The effects of trait-based personalization in social media advertising

Stephan Winter [a,*], Ewa Maslowska [b], Anne L. Vos [c]

[a] *University of Koblenz-Landau, Germany*
[b] *University of Illinois at Urbana-Champaign, USA*
[c] *University of Amsterdam, Netherlands*

ARTICLE INFO

ABSTRACT

Advertisements in social media can be tailored to psychographic profiles based on consumers' digital-trace data. An experiment (N = 936) investigated the conditions under which such trait-based personalization of social media messages is more effective than non-personalized messages and which personality traits and user characteristics are most suitable for this purpose. In a 9 × 2 between-subjects design, the persuasive appeal of a Facebook ad and the advertised product (phone vs. soda) were varied. Participants' 'Big Five' personality traits, need for cognition, and susceptibility to persuasive strategies were assessed in a questionnaire. Results showed limited effects of personality matching. Matched messages led to increased intentions to engage with the post when they addressed specific persuasive susceptibilities (particularly toward authority influence). However, there were no consistent effects on consumers' attitudes toward the advertised products. Findings are discussed regarding the ongoing debate on microtargeting in social media.

1. Introduction

The prevalence of digital traces in social media and the development of methods facilitating analyses of big data have enabled new forms of content personalization, which tailor messages at a more individual level than ever before. Instead of relying on demographics, marketers, advertisers and political strategists can now adapt their messages to the specific consumers' preferences. Furthermore, these preferences are becoming easier to understand and predict. For instance, a seminal study by Youyou, Kosinski, and Stillwell (2015) demonstrated that users' Facebook "likes" can be used to predict users' personality traits with an accuracy higher than estimations made by close friends: Machine-learning techniques were employed to derive rules from big data sets containing both social media profile information ("likes") and survey data on individuals' personality traits such as extraversion. The resulting algorithms can then be used to infer personality traits only on the basis of "likes".

Cambridge Analytica – a British political consulting company – employed such a Facebook-based method to target consumers based on their psychometrics in the presidential campaign of Donald Trump. Building on personality profiles of American voters, they employed a huge number of different messages, including traditional ads and memes, which has sparked controversy and debates about the potential effects and threats of such a form of personalization (e.g., Guardian, 2018; Motherboard, 2017). However, despite claims that this new form of campaigning was a crucial factor in Trump's victory, empirical research showing the effectiveness of *trait-based personalization* in the context of social media marketing is still very limited.

The idea behind trait-based personalization is that advertisers show content that is in line with the individual user's personality traits. For instance, a person with high openness to new experiences would be exposed to an ad that focuses on novel features of a product, while a person with low openness to experience would be shown an ad that highlights the long tradition and classic features of a product. This form of personalization may be less obvious than traditional forms of cue-based personalization (e.g., including the customer's name in a message), therefore, making it more difficult to recognize as targeted advertising and thus more persuasive. Furthermore, trait-based messages are matched to the consumer's specific interests and characteristics (Hirsh, Kang, & Bodenhausen, 2012), which may make them even more influential. Initial studies have mainly focused on the Big Five personality traits, particularly on extraversion and openness (e.g., Matz, Kosinski, Nave, & Stillwell, 2017), as well as on individual susceptibilities to persuasive strategies (Kaptein, de Ruyter, Makropoulos, & Aarts, 2012). However, the effectiveness of these traits for the personalization of marketing messages has not been systematically investigated or

compared yet.

The present work aims to fill these gaps in the extant literature by investigating the conditions under which trait-based personalized marketing messages on social media are more persuasive than non-personalized messages and which personality traits and personal characteristics are most suitable for message personalization. Findings of the present study contribute to the ongoing debate about hidden persuasion in the social media context.

2. Theoretical background

2.1. What is personalization?

Personalization has been extensively studied, mainly in the context of email marketing and health campaigns. The term *personalization* is used to describe different types of tailoring strategies. Dijkstra (2008, p. 768) defined personalization as "incorporating recognizable aspects of a person in the content information." These aspects could be personally identifying information, such as the individual's name or picture, information derived from the individual's past behaviors, such as websites visited, movies watched, or a set of characteristics that are common to a group of individuals, such as gender (Dijkstra, 2008; Pfiffelmann, Dens, & Soulez, 2020). Even though many of these characteristics describe many people, when connected in a specific configuration they can have a high probability of referring to the individual person (Dijkstra, 2008). In the marketing literature, especially in the field of email marketing, the term *personalization* has been used to describe a strategy of adding personally-recognizable cues, such as the consumer's name, employer, town, etc., in the heading or body of an (email) message (i.e., *cue-based personalization*).

Typically, cue-based personalization does not change the persuasive content of a message: A message personalized by adding personal cues contains generic content, which is the same for all recipients. Personal cues are added to trigger several mechanisms. First, personal cues are used to attract consumers' *attention* (Hawkins, Kreuter, Resnicow, Fishbein, & Dijkstra, 2008). Previous research has shown that people prioritize processing of their own names (Tacikowski & Nowicka, 2010) and attend more to ads that include their first names than to non-personalized ads (Bang & Wojdynski, 2016). Using eye tracking, Pfiffelmann et al. (2020) showed that consumers fixate on personalized ads more frequently and spend more time looking at them, even though they do not notice them faster or visit them more frequently. Second, cue-based personalization is believed to trigger the *self-referencing* process and make the message more self-relevant (De Keyzer, Dens, & De Pelsmacker, 2015), which may positively bias heuristic processing and/or trigger more central processing. Indeed, personalization cues have been found to enhance consumers' elaboration upon the message (Maslowska, Smit, & van den Putte, 2016; Tam & Ho, 2005).

In line with these theoretical mechanisms, the results of many past studies suggest that such *cue-based personalization* can be effective (Howard & Kerin, 2004; Sahni, Wheeler, & Chintagunta, 2016). However, there is also research that has found no or negative effects of such personalization efforts (Porter & Whitcomb, 2003; Tsang, Ho, & Liang, 2004; Wattal, Telang, Mukhopadhyay, & Boatwright, 2012; Yu & Cude, 2009). Other studies have shown that the positive effects are rather limited. For example, Maslowska, Van den Putte, and Smit (2011) found that personalization may indeed enhance evaluations of the communication, but not other outcome variables, such as behaviors. Several plausible mechanisms behind the negative consequences of personalization have been proposed, such as involvement and relevance (Kalyanaraman & Sundar, 2006). Consumers use social media to get information and socialize. By shifting attention from this primary goal, personalized ads may interrupt consumers' experiences (Maslowska et al., 2016; Simola, Kivikangas, Kuisma, & Krause, 2013), which may lead to negative consumer responses (Edwards, Li, & Lee, 2002). Furthermore, since personalization includes personal cues, it suggests

that the message was created especially for the recipient, which may signal to consumers that it was created to persuade them, hence, activating consumers' persuasion knowledge and inhibiting persuasion (see Pfiffelmann et al., 2020 for discussion). Furthermore, social media are perceived as social space for users to interact in. Personalized ads on social media may therefore be perceived as invasive (De Keyzer, 2018; Pfiffelmann et al., 2020; van Doorn & Hoekstra, 2013; White, Zahay, Thorbjørnsen, & Shavitt, 2008). This may be especially the case when the use of personal information is not properly justified (White et al., 2008) or when consumers realize that their personal information has been collected without their consent (Aguirre, Mahr, Grewal, de Ruyter, & Wetzels, 2015).

Whether these negative effects occur may also depend on consumers' privacy concerns. The relation between personalization and privacy concerns is often referred to as the "personalization-privacy paradox" (Awad & Krishnan, 2006). The results of empirical studies show that the more people become concerned about their privacy, the less personalized advertising influences them (Gurau, Ranchhod, & Gauzente, 2003).

In summary, cue-based personalization uses rather basic elements such as demographics or previous behaviors, which may backfire, leading to the rejection of the message, especially when privacy concerns are activated. A way for advertisers to avoid negative consumer responses to personalized messages may be to focus on less prominent ways of message personalization. An example of such an advanced strategy would be to use personality traits (i.e., *trait-based personalization*), which has gained lots of media attention triggered by claims that such personalization was used in the most recent American presidential elections. Such tailoring to the characteristics of each recipient is sometimes referred to as microtargeting (e.g., Bodó, Helberger, & de Vreese, 2017) or online behavioral advertising (Boerman, Kruikemeier, & Zuiderveen Borgesius, 2017).

2.2. Trait-based personalization vs. cue-based personalization

Digital developments and the rise of social media are not only facilitating personalization, making it more common, but are also enabling more sophisticated personalization, including trait-based personalization. In order to apply trait-based personalization, advertisers need to possess knowledge about the consumer's traits, which is increasingly possible due to the big amounts of digital trace data left by consumers and machine-learning techniques that can be used to infer traits from data such as Facebook "likes", language use or pictures (Hinds & Joinson, 2019; Wang & Kosinski, 2018).

When messages are personalized using the trait approach, persuasive attempts are adapted to the consumer's personality traits using framing that is likely to be valued by persons with given characteristics. Hence, no recognizable cues are added to the message, but the framing of the message is adapted to consumers' traits. For instance, an extraverted person will see an advertisement portraying friends enjoying the advertised soft drink in a social setting, while a person high in need for cognition will see the same advertised drink but on a desk of a person thinking about a problem at work or solving a puzzle.

There are several differences between trait- and cue-based and other personalization strategies. For instance, while other personalization methods either include simple cues in a message, such as the customer's name or race (e.g., Sahni et al., 2016), as cue-based personalization does, or show different products based on previous browsing behavior, as it is with behavioral targeting (e.g., Lambrecht & Tucker, 2013), the trait-based approach employs a different version of the advertising message for the same product depending on the consumer's personality traits. These differences in message framing may lie in the advertising slogan and visuals included in the ad.

The theoretical explanation behind the working mechanism of trait-based personalization is that matching a message's tone and framing to the personality profile or thinking style of the recipient enhances the message's effectiveness (Graves & Matz, 2018 May 2). While cue-based

personalization is expected to work by triggering an orienting response and attracting attention, and positively biasing heuristic processing (Sahni et al., 2016), trait-based personalization—as a less obvious strategy—may be expected to work more via cognitive elaboration. The fit between the consumer's personality and the message may make consumers perceive the message as more relevant for them and hence trigger deeper cognitive processing (Wheeler, Petty, & Bizer, 2005). Here, the increased processing does not directly lead to more positive attitudes, but it depends on the persuasiveness of the message itself (e.g., the strength of arguments). However, due to the fit, the message may be experienced as more "for me" and hence trigger more self-referent processing, which can produce more positive evaluations. Additionally, the perception of argument quality may change because the receiver places higher value on the matched features. The latter mechanism relies on the alleged ability of the fit between the consumer's personality and the message framing to make message processing easier. The fluency experienced during the processing will be experienced as pleasant, positively biasing consumers' evaluation of the message and augmenting attitudes towards the advertised product. *Congruence theory* is often used to explain the workings of personalization (Dodoo & Wen, 2019). The theory posits that driven by the need for harmony, individuals are more responsive to self-congruent messages, that is, messages that are consistent with their own beliefs and attitudes (Hong & Zinkhan, 1995) and therefore will perceive self-congruent messages as more relevant (Heckler & Childers, 1992). Therefore, if the message is perceived as congruent with the recipient's self-concept (e.g., personality), it will be also perceived as more relevant (see Dodoo & Wen, 2019 for discussion), triggering the self-referencing process and exerting more effect on the recipient.

2.3. Effectiveness of trait-based personalization

Persuasion research in marketing and psychology largely suggests that messages that match the receiver's interests or characteristics are evaluated more favorably (see Crano & Prislin, 2011), but empirical studies have only recently started to investigate the effectiveness of trait-based personalization. Previous research shows that personality traits play an important role in individuals' responses to advertising, particularly in the context of social media messages (e.g., Dodoo & Wen, 2019). Personality traits determine individuals' openness to advertising and their behaviors on social media. For example, individuals who are more open to experience may share more on Facebook (Amichai-Hamburger & Vinitzky, 2010).

One of the most widely used approaches to assess a person's personality is the five-factor model (Big Five) by Costa and McCrae (1992). This model distinguishes and measures a person's level of extraversion (the degree to which people are outgoing and sociable and seek contact with others), agreeableness (the extent of cooperativity and compassion toward others), conscientiousness (characterized by self-discipline, high efficiency and a preference for planned rather than spontaneous events), neuroticism (the degree to which people are likely to experience negative and unpleasant emotions), and openness to experience (the tendency to enjoy adventures and unusual ideas). In one of the first studies investigating matching toward the Big Five personality traits, Hirsh et al. (2012) showed participants several product descriptions of a mobile phone (e.g., "With the new XPhone, you'll never miss an important message, simplifying your work life" for conscientiousness, or "With the new XPhone, you'll always be where the excitement is" for extraversion). Results showed that the focal personality traits were significant predictors of the favorability toward the specific message, suggesting that ads that highlight matching features are evaluated more positively. However, the study did not measure persuasiveness and employed a repeated-measures design with limited external validity (since it is uncommon to view a series of different ads for the same product).

In a recent field experiment on Facebook, Matz et al. (2017) showed ads for a beauty product that focused on either extraversion (with a

slogan: "Dance like no one's watching [but they totally are]") or introversion ("Beauty doesn't have to shout") to users who had previously liked a site that is strongly predictive of high or low extraversion (a follow-up study focused on openness and the product of an app for crossword puzzles). Results showed that a match between indicative like and framing of the message led to higher click-through and conversion rates. As mentioned by the authors, however, the study is limited by its focus on two single traits. Hence, research is needed that will investigate the effectiveness of personalizing to other personality traits. In addition, the authors compared extreme groups, that is, people scoring high versus low on a given trait, prompting future research to look at matching at different levels of the personality continuum. Furthermore, as discussed by Eckles, Gordon, and Johnson (2018), such field studies are prone to internal validity issues as they cannot control for Facebook algorithms and hence ensure random distribution of participants to treatment conditions. Finally, the conditions in that study differed with respect to creative execution, not only targeted personality, and did not include a control condition, making it impossible to know whether personalization is better than no personalization (Sharp, Danenberg, & Bellman, 2018). As a result, we only know that match versus mismatch seems to work better, which provides impetus for more comprehensive studies that would compare more personality traits in a randomized experiment.

Beyond the Big Five, Kaptein, de Ruyter, Markopoulos, and Aarts (2012) identified individual susceptibilities to persuasive strategies (such as authority, consensus, or scarcity; Cialdini, 2001) and showed that text messages about healthy behaviors that focus on the corresponding strategy (e.g., expert statements for people who are highly susceptible to the authority strategy) were more influential than non-tailored messages. Additionally, the need for cognition (individuals' desire to engage in effortful thinking) was used in previous matching experiments (e.g., Wheeler et al., 2005), showing that people who enjoy flexible thinking are likely to appreciate complex messages more than those low in need for cognition.

In summary, personality traits are believed to drive consumers' behaviors on social media and their responses to social media advertising. Based on congruence theory, matching messages with recipients' personalities is expected to trigger self-referent processing and increase the persuasive impact of messages. However, this overview shows that the effectiveness of various personality traits and characteristics for the purpose of personalization has not been systematically compared yet. Therefore, the present work aims to test the assumption shared by both supporters and critics of personalization that personality-matching messages are more persuasive than non-matching messages. We focus on the effects of personalization on attitude toward the product, intention to engage with the post (such as liking or sharing), and purchase intention. Furthermore, we aim to answer the question of which combinations of trait and persuasive appeal are most influential. Based on the previous research findings and the theoretical discussion, we propose the following:

H1. Social media ads that match the users' personality traits will lead to a more positive product attitude than non-matching ads.

H2. Social media ads that match the users' personality traits will lead to a higher purchase intention than non-matching ads.

H3. Social media ads that match the users' personality traits will lead to higher intentions to engage with the post than non-matching ads.

RQ1. Which personality traits (Big Five, susceptibilities to persuasive strategies, need for cognition) are most predictive of persuasive outcomes in interaction with tailored messages?

3. Method

An online experiment tested the mechanisms of trait-based personalization in the social media context. The persuasive appeal was

systematically varied as a between-subject factor: The ad (displayed as a post on the social networking site Facebook) was framed to one of the measured user characteristics. In a post-questionnaire, participants' personality traits and further characteristics were assessed. The study was approved by the Ethics Review Board of the University of Amsterdam.

3.1. Sample

As predefined minimum, we aimed for 900 participants. Using the platform MTurk, English-speaking participants were recruited (as a buffer for potential exclusions, the survey remained open until slightly more than 900 participants were reached) and reimbursed with $3.00. The final sample included 936 respondents who completed the questionnaire (427 female, 1 other, $M_{age} = 33.98$, $SD_{age} = 10.38$), 17.9% of them had a Master's degree or a higher academic degree, 51.9% had a Bachelor's degree, 30.2% had a lower degree of education.

3.2. Independent variable: Ad type

Participants were exposed to a Facebook advertisement. As the main independent variable, we varied the framing of the message, that is, the text and the picture were tailored to match one of the above-mentioned personality traits or personal preferences. Thus, nine versions (tailored to extraversion, agreeableness, conscientiousness, neuroticism, openness, susceptibility toward authority, susceptibility toward scarcity, susceptibility toward consensus, or need for cognition) of ads were created. To increase generalizability, we employed two products: a soda (a low involvement product) and a phone (a high involvement product). This resulted in a 9 (ad type) x 2 (product type) between-subjects design.

Each ad was shown as a Facebook post, including brand name (Sensa as a fictitious and generic name), a picture, and a short caption. The slogan in the caption and the picture were adapted to the focal trait. For instance, the extraverted version of the ad showed a person with the soda drink or the phone surrounded by other people in a social setting and the slogan "Sensa Soda/Phone: designed for those who follow the excitement", the authority version showed a businessman with the product and the slogan "Sensa [...]: recommended and owned by experts," and the need for cognition version showed a person appearing to be deliberating about an issue while holding the phone ("Sensa [...]: designed for those who like deep thoughts."). Fig. 1 shows an example of the stimuli (full versions can be found in the Online Appendix: htt ps://osf.io/unbpt/?view_only=845b66aff2074979934ff8f1ff8d5264). Pictures were acquired from the online stock photography database Shutterstock. All other elements (logo, number of likes and comments) remained constant. Participants were randomly assigned to one of the 18 conditions.[1]

A pilot study with 90 participants (33 female, 56 male, 1 other; M_{age} = 38.93, SD_{age} = 10.20) was conducted to check whether the trait personalization works, that is, if the ads were perceived as tailored to the personality traits they were developed to address. Pilot study participants saw all ad variations for either the phone or the soda (including one version that was not selected for the main study), evaluated them with a semantic differential scale, and answered a multiple-choice question whether the ad is for people who 1) *are extraverted and outgoing,* 2) *are nervous and frequently moody,* 3) *are curious about many new things,* 4) *are helpful and kind to others,* 5) *are reliable and follow their plans,* 6) *like to reflect upon complex issues,* 7) *are inclined to listen to authorities,* 8) *feel obliged to return others' favors,* 9) *follow the majority or advice by friends,* or 10) *value products that are hard to get.* Results showed that most participants selected the answers showing that the specific messages were designed for the focal traits for each of the selected ads, suggesting

Fig. 1. Example of stimulus material: Ads tailored to extraversion.

they were able to recognize the intended appeal of the ads. Minor differences emerged between the ads in terms of liking (measured with an average score of 4 adjective pairs such as "bad – good" on a 7-point semantic differential) such that, among the soda ads, the authority ad was evaluated least favorable ($M = 4.13$, $SD = 1.56$) and the agreeableness ad most favorable ($M = 5.76$, $SD = 1.10$). Among the phone ads, the authority ad was also evaluated least favorable ($M = 4.21$, $SD = 1.68$) and the openness ad most favorable ($M = 5.91$, $SD = 1.07$). However, as these differences were limited in magnitude (and could be due to a specific matching in the sample), they were not deemed to be problematic.

---

[1] Randomization checks showed that the measured personality traits of the respondents did not differ significantly between the conditions.

3.3. Measures

3.3.1 Personality Traits. In order to allow for a systematic comparison, we measured all the personality traits that were used to tailor messages. Based on prior research (e.g., Hirsh et al., 2012), we employed the most frequently used variables, that is, the *Big Five* personality traits (Costa & McCrae, 1992). These were measured with a 44-item questionnaire on 5-point Likert scales (John, Donahue, & Kentle, 1991; John, Naumann, & Soto, 2008), including extraversion (e.g., "I see myself as someone who … is talkative", $\alpha = 0.83$; $M = 3.13$; $SD = 0.83$), agreeableness (e.g., "… is helpful and unselfish with others", $\alpha = 0.76$; $M = 3.58$; $SD = 0.70$), conscientiousness (e.g., "… does a thorough job", $\alpha = 0.84$; $M = 3.71$; $SD = 0.74$), neuroticism (e.g., "… is relaxed, handles stress well" [reverse-coded], $\alpha = 0.84$; $M = 2.82$; $SD = 0.87$), and openness to experience (e.g., "… is curious about many different things", $\alpha = 0.78$; $M = 3.69$; $SD = 0.61$). Additionally, we measured need for cognition (Cacioppo & Petty, 1982; e.g., "I really enjoy a task that involves coming up with new solutions to problems", 18 items on a 7-point scale, $\alpha = 0.90$; $M = 4.29$; $SD = 1.07$). Finally, we measured several individual *susceptibilities to persuasive strategies* (Kaptein et al., 2012). We included *authority* (6 items on a 7-point scale, e.g., "I am more inclined to listen to an authority figure than to a peer", $\alpha = 0.85$; $M = 5.04$; $SD = 1.14$), *scarcity* (5 items, e.g., "I would feel good if I was the last person to be able to buy something", $\alpha = 0.79$; $M = 5.08$; $SD = 1.16$), and *consensus* (5 items, e.g., "It is important to me to fit in", $\alpha = 0.86$; $M = 4.75$; $SD = 1.33$). Although some of the recent studies did not include questionnaire-based measurements of personality traits, the assessment of these variables with well-established scales is more precise and thus necessary to investigate which personality traits are most effective in enhancing persuasive outcomes.

3.3.2 Attitudes and Intentions. After being exposed to the advertising message, participants evaluated the post and were asked whether they recalled the brand that was featured in the post. After that, participants were informed what the name of the brand was and were asked to provide their evaluation of the brand. The main dependent variables were *engagement intention toward the post* (3 items on a 7-point scale: "How likely would you be to click through and go to Sensa's page?", "How likely would you be to share this post by clicking the share button?", and "How likely would you be to "react" to this post by clicking on the Facebook reactions?", based on Shamdasani, Stanaland, & Tan, 2001 and Wojdynski & Evans, 2016, $\alpha = 0.93$; $M = 4.29$; $SD = 2.04$), *purchase intention* (3 items such as "I would consider buying a Sensa soda/phone", Lu, Chang, & Chang, 2014, $\alpha = 0.93$ [soda], $\alpha = 0.94$ [phone]; $M = 4.82$, $SD = 1.71$), and *attitude toward the product* featured in the post (6 adjective pairs such as "useful – useless" on a 7-point semantic differential, Batra & Ray, 1986, $\alpha = 0.84$; $M = 4.96$; $SD = 1.26$).

3.3.3 Manipulation check. Participants were asked how they would describe the consumers for whom the ad they had just seen would be most appealing. As in the pilot study, the answer options were descriptions of the nine traits that the stimuli were tailored to (e.g., "The ad is for people who are helpful and kind to others" for agreeableness or "The ad is for people who like to reflect upon complex issues" for need for cognition). Results of a chi-square test showed that the selection of the answer category significantly differed between the conditions, χ^2 $(64) = 629.61$, $p < .001$. The highest number of selections were obtained for the intended personality trait. There were two exceptions: the conscientiousness and authority ads. For those ads the intended trait was the second choice, with the highest scoring description being in fact openness (i.e., "The ad is for people who are curious about many new things"). Openness was generally the most frequently selected category (see Online Appendix for more detailed results). With few exceptions, this supports the pilot study results and the general ability of participants to detect the highlighted traits – especially given that it is difficult to know the intended target group without any comparison.

3.4. Procedure

The study was described to potential participants as research to gain a better understanding into consumer perceptions of social media posts and their media use. After providing their informed consent, participants were asked to look at a post allegedly taken from a social media site. Then, participants were asked about their evaluation of the ad and the product as well as purchase and engagement intentions (see above). Finally, respondents answered questions about their personality traits, the manipulation check question, and further questions about their media usage (which were included for a different research question within the project). At the end, participants were fully debriefed and thanked for their participation.

4. Results

4.1. Effects of ad and product type

In a preliminary step, we checked for effects of the ad and product type that are unrelated to personalization. A MANOVA with ad type and product type as between-subject factors and product attitude, engagement intention, and purchase intention as dependent variables showed no significant main effect of ad type and no significant interaction between ad type and product type. Only main effects of product type showed that purchase intention was slightly higher for the soda, $F(1, 918) = 7.12$, $p = .008$, $\eta_p^2 = 0.01$, which can be explained by the lower involvement and lower price and thus a higher likelihood to try it out, while product attitudes were more positive for the phone, $F(1, 918) = 20.64$, $p < .001$, $\eta_p^2 = 0.02$. As there were no significant interactions, the conditions with the phone and the soda ad were collapsed for each ad type.

4.2. Effects of matching

Our hypotheses posited that personalized ads will be more persuasive with regard to product attitudes (H1), purchase intentions (H2), and engagement intentions (H3). As a first step, we aimed to replicate previous findings showing that match is more effective than mismatch. To investigate whether ads showing content that is in line with the consumer's personality traits are more persuasive, a match variable was computed. That is, if participants were above the median score on the personality trait the ad was tailored to, it was regarded as "match", otherwise as "no match.".[2]

On this basis, a MANOVA with match and ad type as fixed factors was conducted. Results showed significant effects of the match variable on product attitude, $F(1, 918) = 8.31$, $p = .004$, $\eta_p^2 = 0.01$, purchase intention, $F(1, 918) = 33.02$, $p < .001$, $\eta_p^2 = 0.04$, as well as engagement intention, $F(1, 918) = 42.33$, $p < .001$, $\eta_p^2 = 0.04$. Furthermore, significant interactions between match and ad type emerged for purchase intention, $F(8, 918) = 17.52$, $p < .001$, $\eta_p^2 = 0.13$, and engagement intention, $F(8, 918) = 24.28$, $p < .001$, $\eta_p^2 = 0.18$, that qualify the main effect of the match variable. Table 1 shows the mean values, indicating that the differences between matched and nonmatched ads were greatest for the ads that focused on scarcity, consensus, and authority. When including the measured personality traits as covariates (to account for the fact that people high on certain trait variables may be more positive to advertisements in general), MANOVA showed significant effects of extraversion (on purchase and engagement intentions), conscientiousness (on all three dependent variables), agreeableness (on product

---

[2] Although this is a broad categorization that does not consider continuous differences in personality traits (which will be analyzed in more detail in the following regression-analytic approach), matching algorithms in the practice of trait-based personalization also work with certain thresholds and it allows for a preliminary assessment of the effects that have been tested in previous studies.

Table 1
Effects of match and ad type on the attitude toward the product, purchase intention, and engagement intention (means and standard deviations).

	Product Attitude		Purchase Intention		Engagement Intention	
Ad Type	No Match	Match	No Match	Match	No Match	Match
Extraversion	5.01	5.17	4.67	5.18	3.77	4.82
	(1.21)	(1.26)	(1.57)	(1.68)	(1.80)	(2.02)
Openness	5.10	5.16	4.85	4.85	4.48	4.11
	(1.33)	(1.30)	(1.52)	(1.71)	(2.07)	(2.02)
Conscientiousness	4.92	5.14	5.47	4.21	5.16	3.48
	(1.20)	(1.26)	(1.21)	(1.80)	(1.48)	(1.95)
Neuroticism	5.11	4.67	4.64	5.16	4.27	4.65
	(1.26)	(1.22)	(1.84)	(1.56)	(1.90)	(1.91)
Agreeableness	4.86	5.19	5.09	4.61	4.67	4.09
	(1.22)	(1.18)	(1.65)	(1.70)	(1.85)	(1.94)
Need for Cognition (NfC)	4.82	5.10	5.07	4.71	4.81	4.25
	(1.37)	(1.14)	(1.77)	(1.72)	(2.02)	(1.95)
Scarcity	4.76	5.04	4.03	5.65	2.99	5.51
	(1.22)	(1.45)	(1.62)	(1.43)	(1.94)	(1.61)
Consensus	4.70	5.30	3.71	5.89	2.53	5.52
	(1.25)	(1.20)	(1.54)	(.83)	(1.70)	(1.35)
Authority	4.36	5.00	3.27	5.90	2.52	5.80
	(1.04)	(1.35)	(1.74)	(.98)	(1.86)	(1.19)

attitude), as well as susceptibility to scarcity (all DVs), consensus (all DVs), and authority (purchase and engagement intentions; see details in the regression analysis below). Most notably, after controlling for the personality traits, only the dependent variable of engagement intention was significantly affected by match, $F(1, 909) = 5.57$, $p = .018$, $\eta_p^2 = 0.01$, and the interaction of match and ad type, $F(8, 909) = 2.07$, $p = .036$, $\eta_p^2 = 0.02$. As Table 1 shows, the mean values lend support to the notion that matched ads lead to a higher intention to engage with the ad when the ad focuses on scarcity, consensus, and authority, as well as, but to a lesser extent, when it focuses on extraversion and neuroticism.

4.3. Interactions of ad type and personality traits

To account for the continuous nature of the personality variables, we employed a regression approach to test which interactions of ad and trait lead to stronger persuasive outcomes. For this purpose, hierarchical regression analyses were conducted. In the first block, participants' personality scores were entered; the second block included a dummy variable representing the comparison of the ad addressing the focal trait (e.g., extraversion) to all the other ad types (e.g., a dummy comparing extraversion vs. other); in the third block, the interaction of the focal trait and the dummy variable (e.g., the interaction of measured extraversion and ad type extraversion vs. other) was entered. All predictors were mean-centered, and the interaction term was computed as the product of the personality trait variable and the dummy variable. Since the dummy logic does not allow for a simultaneous test of all nine conditions, these analyses were repeated for all nine traits (with changes in blocks 2 and 3, while the first block remains the same). If high values in the focal traits result in stronger persuasive effects when the specific ad (compared with all the others) is shown, the interaction term should emerge as a significant predictor.

For attitude toward the product, our first dependent variable (H1), the traits of conscientiousness, agreeableness, and the susceptibilities to scarcity and consensus emerged as significant and positive predictors in the first block. Further analyses in block 2 and 3 only showed a significant influence of the dummy variables for the ad type, namely ads addressing openness and authority (see Table 2), suggesting that the ad highlighting openness resulted in better product evaluations and the ad highlighting authority led to less positive attitudes than other ads. However, none of the interaction terms were significant predictors of our outcome variable. In summary, our results speak against the assumption that ads that correspond with the consumer's traits enhance

Table 2
Hierarchical regression analysis: Effects of trait variables, ad type, and interactions on attitudes toward the product.

	Attitude Product		
	R^2	β	P
Block 1	.123		
Extraversion		.053	.185
Openness		-.056	.173
Conscientiousness		**.152**	**.001**
Neuroticism		-.058	.203
Agreeableness		**.103**	**.022**
Need for Cognition (NfC)		.016	.691
Scarcity		**.165**	**<.001**
Consensus		**.171**	**.001**
Authority		-.023	.647
Block 2	.125		
Ad Extraversion vs. other		.033	.278
Block 3	.125		
Interaction: Extraversion Trait * Ad		.017	.597
Block 2	.128		
Ad Openness vs. other		**.068**	**.028**
Block 3	.128		
Interaction: Openness Trait * Ad		-.012	.693
Block 2	.124		
Ad Conscientiousness vs. other		.012	.693
Block 3	.124		
Interaction: Conscientiousness Trait * Ad		.016	.609
Block 2	.124		
Ad Neuroticism vs. other		-.020	.509
Block 3	.124		
Interaction: Neuroticism Trait * Ad		-.002	.955
Block 2	.124		
Ad Agreeableness vs. other		.019	.532
Block 3	.124		
Interaction: Agreeableness Trait * Ad		.008	.785
Block 2	.124		
Ad Need for Cognition (NfC) vs. other		-.017	.588
Block 3	.124		
Interaction: Need for Cognition (NfC) Trait * Ad		.021	.506
Block 2	.124		
Ad Scarcity vs. other		-.027	.384
Block 3	.124		
Interaction: Scarcity Trait * Ad		.006	.839
Block 2	.124		
Ad Consensus vs. other		.013	.682
Block 3	.124		
Interaction: Consensus Trait * Ad		.003	.925
Block 2	.130		
Ad Authority vs. other		**-.080**	**.010**
Block 3	.130		
Interaction: Authority Trait * Ad		.014	.662

product attitudes. Also, the mean values from the initial MANOVA (see above) only showed small advantages of matched ads over nonmatched ads and only for a limited number of traits. The main effect of match was not significant when controlling for the measured personality traits. On this basis, H1 is not supported.

The regression analyses with purchase intention as dependent variable (H2) showed the following pattern in the first block (see Table 3): Extraversion and the susceptibilities to scarcity, consensus, and authority emerged as significant positive predictors, while conscientiousness was a significant negative predictor. In blocks 2 and 3, the only significant intention predictor was the interaction of authority ad type and authority trait. A subsequent simple slope analysis (see Fig. 2) revealed that people with lower susceptibility to authority expressed a lower purchase intention after being exposed to an ad showing an expert, $b = -0.29$, $SE = 0.09$, $t = 3.05$, $p = .002$, whereas those who are strongly inclined to listen to authorities expressed a slightly higher purchase intention, $b = 0.11$, $SE = 0.09$, $t = 1.20$, $p = .230$, after being exposed to an ad showing an expert, although the slope was not significant. This result shows that a mismatch between ad type and personality trait can diminish purchase intentions in case of the authority

Table 3

Hierarchical regression analysis: Effects of trait variables, ad type, and interactions on purchase intentions.

	Purchase Intention		
	R^2	β	P
Block 1	.441		
Extraversion		**.119**	**<.001**
Openness		.017	.600
Conscientiousness		**-.119**	**.001**
Neuroticism		-.069	.059
Agreeableness		.002	.945
Need for Cognition (NfC)		.003	.915
Scarcity		**.199**	**<.001**
Consensus		**.333**	**<.001**
Authority		**.116**	**.004**
Block 2	.441		
Ad Extraversion vs. other		.025	.306
Block 3	.441		
Interaction: Extraversion Trait * Ad		-.007	.766
Block 2	.442		
Ad Openness vs. other		.038	.122
Block 3	.444		
Interaction: Openness Trait * Ad		.048	.052
Block 2	.441		
Ad Conscientiousness vs. other		-.004	.876
Block 3	.441		
Interaction: Conscientiousness Trait * Ad		.004	.875
Block 2	.441		
Ad Neuroticism vs. other		-.005	.839
Block 3	.441		
Interaction: Neuroticism Trait * Ad		.014	.565
Block 2	.441		
Ad Agreeableness vs. other		-.022	.379
Block 3	.441		
Interaction: Agreeableness Trait * Ad		-.011	.668
Block 2	.441		
Ad Need for Cognition (NfC) vs. other		-.009	.705
Block 3	.441		
Interaction: Need for Cognition (NfC) Trait * Ad		.005	.842
Block 2	.441		
Ad Scarcity vs. other		.004	.857
Block 3	.441		
Interaction: Scarcity Trait * Ad		.003	.903
Block 2	.441		
Ad Consensus vs. other		.012	.625
Block 3	.441		
Interaction: Consensus Trait * Ad		-.001	.957
Block 2	.442		
Ad Authority vs. other		-.040	.112
Block 3	.449		
Interaction: Authority Trait * Ad		**.081**	**.001**

tactic, or – in other words – a match can inhibit the effects of the otherwise negatively evaluated ad with an authority appeal on purchase intentions. Given this finding and the MANOVA results that do not show a consistent main effect of the broader matching variable for the other traits, H2 is not consistently supported – only the interaction for the susceptibility to authority is in line with the hypothesis.

For the dependent measure of the intention to engage with the ad in social media (H3), the regression analyses showed a similar pattern (Table 4). In the first block, extraversion and the susceptibilities to scarcity, consensus, and authority were significant positive predictors, and conscientiousness as well as neuroticism were significant negative predictors. In the subsequent blocks, the interaction of authority trait and ad significantly predicted engagement intentions: Again, those with lower susceptibility to authority expressed a lower engagement intention when the ad featured an authority framing (compared to all the other ads), $b = -0.20$, $SE = 0.10$, $t = 2.02$, $p = .044$, while those with higher susceptibility tended to report a higher engagement intention, $b = 0.14$, $SE = 0.10$, $t = 1.34$, $p = .180$. Although the slope is only significant for lower susceptibility (and thus indicating a negative effect in the case of a mismatch), this interaction pattern is in line with expectations of H3 for the individual susceptibility to authority. The significant interaction of the broader match variable and ad type (in the MANOVA reported above) lends further tentative support for matching effects on engagement intention for the individual susceptibility toward scarcity and consensus as well as extraversion and neuroticism, but not for the other variables.

Concerning RQ1, the overall results suggest that the matching effects are generally limited and that the individual susceptibilities to persuasive strategies, particularly to authority, in interaction with messages tailored to these preferences are more predictive of persuasive outcomes than the Big Five personality traits.

5. Discussion

New technologies and their novel applications are changing people's daily activities and providing new advertising and marketing possibilities. When interacting with these technologies, consumers leave behind digital footprints that can be used by marketers to better understand and address consumers. These changes fuel a rapidly emerging field of so called "computational advertising," on the one hand allowing companies to more precisely track and personalize their interactions with consumers and on the other hand providing academics with opportunities to conduct studies that have not been possible before (Yang, Yang, Jansen, & Lalmas, 2017). While these new opportunities have been appreciated by companies and advertisers, critics argue that such a
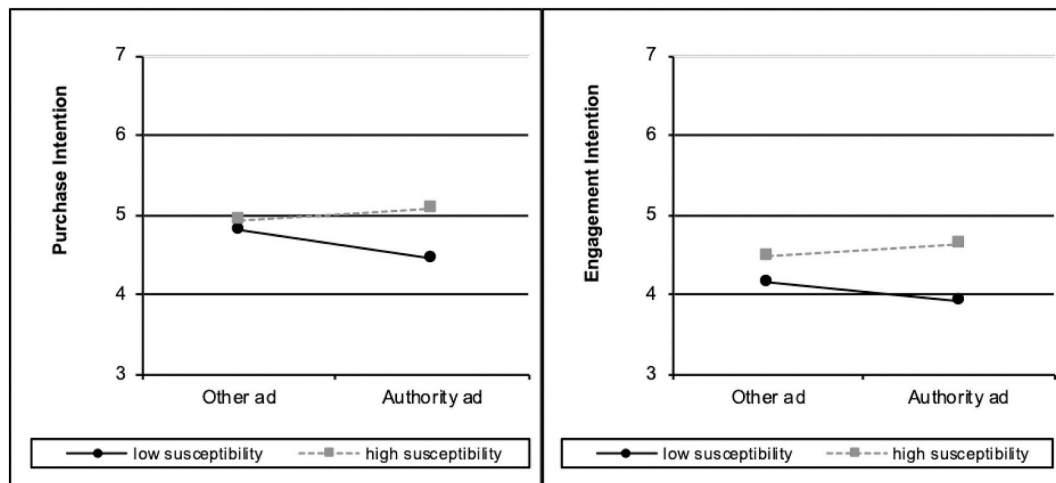

Fig. 2. Simple slops: Interaction of susceptibility to authority and ad type (authority vs. other) on purchase and engagement intention.

Table 4

Hierarchical regression analysis: Effects of trait variables, ad type, and interactions on engagement intentions.

	Engagement Intention		
	R^2	β	p
Block 1	.538		
Extraversion		**.220**	**<.001**
Openness		-.044	.145
Conscientiousness		**-.139**	**<.001**
Neuroticism		**-.079**	**.018**
Agreeableness		-.035	.283
Need for Cognition (NfC)		-.007	.806
Scarcity		**.219**	**<.001**
Consensus		**.316**	**<.001**
Authority		**.133**	**<.001**
Block 2	.539		
Ad Extraversion vs. other		.007	.755
Block 3	.539		
Interaction: Extraversion Trait * Ad		-.007	.743
Block 2	.540		
Ad Openness vs. other		.039	.085
Block 3	.541		
Interaction: Openness Trait * Ad		.024	.277
Block 2	.539		
Ad Conscientiousness vs. other		-.003	.883
Block 3	.539		
Interaction: Conscientiousness Trait * Ad		.025	.274
Block 2	.539		
Ad Neuroticism vs. other		.004	.848
Block 3	.539		
Interaction: Neuroticism Trait * Ad		-.013	.553
Block 2	.539		
Ad Agreeableness vs. other		-.020	.385
Block 3	.539		
Interaction: Agreeableness Trait * Ad		-.016	.467
Block 2	.539		
Ad Need for Cognition (NfC) vs. other		.014	.540
Block 3	.540		
Interaction: Need for Cognition (NfC) Trait * Ad		.030	.193
Block 2	.538		
Ad Scarcity vs. other		-.003	.894
Block 3	.539		
Interaction: Scarcity Trait * Ad		.031	.170
Block 2	.539		
Ad Consensus vs. other		-.021	.339
Block 3	.539		
Interaction: Consensus Trait * Ad		.011	.614
Block 2	.539		
Ad Authority vs. other		-.016	.487
Block 3	.542		
Interaction: Authority Trait * Ad		**.057**	**.012**

detailed level of personalization (or microtargeting) may be misused to persuade consumers without their awareness (see Bodó et al., 2017). Situations when consumers do not know that the ad they just saw was displayed because of their personality traits and personal preferences (inferred from their digital footprints) can be interpreted as hidden and thus unethical persuasion.

Recognizing these changes in advertising and marketing, the present work aimed to empirically test the persuasive potential of social media ads tailored to specific personality traits and personal preferences. For a systematic comparison, we created comparable ads for a drink and a phone in which the slogan and the picture were tailored to either one of the Big Five personality traits, need for cognition (the tendency to enjoy complex thinking), or one of the individual susceptibilities to persuasive strategies, namely authority, consensus, or scarcity (Cialdini, 2001). According to the broadly shared assumption that ads tailored to the recipient's trait are more effective, a person high in a specific trait would be influenced more by an ad specifically targeting this focal trait.

5.1. Theoretical contributions

The results of the experiment show only limited support for this assumption. For consumers' *attitude toward the product,* there was no significant effect of a match (i.e., people who scored higher than the median of the sample on the focal personality trait to which the ad was tailored to) after controlling for the main effects of the personality variables. That is, people who are conscientious, agreeable, and susceptible to scarcity and consensus appeals generally had a more positive attitude toward the product and this effect was not influenced by whether the specific ad matched those traits. According to the regression models that employed comparisons of each ad type (vs. all the other types), additional main effects of the ad emerged with the openness ad being slightly more persuasive and the authority ad being less effective, but there were no significant interactions between the ad type and the personality trait. This suggests that trait-based personalization may not be very effective in influencing attitudes towards the advertised product.

When it comes to *purchase intention,* it was also significantly affected by several personality variables: Extraverts and those who are susceptible to scarcity, consensus, and authority appeals were more inclined to buy the product, whereas conscientious individuals were less likely to purchase it. Beyond those main effects of personality, which occurred independent from the ad type, only one significant interaction between the focal trait and the ad emerged, namely, the ad that portrayed an expert and the slogan "Sensa […]: recommended and owned by experts" led to a lower purchase intention for those less susceptible to authority influence, whereas those with higher susceptibility showed a slightly higher purchase intention when seeing the ad tailored to authority (in comparison to all other ads); however, the latter slope was not statistically significant. This pattern is generally in line with the hypothesis, but specifically occurred on the mismatch side of the continuum. Perhaps the specific ad with the expert was not sufficiently appealing (as discussed above, there was a small negative main effect of this ad on product attitude), and therefore, the ad triggered a negative evaluation, particularly among people who are not inclined to listen to authority figures. On the match side of the continuum, the fit between the ad and the personal preference then likely inhibited this negative evaluation.

A similar interaction between the authority ad and the respective susceptibility significantly affected the *intention to engage* with the ad on social media (e.g., by liking and sharing this ad). For this variable, also a clearer effect of the broader match vs. no-match comparison was detected, even when controlling for the personality variables. Particularly, matched ads led to higher engagement intentions when the ads focused on the susceptibility toward persuasive strategies (scarcity, consensus, and authority) and to a lesser extent when they addressed extraversion and neuroticism. These results provide tentative support for the persuasive potential of messages that employ trait-based personalization but only in few instances. It seems that especially ads that address Big Five personality traits only show a weak advantage of matching versus non-matching ads for triggering engagement intentions. The only consistent pattern we observed was that a match between the expert ad and susceptibility toward authority inhibits a negative effect on purchase and engagement intention (and tended to increase these outcomes by trend). Our overall findings suggest that while trait-based personalization may indeed work, we only observe its effectiveness for very specific cases. Our results rather indicate that tailoring effects are smaller and more difficult to create than previous research suggests (e.g., Hirsh et al., 2012; Kaptein et al., 2012; Matz et al., 2017).

One reason for this discrepancy could be that this experiment focused on more impactful variables that are more difficult to influence, such as purchase intention, whereas the study by Hirsh et al. (2012) measured ad evaluation. Furthermore, their study showed several ads in a within-subject design, which may have fostered comparisons that do not occur in real situations where individuals are exposed to one specific ad only. The present experiment also considered continuous differences

in personality traits, which allowed for a more fine-grained analysis of interaction patterns, rather than a broad match/no-match distinction. It can be argued that actual matching algorithms in social media environments do work with broader categorizations (as they were simulated in the field study by Matz et al., 2017), but their effectiveness then is likely dependent on specific matching thresholds, which future research could establish.

Our findings indicating that people high in specific traits (such as extraversion) generally express higher purchase intentions after ad exposure may partly explain previous results. It has yet to be tested whether this is a robust finding or only occurred for this specific set of products and stimulus ads. An alternative explanation could be that some ads were too similar (e.g., the consensus ad was also somewhat appealing to extraverts) and had characteristics that can address several traits.

5.2. Limitations

This leads to the limitations of the present study that need be considered when interpreting the findings. Although the ads were pre-tested, it cannot be ruled out that they had unsystematic variations that highlighted specific aspects that were attractive to some consumers. As a recent study by Matz, Segalin, Stillwell, Müller, and Bos (2019) shows, certain visuals appeal more to specific personalities. Most importantly, advertising success depends heavily on creativity and quality of the messages, and it is challenging to investigate matching effects in externally valid but systematic ways. This can only be solved by replications and a careful creation or adaptation of stimuli. In comparison to field experiments, the present study did not observe actual click or purchase behaviors but relied on a scenario and questions measuring intentions. It is possible that the actual social media environment and being logged into Facebook or other platforms activate different processes, for example, ads are more native to the context and hence may be processed more naturally and via lower cognitive elaboration. Also, we did not include an actual matching algorithm but randomly assigned participants to one of the ads. This was done to avoid priming participants with certain personality traits and to be able to explore the interactions between ad type and continuous personality traits (that would significantly affect outcomes if matching worked) but may have neglected the comparison to intentional mismatches, as they were included in previous studies (e.g., Matz et al., 2017). That is, if we compare match and no-match participants in the present study, there is no random assignment anymore because people high on several specific traits had a higher likelihood to end up in the match group.

5.3. Social and practical considerations

Concerning the societal debate on microtargeting, the findings indicate that matching effects are detectable for specific traits but are likely to be smaller than hopes of proponents and fears of critics suggest. Still, consumers may unknowingly be subjected to personalized persuasion, which may be considered unethical. It is also possible that tailoring techniques become more sophisticated and shift their focus from one of the nine broad traits that were used in the present study to consider specific combinations of trait-based and cue-based personalization (Maslowska et al., 2016). Emerging technologies may also enable a more interactive use of personalization: Beyond tailoring static ads, automated community management and chatbots may also make use of the digital traces that companies have about individual customers.

Our findings also have implications for marketers and regulators. While trait-based personalization is becoming easier to achieve, companies should think whether it is worth it. They should conduct tests that would also investigate negative consequences of such personalization when recognized by customers. Although trait-based personalization is more subtle than cue-based personalization, customers' persuasion knowledge may be expected to increase due to an increased media

attention to advertising tactics and personalization strategies. Also, regulators, such as the Federal Trade Commission and European Commission, should further investigate the effects and consumers' knowledge about "algorithmic persuasion," and adjust their regulations accordingly. While we see such steps being undertaken in the European Union with, for example, General Data Protection Regulation, such regulations should be updated based on technological developments, and should be present in different countries. While most countries require social media to disclose paid content, they do not specify whether and how different strategies should be disclosed. While behavioral retargeting is somehow disclosed (even though it is not entirely effective, see e.g., Leon et al., 2012, pp. 19–30), personalized advertising is currently not clearly transparent.

5.4. Future research

Based on the findings and limitations of the present study and recent developments in tailoring techniques, further research is needed to assess the potential effects of trait-based personalization in current and emerging technological settings. Specifically, additional experimental studies with realistic stimuli and matching algorithms (or a comparison to classic cue-based personalization) as well as analyses on the precision of trait estimations based on digital traces would be valuable next steps that would allow for a more accurate estimation of the strength of microtargeting effects. Such an endeavor would benefit from more interdisciplinary work between psychologists, communication and advertising scholars, and computer scientists. Additionally, research should be extended to other domains (such as political or health communication) to investigate whether individuals' responses to personalized messages depend on the topical context.

Moreover, there is a need for a further theoretical refinement of the processes that lead to personalization effects. While most studies (ours included) have focused on the persuasive outcomes, the underlying mechanisms are not yet well understood. Theoretical assumptions that have been given so far include increased fluency, higher relevance, congruence with one's self-concept, or higher perception of argument quality (e.g., Heckler & Childers, 1992; Wheeler et al., 2005), and these variables could be included as mediators in future studies. Additionally, a simultaneous variation of argument quality could test whether a matching ad increases elaboration such that differences between high-quality and low-quality arguments become larger. If the crucial mechanisms are detected, it would also be easier to identify potential counterstrategies that could help consumers shield themselves against undesired effects. From the perspective of consumer empowerment, there is an increasing need for research on whether and how media literacy interventions and notification of targeting activities would limit microtargeting effects or even lead to negative evaluations of the advertised products.

6. Conclusion

In summary, the present research provides an empirical contribution to the debate on microtargeting effects and assesses the persuasive effects of messages that are tailored to specific personality traits and preferences in the context of social media advertising. In comparison to cue-based personalization, it was assumed that trait-based personalization is less obvious and leads to better evaluations of the content and thus more positive product attitudes and higher purchase and engagement intentions. Results show a more nuanced picture than has been suggested by the previous research and debates on microtargeting: Matched ads led to higher engagement intentions when they addressed specific persuasive susceptibilities (scarcity, consensus, and authority), extraversion or neuroticism (but to a lesser extent). A match between authority ad and susceptibility to authority exerted a persuasive advantage concerning purchase intention, but there were no consistent effects on consumers' attitudes toward the advertised products. Instead,

some consumers turned out to be more favorable toward most of the ads, regardless of whether they were tailored or not. For instance, extraverts generally indicated higher purchase and engagement intentions.

Findings of the present study thus temper fears (and hopes) that microtargeting may act as a magic bullet in consumer persuasion, however, they do not mean that microtargeting is pointless for advertisers or harmless for consumers. While most studies so far concentrated on the Big Five traits, the present results indicate that tailoring to more specific variables, such as susceptibilities to persuasive strategies, has an effect on engagement intentions (i.e., recommending and forwarding the ad), which has concrete consequences for the ad's visibility and credibility. It can also be expected that novel tailoring techniques will make use of a combination of traits. Thereby, the persuasive capacity of trait-based personalization depends on a complex interplay of advertising quality, matching algorithms, personality traits, and characteristics of the media environment. Given the pace of technological developments, it becomes even more important to further decode and model this interplay.

Credit author statement

Stephan Winter: Conceptualization; Formal analysis; Grant acquisition; Writing - original draft, Ewa Maslowska: Conceptualization; Formal analysis; Grant acquisition; Writing - original draft, Anne Vos: Preparation of Stimuli and Data; Formal analysis; Writing - review & editing

Acknowledgment

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.chb.2020.106525.

References

Aguirre, E., Mahr, D., Grewal, D., de Ruyter, K., & Wetzels, M. (2015). Unraveling the personalization paradox: The effect of information collection and trust-building strategies on online advertisement effectiveness. *Journal of Retailing, 91*, 34–49.

Amichai-Hamburger, Y., & Vinitzky, G. (2010). Social network use and personality. *Computers in Human Behavior, 26*, 1289–1295.

Awad, N. F., & Krishnan, M. S. (2006). The personalization privacy paradox: An empirical evaluation of information transparency and the willingness to be profiled online for personalization. *MIS Quarterly*, 13–28.

Bang, H., & Wojdynski, B. (2016). Tracking users' visual attention and responses to personalized advertising based on task cognitive demand. *Computers in Human Behavior, 55*, 867–876.

Batra, R., & Ray, M. L. (1986). Situational effects of advertising repetition: The moderating influence of motivation, ability, and opportunity to respond. *Journal of Consumer Research, 12*, 423–445.

Bodó, B., Helberger, N., & de Vreese, C. H. (2017). Political micro-targeting: A manchurian candidate or just a dark horse? *Internet Policy Review, 6*.

Boerman, S. C., Kruikemeier, S., & Zuiderveen Borgesius, F. J. (2017). Online behavioral advertising: A literature review and research agenda. *Journal of Advertising, 46*, 363–376.

Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology, 42*, 116–131.

Cialdini, R. (2001). *Influence, science, and practice*. Boston, MA: Allyn & Bacon.

Costa, P. T., & McCrae, R. R. (1992). Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychological Assessment, 4*, 5–13.

Crano, W. D., & Prislin, L. (2011). *Attitudes and attitude change*. New York, NY: Psychology Press.

De Keyzer, F. (2018). *Brand communication on social networking sites*. Belgium: Dissertation, University of Antwerp.

De Keyzer, F., Dens, N., & De Pelsmacker, P. (2015). Is this for me? How consumers respond to personalized advertising on social network sites. *Journal of Interactive Advertising, 15*, 124–134.

Dijkstra, A. (2008). The psychology of tailoring-ingredients in computer-tailored persuasion. *Social and Personality Psychology Compass, 2*, 765–784.

Dodoo, N. A., & Wen, J. (2019). A path to mitigating SNS ad avoidance: Tailoring messages to individual personality traits. *Journal of Interactive Advertising, 19*, 116–132.

van Doorn, J., & Hoekstra, J. C. (2013). Customization of online advertising: The role of intrusiveness. *Marketing Letters, 24*, 339–351.

Eckles, D., Gordon, B. R., & Johnson, G. A. (2018). Field studies of psychologically targeted ads face threats to internal validity. *Proceedings of the National Academy of Sciences, 115*, E5254–E5255.

Edwards, S. M., Li, H., & Lee, J. H. (2002). Forced exposure and psychological reactance: Antecedents and consequences of the perceived intrusiveness of pop-up ads. *Journal of Advertising, 31*, 83–95.

Graves, C., & Matz, S. (2018). What marketers should know about personality-based marketing. *Harvard business review*. May 2 https://hbr.org/2018/05/what-marketers-should-know-about-personality-based-marketing.

Guardian. (2018). https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election.

Gurau, C., Ranchhod, A., & Gauzente, C. (2003). "To legislate or not to legislate": A comparative exploratory study of privacy/personalisation factors affecting French, UK and US web sites. *Journal of Consumer Marketing, 20*, 652–664.

Hawkins, R. P., Kreuter, M., Resnicow, K., Fishbein, M., & Dijkstra, A. (2008). Understanding tailoring in communicating about health. *Health Education Research, 23*, 454–466.

Heckler, S. E., & Childers, T. L. (1992). The role of expectancy and relevancy in memory for verbal and visual information: What is incongruency? *Journal of Consumer Research, 18*, 475–492.

Hinds, J., & Joinson, A. (2019). Human and computer personality prediction from digital footprints. *Current Directions in Psychological Science, 28*, 204–211.

Hirsh, J. B., Kang, S., & Bodenhausen, G. V. (2012). Personalized persuasion: Tailoring persuasive appeals to recipients' personality traits. *Psychological Science, 23*, 578–581.

Hong, J. W., & Zinkhan, G. M. (1995). Self-concept and advertising effectiveness: The influence of congruency, conspicuousness, and response mode. *Psychology and Marketing, 12*, 53–77.

Howard, D. J., & Kerin, R. A. (2004). The effects of personalized product recommendations on advertisement response rates: The 'Try this. It works!' technique. *Journal of Consumer Psychology, 14*, 271–279.

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The big five inventory - versions 4a and 54*. Berkeley, CA. Berkeley: University of California.

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (pp. 114–158). New York, NY: Guilford Press.

Kalyanaraman, S., & Sundar, S. S. (2006). The psychological appeal of personalized content in web portals: Does customization affect attitudes and behavior? *Journal of Communication, 56*, 110–132.

Kaptein, M., de Ruyter, B., Markopoulos, P., & Aarts, E. (2012). Adaptive persuasive systems: A study of tailored persuasive text messages to reduce snacking. *ACM Transactions on Interactive Intelligent Systems, 2*.

Lambrecht, A., & Tucker, C. (2013). When does retargeting work? Information specificity in online advertising. *Journal of Marketing Research, 50*, 561–576.

Leon, P., Cranshaw, J., Cranor, L., Graves, J., Hastak, M., Ur, B., et al. (2012). What do online behavioral advertising privacy disclosures communicate to users?. *Proceedings of the 2012 ACM workshop on Privacy in the electronic society (WPES '12)*. New York, NY, USA: Association for Computing Machinery.

Lu, L. C., Chang, W. P., & Chang, H. H. (2014). Consumer attitudes toward blogger's sponsored recommendations and purchase intention: The effect of sponsorship type, product type, and brand awareness. *Computers in Human Behavior, 34*, 258–266.

Maslowska, E., Smit, E. G., & van den Putte, B. (2016). It is all in the name: A study of consumers' responses to personalized communication. *Journal of Interactive Advertising, 16*, 74–85.

Maslowska, E., Van den Putte, B., & Smit, E. G. (2011). The effectiveness of personalized e-mail newsletters and the role of personal characteristics. *Cyberpsychology, Behavior, and Social Networking, 14*, 765–770.

Matz, S. C., Kosinski, M., Nave, G., & Stillwell, D. J. (2017). Psychological targeting as an effective approach to digital mass persuasion. *Proceedings of the National Academy of Sciences, 114*, 12714–12719.

Matz, S., Segalin, C., Stillwell, D., Müller, S., & Bos, M. (2019). Predicting the personal appeal of marketing images using computational methods. *Journal of Consumer Psychology, 29*, 370–390.

Motherboard. (2017). https://motherboard.vice.com/en_us/article/mg9vvn/how-our-likes-helped-trump-win.

Pfiffelmann, J., Dens, N., & Soulez, S. (2020). Personalized advertisements with integration of names and photographs: An eye-tracking experiment. *Journal of Business Research, 111*, 196–207.

Porter, S. R., & Whitcomb, M. E. (2003). The impact of contact type on web survey response rates. *Public Opinion Quarterly, 67*, 579–588.

Sahni, S., Wheeler, C., & Chintagunta, P. K. (2016). Personalization in email marketing: The role of non-informative advertising content. *Working paper*. Stanford University.

Shamdasani, P. N., Stanaland, A. J., & Tan, J. (2001). Location, location, location: Insights for advertising placement on the web. *Journal of Advertising Research, 41*, 7–21.

Sharp, B., Danenberg, N., & Bellman, S. (2018). Psychological targeting. *Proceedings of the National Academy of Sciences, 115*, E7890. E7890.

Simola, J., Kivikangas, M., Kuisma, J., & Krause, C. M. (2013). Attention and memory for newspaper advertisements: Effects of ad–editorial congruency and location. *Applied Cognitive Psychology, 27*, 429–442.

Tacikowski, P., & Nowicka, A. (2010). Allocation of attention to self-name and self-face: An ERP study. *Biological Psychology, 84*, 318–324.

Tam, K. Y., & Ho, S. Y. (2005). Web personalization as a persuasion strategy: An elaboration likelihood model perspective. *Information Systems Research, 16*, 271–291.

Tsang, M. M., Ho, S.-C., & Liang, T.-P. (2004). Consumers' attitudes toward mobile advertising: An empirical study. *International Journal of Electronic Commerce, 8*, 65–78.

Wang, Y., & Kosinski, M. (2018). Deep neural networks are more accurate than humans at detecting sexual orientation from facial images. *Journal of Personality and Social Psychology, 114*, 246–257.

Wattal, S., Telang, R., Mukhopadhyay, T., & Boatwright, P. (2012). What's in a "name"? Impact of use of customer information in e-mail advertisements. *Information Systems Research, 23*, 679–697.

Wheeler, S. C., Petty, R. E., & Bizer, G. Y. (2005). Self-schema matching and attitude change: Situational and dispositional determinants of message elaboration. *Journal of Consumer Research, 31*, 787–797.

White, T. B., Zahay, D. L., Thorbjørnsen, H., & Shavitt, S. (2008). Getting too personal: Reactance to highly personalized email solicitations. *Marketing Letters, 19*, 39–50.

Wojdynski, B. W., & Evans, N. J. (2016). Going native: Effects of disclosure position and language on the recognition and evaluation of online native advertising. *Journal of Advertising, 45*, 157–168.

Yang, Y., Yang, Y., Jansen, B. J., & Lalmas, M. (2017). Computational advertising: A paradigm shift for advertising and marketing? *IEEE Intelligent Systems, 32*, 3–6.

Youyou, W., Kosinski, M., & Stillwell, D. (2015). Computer-based personality judgments are more accurate than those made by humans. *Proceedings of the National Academy of Sciences, 112*, 1036–1040. https://doi.org/10.1073/pnas.1418680112.

Yu, J., & Cude, B. (2009). Hello, Mrs. Sarah Jones! We recommend this product! Consumers' perceptions about personalized advertising: Comparison across advertisements delivered via three different types of media. *International Journal of Consumer Studies, 33*, 503–514.