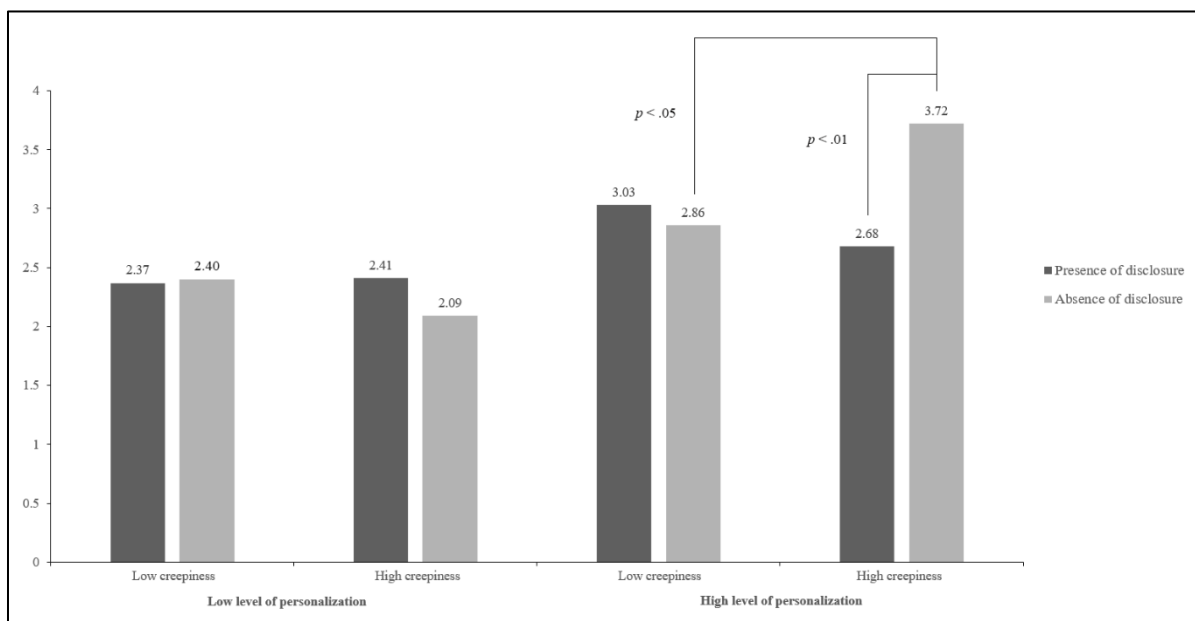


Figure 7. Interaction effect of level of personalization, data source creepiness and information disclosure on click-through intention.

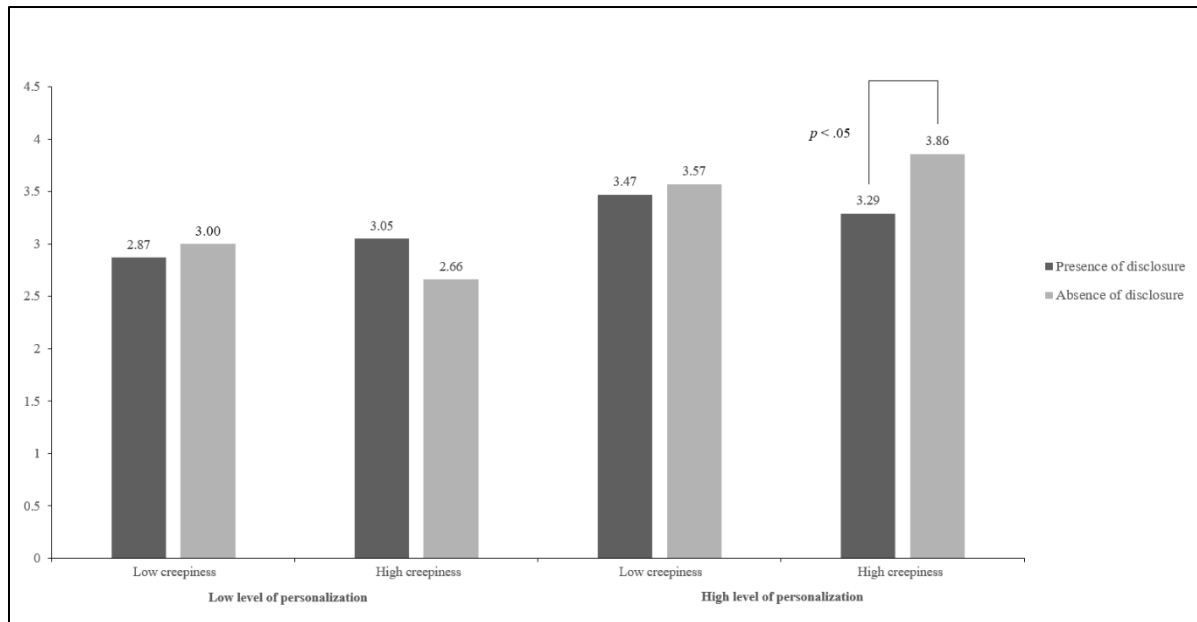


Figure 8. Interaction effect of level of personalization, data source creepiness and information disclosure on purchase intention.

4.3.3 Level of personalization × Data source creepiness × Information disclosure

This study also hypothesized a three-way interaction effect between all independent variables. Process results show that the three-way interaction significantly predicted click-through intention ($\beta = 1.59$, $t(271) = 2.29$, $p < .02$) and marginally significant predicted purchase intention ($\beta = .95$, $t(271) = 1.74$, $p = .08$). Figures 7 and 8 show visual representations of these three-way interaction effects. To test the simple effects, an ANCOVA was executed. Results show that there were no significant differences between the four low personalization conditions in combination with data source creepiness and information disclosure for both dependent variables. For click-through intention, two significant differences were found in the high personalization conditions. One significant difference was found for purchase intention in the high personalization conditions.

Firstly, results show significant differences in click-through intention ($F(1, 139) = 8.70$, $p < .01$) and purchase intention ($F(1, 139) = 4.32$, $p < .05$) between two conditions. Respondents that were exposed to a highly personalized ad, based on a creepy data source without information disclosure showed significantly higher click-through intentions ($M_{\text{High} \times \text{Creepy} \times \text{Absence}} = 3.72$ vs. $M_{\text{High} \times \text{Creepy} \times \text{Presence}} = 2.68$) and purchase intentions ($M_{\text{High} \times \text{Creepy} \times \text{Absence}} = 3.86$ vs. $M_{\text{High} \times \text{Creepy} \times \text{Presence}} = 3.29$) than respondents that were exposed to a highly personalized ad, based on a creepy data source with information disclosure. Secondly, there was another significant difference between two conditions for click-through intention ($F(1, 139) = 5.89$, $p < .05$). Respondents that were exposed to a highly personalized ad without information

disclosure, based on a creepy data source showed significantly higher click-through intentions ($M_{\text{High} \times \text{Creepy} \times \text{Absence}} = 3.72$ vs. $M_{\text{High} \times \text{Less Creepy} \times \text{Absence}} = 2.86$) than respondents that were exposed to a highly personalized ad without information disclosure, based on a less creepy data source. Based on the results above, the most preferable condition was a highly personalized ad, based on a creepy data source without information disclosure. This was not the three-way interaction effect that was expected in hypothesis 8, so this hypothesis is not supported. Still, other three-way interaction effects were found.

Next to this, the mediated interaction effects were tested. There were no significant three-way interaction effects found on perceived intrusiveness ($\beta = -.30$, $t(273) = .52$, $p = .60$) and perceived vulnerability ($\beta = .02$, $t(273) = .03$, $p = .98$). Therefore, hypotheses 9a and 9b are not supported. Table 6 shows an overview with the outcomes for all hypotheses.

Table 6
Outcomes of hypothesis testing.

Hypothesis	Outcome
<i>H1</i> Less personalized advertisements lead to more OBA effectiveness than highly personalized advertisements.	Opposite supported
<i>H2</i> The effects of level of personalization on OBA effectiveness are mediated by (a) perceived intrusiveness and (b) perceived vulnerability.	Not supported
<i>H3</i> The negative effect of a high level of personalization on OBA effectiveness is stronger when a creepy data source is used than when a less creepy data source is used.	Not supported
<i>H4</i> The interaction effect of level of personalization and data source creepiness on OBA effectiveness is mediated by (a) perceived intrusiveness and (b) perceived vulnerability.	Not supported
<i>H5</i> The use of a high level of personalization whereby information disclosure is present leads to more OBA effectiveness than the use of a high level of personalization whereby information disclosure is absent.	Opposite supported
<i>H6</i> The use of a low level of personalization whereby information disclosure is absent leads to more OBA effectiveness than the use of a low level of personalization whereby information disclosure is present.	Not supported
<i>H7</i> The interaction effects of level of personalization and information disclosure on OBA effectiveness are mediated by (a) perceived intrusiveness and (b) perceived vulnerability.	Not supported
<i>H8</i> The use of a high level of personalization leads to more OBA effectiveness, but only in combination with a less creepy data source and the presence of information disclosure.	Not supported (other three-way interaction supported)
<i>H9</i> The three-way interaction effect of level of personalization, data source creepiness and information disclosure on OBA effectiveness is mediated by (a) perceived intrusiveness and (b) perceived vulnerability.	Not supported

5. Discussion

The aim of this study was to experimentally investigate the effects of level of personalization (high vs. low), data source creepiness (less creepy vs. creepy) and information disclosure (presence vs. absence) on OBA effectiveness. It was hypothesized that the three independent variables interacted with each other. Also, perceived intrusiveness and perceived vulnerability were expected to mediate the effects of the independent variables on OBA effectiveness.

5.1 Discussion of the results

This study found that a high level of personalization leads to more OBA effectiveness than a low level of personalization, which opposes the expected effect. A reason for this could be that consumers simply like advertisements to be relevant and suiting to their needs. This study also did not find evidence for an effect of level of personalization on negative consumer perceptions, such as perceived intrusiveness and perceived vulnerability. The lack of this negative effect might explain why OBA effectiveness was higher for highly personalized ads too. Findings in current research are mixed, so the effect of personalization found in this study is conflicting with some previous investigations, but consistent with others (see Boerman et al., 2017). This might be an indication that the relation of level of personalization and OBA effectiveness is very context-dependent. For instance, Bleier and Eisenbeiss (2015) found that a highly personalized ad caused higher click-through intentions than a low personalized ad, but only for trusted advertisers. Additionally, Aguirre et al. (2015) only found this positive effect when the ad was shown on a trusted website.

Next to this, it was expected that the level of personalization would only positively influence OBA effectiveness when the creepiness of the data source was low. However, a highly personalized ad caused more OBA effectiveness than a low personalized ad, regardless of the data source that was used to personalize the ad. This is an interesting finding, as it was expected that a creepy data source would serve as an invasion of one's personal space (Moore et al., 2015), which would affect consumer perceptions negatively. Yet, the interaction did not cause any differences in perceived intrusiveness or perceived vulnerability. A possible explanation for this insignificant effect in the high personalization condition could be that the relevance of the advertisement took away the negative impact of the data source. Zhu and Chang (2016) show that the perceived relevance of an advertisement mitigates the feeling of privacy invasion that can be caused by a personalized ad. Following this line of reasoning, the perceived benefits of a highly personalized ad might outweigh the feelings of fear and discomfort that are generated by a creepy data source. This can explain why a creepy data source did not lower

OBA effectiveness in the high personalization condition. In the low personalization condition, it was already expected that the data source would not cause a difference in OBA effectiveness, as the advertisement was less distinctive and adapted to the consumer (Bleier & Eisenbeiss, 2015). Therefore, the consumer would not notice that he or she was exposed to a personalized advertisement, based on either creepy- or less creepy data.

Thirdly, it was predicted that a high level of personalization would only have a positive effect on OBA effectiveness when it was accompanied by information disclosure. However, results of this study have shown that OBA effectiveness was higher when the information disclosure was absent in a high personalization condition. Thus, this experiment has shown that being transparent about personalization and the collected data does not always lead to higher OBA effectiveness, which is opposing to a reasonable amount of studies (e.g. Aguirre et al., 2015; Van Noort et al., 2013). The information disclosure could have had a backfiring effect for the advertiser, because it raised OBA awareness and persuasion knowledge (Baek & Morimoto, 2012). This is a positive finding for consumers, as persuasion knowledge helps them to resist to advertising strategies, which explains why OBA effectiveness decreases (Friestad & Wright, 1994). For low personalized advertisements, it was expected that the OBA effectiveness would be higher when information disclosure was absent. Yet, results show that it did not matter whether there was information disclosure present or absent, which is in line with findings by Aguirre et al. (2015). These authors also did not find an effect of information disclosure for low personalized advertisements. A reason for this could be that, in general, consumers do not pay attention to the icons or do not understand their purpose (Ur et al., 2012; Van Noort et al., 2013). In a low personalization condition, consumers might not notice that they are exposed to a personalized advertisement, which could make the information disclosure less important, comprehensible or outstanding.

Furthermore, the results of this study have shown that, for a low personalized ad, it does not make a difference whether it is based on creepy or less creepy data and whether it is accompanied by information disclosure. For a highly personalized ad, it was expected that it would be best to base it on a less creepy data source and accompany it with information disclosure. However, the opposite was found. Consumers that were exposed to an ad with high personalization had the most click-through intentions and purchase intentions when it was based on a creepy data source and information disclosure was absent. As informing consumers about the usage of creepy data sources lowers OBA effectiveness, it could also be argued that consumers do not like the usage of such sources. Additionally, being exposed to a highly personalized ad with information disclosure raises OBA awareness (Baek & Morimoto, 2012),

which makes consumers aware of the persuasive tactics of the ad. This raises their defences (Friestad & Wright, 1994). When consumers read which data source was used for the ad in the information disclosure, they resist to the persuasion attempt, which lowers OBA effectiveness.

The results of this study also imply that it is better to leave out information disclosure when a highly personalized ad is based on a creepy data source than when the ad is based on a less creepy data source. The findings of the negative effect of information disclosure might be explained by the design of this experiment. Some previous studies mentioned in their scenarios whether data was collected overtly or covertly (e.g. Aguirre et al., 2015). This study used a different approach, by mentioning the data source in the scenario and either including or excluding an information disclosure message. Whether the data was collected overtly or covertly was not mentioned before being exposed to the ad. In this way, resistance to OBA was not influenced before the exposure to the personalized ad, but by showing (or not showing) the consumer information disclosure during the exposure to the ad. Consumers seem to dislike being informed about the usage of a creepy data source for a highly personalized ad, as it lowers OBA effectiveness. In contrast, when a highly personalized ad was accompanied by information disclosure, the data source did not cause any significant differences in OBA effectiveness. Thus, when a company is transparent about the data on which a highly personalized ad is based, it does not matter whether this was creepy or less creepy data, as the effectiveness does not differ.

Essentially, OBA can be a very lucrative practice for advertisers. Highly personalized ads led to more OBA effectiveness than low personalized ads. Still, advertisers should be wary of the negative effects of highly personalized ads based on creepy data sources whereby disclosure is present. This study shows that transparency is not always the best solution, but from an ethical point of view, advertisers should consider whether they want to be transparent or not. For highly personalized ads, not disclosing information about the data source led to more OBA effectiveness, but what if this happened because people did not notice that they were exposed to OBA or which data source was used? When they were informed about this, OBA effectiveness declined. This could be interpreted as an indicator that people do not like personalized advertisements that are based on creepy data sources. Therefore, it would be advisable for advertisers to avoid the usage of creepy data sources and to be transparent about their ads. Furthermore, before advertisers set up a new campaign and think about the possible data sources, they could ask themselves the following question: would I feel comfortable when someone would base an ad on this data source for me, my partner, my children, or other relatives? If this question can be answered with no, they should seriously overthink the usage of the data source, as the data source will most likely be more creepy than lucrative.

5.2 Limitations and directions for further research

Although this study contributed to theoretical and practical knowledge, it has some limitations. The first limitation is the sampling method used in this study. Convenience sampling in combination with a snowballing technique was used to gather the respondents. This may have led to a less representative sample, which limits the findings' generalizability. Also, it is unknown how people from different countries and cultures will react to the manipulated variables in this research. Previous studies have already shown that the effects of online advertising can differ across cultures (e.g. Lee & Choi, 2005; Wang, Sun, Lei, & Toncar, 2009). Therefore, future research could use other target groups to see whether it causes discrepancies in the results of this particular research. For instance, the effect of data source creepiness and information disclosure could differ across cultures who are risk averse and risk taking.

Furthermore, a fictional organization was used as a context for the experiment. This was done on purpose, to prevent bias caused by former reputation or brand preference. However, former reputation or brand preference might also influence the extent to which personalization, creepy data sources or information disclosure have an effect on OBA effectiveness. Brand preference might positively affect OBA effectiveness, as consumers like the brand. Additionally, the use of a creepy data source by an organization with an unfavourable prior reputation could have a different effect than the use of a creepy data source by an organization that has a good reputation. This might be an interesting subject for further investigation.

Next to this, long-term effects were not taken into account by the current experiment. The OBA effectiveness of the ads that were manipulated in this study was only measured directly after the exposure to the scenario and the ad. In this way, it was found that a highly personalized ad, based on a creepy data source without information disclosure will cause the most OBA effectiveness in the short-term. However, it is unknown what the effect will be on the long-term, as there is no current literature that dives into this matter. It could be the case that using a creepy data source backfires on an advertiser's reputation after a longer period of time, when consumers have had more time to evaluate the impact of the usage of their private data. Thus, it would be interesting for further research to explore the longitudinal effects of the variables of this study.

Another limitation lies in the experimental setting of this study. Respondents were explicitly asked to carefully look at the advertisement and to answer the questions accordingly. In real life, people are exposed to thousands of ads every day (Strick et al., 2009). Therefore, they might not even notice the level of personalization, data source creepiness or information disclosure of an ad they see. The experimental setting in this research may have led to bias in

this way. This means that it could be relevant for further research to test the effects of level of personalization, data source creepiness and information disclosure in a real life setting.

Furthermore, for future experimental research it would be interesting to use another product category as a context in the scenario. In this experiment, the banking sector was used as a context. Still, taking a mortgage or getting stock trading advice can be seen as an intensive procedure which requires quite some information processing. It would be interesting to see how data source creepiness and information disclosure play a role in purchasing processes that require less information processing. Maybe the effect will differ when the scenario focuses on other product categories, such as clothing or groceries, instead of mortgage and stock trading advice.

Lastly, future research could focus on the negative effects of information disclosure on OBA effectiveness. A large amount of previous studies indicate that the effects of disclosures are mainly positive (Boerman et al., 2017). Still, this study has found a more negative effect of disclosing information about a data source, especially when it is shown with a highly personalized ad. Future studies could explore the effect of information disclosure on persuasion knowledge and whether it helps consumers to resist to persuasive tactics by advertisers. It can be argued that this is a bad development for the advertising industry, but a good development for consumers, as more persuasion knowledge might reduce unconscious decision making.

6. Conclusion

This study has shown that the effectiveness of Online Behavioral Advertising is influenced by level of personalization, data source creepiness and information disclosure. However, these effects were not mediated by perceived intrusiveness and perceived vulnerability. Furthermore, the findings were not always in line with previous work in the field. Information disclosure caused lower OBA effectiveness for consumers who were exposed to a highly personalized ad based on a creepy data source. This proposes an important implication for both advertising practitioners and academics. It seems that consumers do not mind to see an ad that is based on a data source which invades their personal space, unless you make them aware of this. Yet, this is not an invitation for advertisers to use creepy data sources without mentioning it. They should be wary of the various concerns that are present among consumers and about the possible long-term effects of using creepy data sources. Lower effectiveness when consumers are informed about OBA practices, might also be interpreted as an indicator that consumers do not like OBA and creepy data sources. Personalizing advertisements to be more relevant towards consumers can be a lucrative practice, but advertisers should be aware of the risks of too much personalization and take ethical considerations into account.

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Appendices

Appendix A: Additional tables and results for pre-test 1

Additional information about the manipulation in the first pre-test

After looking at the advertisement, respondents were asked to answer statements regarding the level of personalization of the advertisement, based on a four-item scale adapted from Dijkstra (2005). Furthermore, respondents were asked to indicate whether the scenario stated that they were searching for a car loan, which served as a manipulation check. All items were measured on a 7-point Likert scale ranging from “strongly disagree” to “strongly agree”. The list of items used in pre-test 1 can be found in Table A1. The manipulation check showed a significant difference between the two conditions, as shown by an independent samples t-test ($M_{\text{High pers.}} = 1.86$, $SD_{\text{High pers.}} = 1.89$ vs. $M_{\text{Low pers.}} = 6.10$, $SD_{\text{Low pers.}} = 1.51$, $t(41) = -8.09$, $p < .001$), which means that the respondents correctly noticed the manipulated text. However, the results also show that there was no significant difference between the perceived personalization of the ad ($M_{\text{High pers.}} = 4.53$, $SD_{\text{High pers.}} = 1.26$ vs. $M_{\text{Low pers.}} = 4.17$, $SD_{\text{Low pers.}} = 1.33$, $t(41) = .93$, $p < .05$). Thus, the level of personalization was not correctly manipulated in this first pre-test.

Table A1

Overview of the used items in Pre-test 1.

Construct (Cronbach's α in parentheses)	Item	Source
Perceived level of personalization ($\alpha = .76$)	The advertisement was directed to me personally.	Dijkstra (2005)
	I recognized my personal situation in the advertisement.	
	The advertisement took into account the problem I faced.	
	The advertisement took into account my personal situation.	
Trustworthiness ($\alpha = .92$)	I trust this bank.	Walsh et al. (2009)
	I have great confidence in this bank.	
	This bank has high integrity.	
	I can depend on this bank to do the right thing.	
	This bank can be relied upon.	
Purchase intention ($\alpha = .90$)	The likelihood that I would consider opening an account at this bank is large.	Grewal et al. (1998)
	If I am going to open a bank account, the probability of doing it at this bank is large.	
	I would open an account at this bank.	

Table A2

Mean and standard deviation scores for trustworthiness and purchase intention towards the bank names.

	Trust		Purchase intention	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
FIVG Bank	4.09	.97	3.21	.96
Burgerbank	4.33	1.05	3.50	1.40
DGI Bank	4.13	.95	3.49	1.12

Appendix B: Additional tables and results for pre-test 2

Table B1

Overview of the used items in Pre-test 2.

Construct (Cronbach's α in parentheses)	Item	Source
Perceived level of personalization ($\alpha = .78$)	The advertisement was directed to me personally.	Dijkstra (2005)
	I recognized my personal situation in the advertisement.	
	The advertisement took into account the problem I faced.	
	The advertisement took into account my personal situation.	
Trust in Facebook ($\alpha = .94$)	I trust Facebook.	Walsh et al. (2009)
	I have great confidence in Facebook.	
	Facebook has high integrity.	
	I can depend on Facebook to do the right thing.	
	Facebook can be relied upon.	
Attitude towards Facebook ($\alpha = .85$)	I would like to visit Facebook again in the future.	Chen and Wells (1999)
	I think surfing on Facebook is a good way to spend time.	
	Facebook makes it easy for me to build a relationship with them.	
	I am satisfied with the service that Facebook offers.	
	I feel comfortable when I surf on Facebook.	
	Compared to other websites, I would rate Facebook as one of the best.	

Appendix C: Additional tables and results for the main study

Table C1

Full list of scale items.

Construct (Cronbach's α in parentheses)	Item	Source
Trust in the advertiser ($\alpha = .93$)	I trust the advertiser. I have great confidence in the advertiser. The advertiser has high integrity. I can depend on the advertiser to do the right thing. The advertiser can be relied upon.	Walsh et al. (2009)
Perceived intrusiveness ($\alpha = .94$)	I think this offer is disturbing. I think this offer is alarming. I think this offer is obtrusive. I think this offer is irritating. I think this offer is annoying. I think this offer is uncomfortable. I think it is uncomfortable that personal information is used in this offer. The supplier knows a lot about me. This offer gives me an uneasy feeling.	Bleier and Eisenbeiss (2015)
Perceived vulnerability ($\alpha = .92$)	The advertisement makes me feel... ...exposed. ...unprotected. ...susceptible. ...unsafe. ...vulnerable.	Aguirre et al. (2015)
Click-through intention	I would like to click on the advertisement to acquire further information.	Yoo (2007)
Purchase intention ($\alpha = .88$)	The likelihood that I would request more information about the service from the advertisement is large. If I am going to request more information about the service from the advertisement, the probability that I would do this at DGI Bank is large. I would request more information about the service from the advertisement at the DGI Bank.	Grewal et al. (1998) and Van Doorn and Hoekstra (2013)
Trust in Facebook ($\alpha = .94$)	I trust Facebook. I have great confidence in Facebook. Facebook has high integrity. I can depend on Facebook to do the right thing. Facebook can be relied upon.	Walsh et al. (2009)
Attitude towards Facebook ($\alpha = .87$)	I would like to visit Facebook again in the future. I think surfing on Facebook is a good way to spend time. Facebook makes it easy for me to build a relationship with them. I am satisfied with the service that Facebook offers. I feel comfortable when I surf on Facebook. Compared to other websites, I would rate Facebook as one of the best.	Chen and Wells (1999)
Privacy concerns ($\alpha = .90$)	It bothers me that companies are able to keep track of information about me. I am afraid that companies have too much information about me. It bothers me that companies have access to information about me. I am afraid that my information can be used in ways that I cannot foresee.	Sheng, Nah, and Siau (2008)

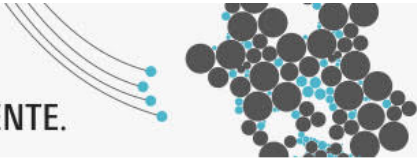
Table C2

Pearson correlation matrix for the mediators and dependent variables of the main study.

	1.	2.	3.
1. Perceived intrusiveness			
2. Perceived vulnerability	.66**		
3. Click-through intention	-.31**	-.14*	
4. Purchase intention	-.37**	-.04	.63**

Note: * $p < .05$; ** $p < .001$.

Appendix D: Approval form of ethics committee



UNIVERSITY OF TWENTE.

APPROVED BMS EC RESEARCH PROJECT REQUEST

Dear researcher,

This is a notification from the BMS Ethics Committee concerning the web application form for the ethical review of research projects.

Requestnr. : 190692

Title : Why am I seeing this ad? The influence of online advertising on consumer behavior.

Date of application : 2019-04-17

Researcher : Scholten, J.D.F.

Supervisor : Ooijen, I. van

Commission : Galetzka, M.

Usage of SONA :
Y

Your research has been approved by the Ethics Committee.

The ethical committee has assessed the ethical aspects of your research project. On the basis of the information you provided, the committee does not have any ethical concerns regarding this research project.

It is your responsibility to ensure that the research is carried out in line with the information provided in the application you submitted for ethical review. If you make changes to the proposal that affect the approach to research on humans, you must resubmit the changed project or grant agreement to the ethical committee with these changes highlighted.

Moreover, novel ethical issues may emerge while carrying out your research. It is important that you re-consider and discuss the ethical aspects and implications of your research regularly, and that you proceed as a responsible scientist.

Finally, your research is subject to regulations such as the EU General Data Protection Regulation (GDPR), the Code of Conduct for the use of personal data in Scientific Research by VSNU (the Association of Universities in the Netherlands), further codes of conduct that are applicable in your field, and the obligation to report a security incident (data breach or otherwise) at the UT.

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This is an automated e-mail from My University of Twente.

University of Twente, Drienerlolaan 5, 7522NB Enschede, The Netherlands