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Personalized advertisements with integration of names and photographs: An eye-tracking experiment

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ABSTRACT

This article examines the influence of a job recruitment advertisement personalized with a recipient's name and photograph on the visual attention to the advertisement, the attitudes toward the advertisement and, ultimately, job-pursuit intentions. Perceived ad intrusiveness and attitudinal persuasion knowledge may function as parallel mediators of visual attention and attitude toward the advertisement, with personal privacy concerns as a moderator of this relationship. In a between-subjects eye-tracking experiment, 72 participants view an advertisement on LinkedIn that is either personalized or not personalized. Although the participants fixate on the personalized advertisement more frequently and view it longer, they do not notice it faster or return to it more frequently. Furthermore, enhanced visual attention augments perceived intrusiveness, regardless of participants' levels of privacy concern, and decreases attitudinal persuasion knowledge for those who are less concerned about privacy.

1. Introduction

Social media play a central role in many people's lives; in the United States, for example, 77% of the population has a social media profile (Statista Inc, 2018). Advertisers and recruiters use social media to persuade buyers and recruit talent; they also take advantage of opportunities to customize advertising to individual users according to their personal profiles. For example, LinkedIn offers members the opportunity to embed first names and profile photographs (photos) into advertisements to promote company pages, invite potential employees to discover job openings, or make job offer recommendations. LinkedIn claims this feature drives higher click-through rates.

In marketing, eye-tracking studies show that the inclusion of people's first names (Bang & Wojdynski, 2016) or photos (Malheiros, Jennett, Patel, Brostoff, & Sasse, 2012) increases users' visual attention. Because of advertising clutter and banner blindness, that is, the tendency of users to avoid attending to banner ads or anything that preattentively resembles banner ads (Resnick & Albert, 2014), attention is an increasingly scarce good. It is unclear, however, whether attention actually translates into positive attitudes about, or pursuit of, jobs.

Maslowska, Smit, and van den Putte (2016) show that self-reported attention influences attitude toward personalized ads by instigating deeper processing and triggering more thoughts. They find that in general, perceived personalization triggers more positive than negative thoughts, but the negative effect of negative thoughts on attitudes is much stronger than the positive effect of positive thoughts. They also find that personal identification, achieved by using a subject's first name, is the only strategy among those they test that leads to more negative than positive thoughts.

Some prior research suggests that personalization exerts positive effects through self-referencing (De Keyzer, Dens, & De Pelsmacker, 2015; Walrave, Poels, Antheunis, Van den Broeck, & van Noort, 2016), negative effects through perceived intrusiveness (De Keyzer, Dens, & De Pelsmacker, 2018; van Doorn & Hoekstra, 2013; White, Zahay, Thorbjørnsen, & Shavitt, 2008), and negative thoughts in general (Maslowska et al., 2016). However, these effects may cancel one another out, explaining why Pfiffelmann and Soulez (2018) find no significant differences between ads personalized with first names/photos and non-personalized ads in terms of attitudes toward the ad and intention to pursue jobs.

In this study, we seek to understand this lack of effect by measuring actual rather than self-reported visual attention to highly personalized ads. We use eye-tracking technology to test how visual attention affects recipients' attitudes toward the ad and behavioral intentions related to job pursuit. We also shed new light on the underlying processes of personalization effects by considering the perceived intrusiveness of the

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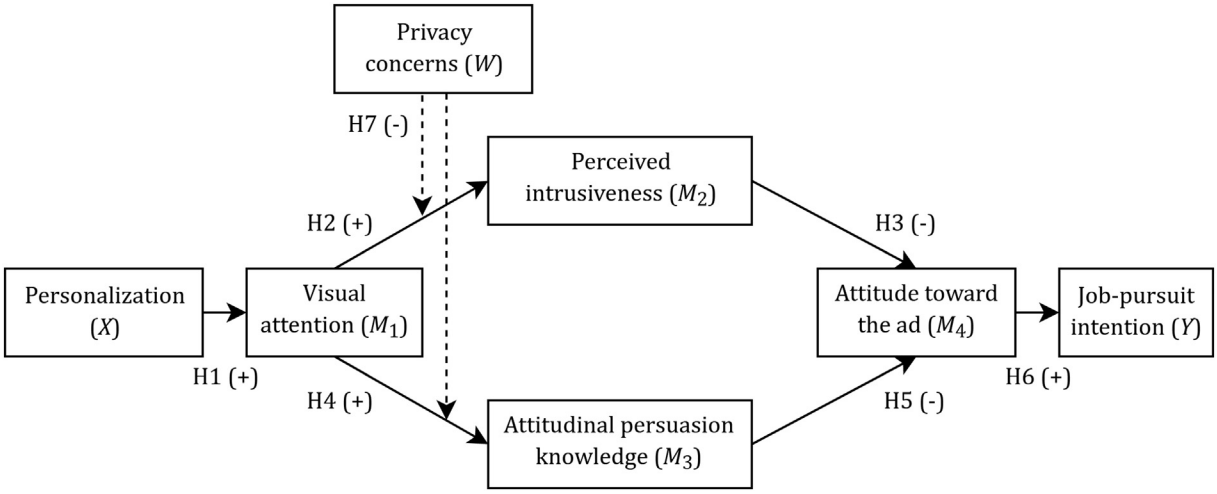


Fig. 1. Conceptual framework.

ad and attitudinal persuasion knowledge as mediators. Finally, we investigate a potential boundary condition of personalization effects by studying the moderating role of people's privacy concerns; privacy concerns influence both ad avoidance and ad skepticism (Baek & Morimoto, 2012), yet personal privacy concerns are influenced by internal and external factors that prompt distinct perceptions of fairness related to firms' practices (Malhotra, Kim, & Agarwal, 2004). We propose that the level of privacy concern moderates perceived ad intrusiveness and attitudinal persuasion knowledge.

Fig. 1 illustrates our conceptual framework. As our main contribution, we provide a better understanding of both the processing of highly personalized ads and a boundary condition of such processing, thereby enhancing theoretical understanding of personalized advertising. We also contribute to research on employer branding: Although attracting potential employees is a perennial difficulty for organizations, and they increasingly use social networking sites to manage employer branding (Kissel & Büttgen, 2015) and attract talent using personalized ads (Pfiffelmann & Soulez, 2018), we still know little about the effects of personalization in the context of recruitment advertising on social network sites.

2. Conceptual background and hypotheses development

2.1. The effect of personalization on attention

Personalization refers to the incorporation of one or more recognizably individual characteristics in persuasive text (Dijkstra, 2008). These characteristics can be common to a segment of people (e.g., age, gender, favorite sports team) or be truly individualized according to a person's own behaviors (e.g., past search terms, website visits) or personally identifying information (e.g., first name, photo). Personalized ads are intended to increase attention (Hawkins, Kreuter, Resnicow, Fishbein, & Dijkstra, 2008) and induce greater elaboration of messages (Petty, Barden, & Wheeler, 2002; Tam & Ho, 2005). In finding that people prioritize processing of their own names and faces over the processing of others' names and faces, Tacikowski and Nowicka (2010) highlight the attention-capturing properties of these self-relevant cues. They also show people have equal attention preferences for these two self-related cues.

In an advertising context, studies of increased attention through personalization have measured self-reported attention (Bragge, Sunikka, & Kallio, 2013; Maslowska et al., 2016), analyzed behavior that is indicative of attention (Tam & Ho, 2005), or used eye-tracking metrics (Bang & Wojdynski, 2016; Malheiros et al., 2012). Malheiros et al. (2012) find that people are more likely to notice ads that feature their own first names or photos, and they look twice as long at ads that include their own photos than those that contain only their first names. Similarly, Bang and Wojdynski (2016) find that participants pay relatively more attention to ads that include their first names and locations than to ads that are not personalized, but they do not notice them any faster.

However, Malheiros et al.'s (2012) and Bang and Wojdynski's (2016) eye-tracking studies explore website advertising, whereas we examine advertising on a social networking site (LinkedIn). We argue that people's attention and reactions to personalized ads may be different on social networking sites than on other websites: Because social media explicitly require users to create profiles, users may be more aware that their personal information is contained in social media systems than in other online environments. Therefore, they may expect—or at least be less surprised by—personalized ads and pay less attention to them. Nevertheless, such ads should attract their attention more than non-personalized ads. To test these predictions, we rely on six eye-tracking metrics (see the “Measures” section for details)—fixation likelihood, fixation count, fixation duration, dwell count, and dwell duration—which enable us to measure likelihood, intensity, and frequency of attention. For the analysis of how fast respondents pay attention, we use time to first fixation.

A personalized photo, or self-face, is a stimulus that is unique to each person; it has unique attentional properties and capacity to attract attention (Devue & Brédart, 2008). However, people tend to have difficulty disengaging their attention from photos of themselves (Devue & Brédart, 2008; Devue, Van der Stigchel, Brédart, & Theeuwes, 2009), which could detract attention from other ad elements, such as recruiter logos or ad copy. Research on sex appeal in advertising shows that attention to pictures in ads can distract people's attention from brand names and result in lower brand recall or recognition (Baker, 1961; Wirtz, Sparks, & Zimbres, 2018). When a visual portion of the message is sexual in nature, processing tends to focus more on the execution and less on the evaluation of the message (Severn, Belch, & Belch, 1990) or brand (Steadman, 1969). Similarly, exposure to one's own face may create temporary distraction from the rest of the ad (Devue et al., 2009). However, prior eye-tracking studies indicate that people look longer at ads as a whole when the ads are personalized with first names or photos (Bang & Wojdynski, 2016; Malheiros et al., 2012), perhaps because they look at other ad elements in addition to the personalized elements. The gaze plots in Bang and Wojdynski's (2016) study suggest this explanation, in that their participants look at other ad elements such as the brand logo and text.

Overall then, we do not know if personalized ads detract people's attention from ad elements; because their own faces are highly self-

relevant stimuli, and people have difficulty disengaging their attention from their own faces, or if personalized ads induce a spill-over effect on other ad elements, by increasing self-relevance, so people more carefully scan the ads as a whole? In line with previous research (e.g., Bang & Wojdynski, 2016), we argue that people pay more visual attention to personalized ads as a whole than they do to non-personalized ads, and they ineluctably pay more visual attention to other elements of the ads.

H1. Compared with a non-personalized ad, a personalized ad containing a user's first name and photo induces greater fixation likelihood, faster time to first fixation, greater fixation count, longer fixation duration, greater dwell count, and longer dwell duration on (a) the ad as a whole, (b) the photo, (c) the recruiter logo, and (d) the advertising copy.

2.2. Personalization as an intrusive strategy

According to the multiple resource theory, people have several types of finite sets of mental resources (Wickens, 2002). Resources committed to primary tasks become unavailable to secondary tasks if they require the same type of mental resources (e.g., visual vs. auditory) at the same stage of processing (e.g., cognitive vs. response-related). Although personalized ads attract attention, they attract it away from tasks (e.g., visiting social media sites to read information or build relationships), thereby interrupting task performance (Simola, Kivikangas, Kuisma, & Krause, 2013). People use social networking sites primarily to pass time and be amused (Ku, Chu, & Tseng, 2013); ads can interrupt those activities. Task interruption leads to negative responses (Cho & Cheon, 2004; Edwards, Li, & Lee, 2002), because intrusiveness is “a psychological reaction to ads that interferes with a consumer's ongoing cognitive processes” (Li, Edwards, & Lee, 2002, p. 39).

Although Bang and Wojdynski (2016) find no evidence that personalized ads impede goal perception, studies show that people perceive personalized ads as more intrusive than non-personalized ads (De Keyzer et al., 2018; van Doorn & Hoekstra, 2013). Furthermore, people consider social network sites “personal space” (Kelly, Kerr, & Drennan, 2010). They may react negatively to personalized ads on social networking sites because they perceive them as disruptive, invasive, and less relevant than ads in other online environments. According to White et al. (2008), ads that use more personal data increase feelings of intrusiveness when consumers do not see legitimate reasons for their personal information to be used. Intrusiveness in turn leads to ad avoidance (Cho & Cheon, 2004) and negatively affects people's attitudes toward the ad and their behavioral intentions (De Keyzer et al., 2018).

According to dual-process theories (Chaiken & Trope, 1999), the more people are exposed to a stimulus, the more they have the opportunity to argue against it. Perceptions of intrusiveness may not emerge when people are processing an ad superficially. The more attention people devote to the ad, however, the more they may start questioning the legitimacy of the use of their private information and to feel interrupted in their online activities. Therefore, visual attention to ads should have a mediating role between personalization and perceived ad intrusiveness.

H2. A personalized ad is perceived as more intrusive than a non-personalized ad, and this effect is mediated by visual attention.

H3. The greater the perceived ad intrusiveness, the more negative the attitude toward the ad.

2.3. Effects of personalization on attitudinal persuasion knowledge

Persuasion knowledge refers to (1) consumers' knowledge and beliefs about tactics marketers use to persuade them, (2) the extent to which consumers find these techniques effective and appropriate, and (3) personal beliefs about how to cope with these persuasion tactics (Friestad & Wright, 1994; Hibbert, Smith, Davies, & Ireland, 2007). Boerman, Willemsen, and Van Der Aa (2017) find that though the affective dimension of persuasion knowledge reflects consumers' tendencies to disbelieve, dislike, and distrust ads, it can be applied to specific ads and act as an attitudinal mechanism for coping with ads. The authors also find that the knowledge that Facebook-sponsored posts are actually ads increases people's critical and distrusting feelings about the ads. Personalization conveys, explicitly or implicitly, that a communication/ad is designed specifically for the user/viewer (“you”) (Hawkins et al., 2008); by signaling that an ad is intended to persuade (Dijkstra, 2008), personalization may act as a forewarning that inhibits persuasion (Petty & Cacioppo, 1986). That is, personalization of ads may signal the persuasive intent of the ads, thus activating people's attitudinal persuasion knowledge and causing them to develop distrust.

The development of persuasion knowledge is typically considered a process requiring attention or cognitive capacity. Campbell (1995) was one of the first to suggest that the use of attention-getting tactics (in her study, late timing of brand identification and borrowed interest appeals), by raising the processing level, may increase the activation of persuasion knowledge. More active processing could lead consumers to think about what an advertiser is doing in the ad and why the ad is in a certain form, increasing the probability of negative processing consequences, such as inferences of manipulative intent. Based on equity theory, she showed that the relationship between the attention-getting tactics and inferences of manipulative intent is mediated by measures of personal benefits, personal investments and the advertiser's investments. Later, Campbell and Kirmani (2000) suggested that, when drawing inferences about individuals or advertisers based on their behavior, people first draw a correspondent inference about the behavior (called characterization) and then correct the correspondent inference with information about situational constraints, such as ulterior motives. Where characterization is fairly automatic, correction requires higher-order processing and greater cognitive capacity (Campbell & Kirmani, 2000). Lang's (2000) limited cognitive capacity theory assumes that one's total cognitive capacity at any one point in time is limited and the capacity being used to perform one task cannot be used to perform another task. Persuasion knowledge is thus less likely to be developed when a person has competing cognitive demands, like when he or she is reading the LinkedIn page surrounding the advertisement. However, when attention and cognitive resources are directed to the ad, the development of persuasion knowledge is more likely. More recently, following the same logic, Evans and Hoy (2016) argued that persuasion knowledge activation may not manifest within an advergaming environment for parents. Advergames are an immersive form of advertising that require substantial cognitive resources for successful navigation. This may prevent parents from recognizing the game's persuasive motives. In the context of personalized advertising, Maslowska et al. (2016) showed that personalization leads to more attentive reading and the increased attention paid to the message in turn evokes both more positive as well as more negative thoughts. Therefore, we propose that visual attention acts as a mediator between personalization and attitudinal persuasion knowledge.

H4. A personalized ad elicits greater attitudinal persuasion knowledge than a non-personalized ad, and this effect is mediated by visual attention.

Consumers' thoughts and feelings about persuasion attempts lead them to resist such attempts when they recognize them as persuasion (Friestad & Wright, 1994). Therefore, activation of persuasion knowledge generates more critical processing, leads to resistance to the persuasive message, and results in more negative attitudes toward the ad or brand (Boerman, van Reijmersdal, & Neijens, 2012; Daems, De Pelsmacker, & Moons, 2018).

H5. The greater the attitudinal persuasion knowledge, the more negative the attitude toward the ad.

Models such as the theory of reasoned action (Fishbein & Ajzen, 1975) suggest a positive relationship between attitude and behavioral intentions. Because the primary objective of job recruitment is to motivate applicants to pursue and accept job openings, job-pursuit intention is a relevant measure of recruitment effectiveness (Cable & Turban, 2003). According to Wei, Chang, Lin, and Liang (2016), there is a close connection between recruitment ad content and potential employees' decision making. Accordingly, we propose:

H6. The more positive the attitude toward a job recruitment ad, the greater the intention to pursue the job.

2.4. The moderating role of individual privacy concerns

Privacy concerns reflect the degree to which people worry about the potential invasion of their right to disclose their personal information to others (Westin, 1967). Information privacy concerns relate to the input, use, and control of data and to people's subjective views of fairness within the context of information privacy (Campbell, 1997). People with high concerns for information privacy express lower perceptions of fairness (Krishen, Raschke, Close, & Kachroo, 2017). Moreover, though people's privacy concerns are influenced by external conditions such as industry sectors, cultures, and regulatory laws (Culnan & Bies, 2003; Park & Jun, 2003; Rohm & Milne, 2004), their concerns also vary with personal characteristics or knowledge of actual corporate policies (Hoy & Milne, 2010; Smit, van Noort, & Voorveld, 2014; Stone, Gardner, Gueutal, & McClure, 1983). Therefore, people often have different opinions about what is fair or not with regard to firms' collection and use of their personal information (Malhotra et al., 2004). By providing people with more control, firms can reduce the effects of privacy concerns. Perceived levels of control exert a negative influence on mobile ad avoidance, through perceptions of the brand's ethical values (Mpinganjira & Maduku, 2019). Moreover, users' perceptions of control over their personal information affect how likely they are to click on online advertising on social networking sites (Tucker, 2014).

Personal privacy concerns are a key factor for understanding people's attitudinal and behavioral responses to online advertising. Privacy concerns lead to ad avoidance (Baek & Morimoto, 2012; Jung, 2017; Mpinganjira & Maduku, 2019) and ad skepticism (Baek & Morimoto, 2012). Thus, if privacy concerns cause people to ignore ads intentionally, it is likely that those concerned about their privacy will perceive personalized ads as more intrusive. Moreover, if privacy concerns lead to ad skepticism, such as distrust in advertising claims or suspicion of the intent of the advertiser, it is likely that greater privacy concerns lead to greater attitudinal persuasion knowledge. We argue that users who are generally more concerned about their privacy on the Internet respond more negatively to personalized ads as the result of perceived intrusiveness and attitudinal persuasion knowledge. Thus,

H7. The influence of visual attention on (a) perceived intrusiveness and (b) attitudinal persuasion knowledge is greater for those who are concerned about their privacy than those who are not.

3. Research methodology

3.1. Research design

The objective of this study is to examine potential employees' attention and response to recruitment ads that are personalized according to first names and personal photographs. To test our hypotheses, we conducted a between-subjects eye-tracking experiment in which we randomly exposed participants to one of two experimental versions of an online LinkedIn job ad, either personalized with first name and photograph ($N = 36$) or not personalized ($N = 36$). In the personalized condition, we automatically imported the first name and photograph of each participant from her or his LinkedIn profile, provided upon registration (see Appendix A.1). In the non-personalized advertisement, we did not include the participant's name or photograph; instead, we featured a professional photograph of either a man (for male participants) or a woman (for female participants) (see Appendix A.2). While adapting the gender of the photo is a mild form of personalization, this choice is relevant from an eye-tracking perspective, because it makes the non-personalized photo more comparable to the personalized photo. It also provides for a stricter test of our hypotheses. The ads were otherwise identical between conditions; both included a short copy ("[First name/Empty] explore jobs at Swish that match your skills"), a call-to-action button ("See jobs") and the recruiter's logo in the same location. We used a fictitious organization ("Swish") to avoid potential bias due to prior brand familiarity (Dens & De Pelsmacker, 2010). We presented the ad on a non-clickable screenshot of the University of Antwerp LinkedIn company page.

3.2. Participants

We recruited participants ($N = 75$) in Antwerp (Belgium) to participate in the experiment in exchange for a €10 gift card from an online retailer. We excluded three participants from the analyses because of poor gaze data (eye-tracking samples that were correctly identified < 50%), leaving a useable sample of 72 participants. These university students and employees ranged in age from 21 to 52 years (70.8% women; $M_{age} = 26.9$ years; $SD_{age} = 7.1$). All had completed at least high school education, making it a relevant sample for LinkedIn; 61.1% of participants were looking for a job or an internship. Table 1 provides a more detailed sample description. The sample did not differ

Table 1
Demographic information about participants.

		Non-personalized condition		Personalized condition		
		n	%	*n*	%	Chi-square test
Gender	Female	28	77.8%	23	63.9%	$\chi^2(18) = 1.68$
	Male	8	22.2%	13	36.1%	
Age	< 23	14	38.8%	5	13.8%	$\chi^2(1) = 27.43$
	23–24	13	36.1%	7	19.4%	
	> 26	9	25%	24	66.7%	
Level of education	Bachelor's degree	19	52.8%	10	27.8%	$\chi^2(8) = 18.64^*$
	Master's degree	14	38.8%	7	19.4%	
	Doctoral studies	3	8.3%	19	52.8%	
Interest in job opportunity	Yes	27	75%	17	47.2%	$\chi^2(1) = 5.84^*$
	No	9	25%	19	52.8%	
TOTAL		36	100%	36	100%	

* $p \leq .05$.

significantly between conditions in participants' age and gender. However, it did differ in the level of education and interest in job opportunities; to control for potential confounds, we added these two variables as covariates in our main analysis.

3.3. Procedure

The experiment took place in the Antwerp Humanities Lab (AnHuLab) of the University of Antwerp, a laboratory equipped with a participant computer station featuring a device-mounted Tobii TX300 eye-tracker (software Tobii Studio 3.4.5.1309) and a separate station for the researcher. We conducted eye-tracking with a monitor frequency of 60 Hz (1.0 frame, 16.7 ms) and integrated the Tobii TX300 eye tracker into a 22-inch screen that was placed 23–32 inches from the participant. Each participant signed up for a 20-minute lab session. When each participant arrived at the lab, the first author explained the procedure.

To start, the researcher conducted a calibration of the eye tracking, by adjusting participants' positions (e.g., chair positions and distance). The researcher then loaded a page containing the first part of the questionnaire, which included measurements of participants' use of LinkedIn and attitudes toward LinkedIn, as part of the cover story that the aim was to evaluate the university's LinkedIn page. Next, participants viewed instructions to consider the University of Antwerp LinkedIn page and read the About Us section before continuing to the questionnaire. The focal ad was included on the right side of this page. Participants could look at the page for as long as they liked, to avoid time pressure or idleness (Orquin and Holmqvist, 2018a). Participants then completed the second part of the questionnaire, as detailed next.

3.4. Measures

3.4.1. Eye-tracking measures

Following guidelines provided by Orquin, Ashby, and Clarke (2016), we analyzed similar sizes and locations of ad areas of interest (AOIs) across respondents. Because of possible noise in the eye-tracking data, the possibility of peripheral attention (Purucker, Landwehr, Sprott, & Herrmann, 2013), variations in calibration, and variations in weight gaze samples, we set up the surface sizes of all AOIs at 120% of the actual area, to keep a small AOI margin and balance the ratio of true and false positive fixations (Orquin et al., 2016). For H1, we considered four AIOs related to the ad. The ad AOI refers to the ad as a whole, with a size of 426px × 426px (181,476px, 8.75% of the page surface); the photograph AOI size was 120px × 120px (11,237px, 0.54% of the page surface), the recruiter logo AOI size was 150px × 60px (9000px, 0.43% of the page surface), and the advertising copy AOI size was 320px × 80px (25,600px, 1.23% of the page surface) (see Appendix A). The screen resolution was 1920 × 1080.

Likelihood of fixation on an AOI was a binary variable that indicated whether the AOI was fixated on or not (12 participants did not fixate on the advertisement during the session) ($M = 0.83$, $SD = 0.37$). Time to first fixation on an AOI was the amount of time that elapsed between the loading of the LinkedIn page and participants' first fixation on the AOI. If at the end of the recording the participant had not fixated on the AOI, we coded the metric as missing ($M = 13.30$, $SD = 16.91$). Fixation count on an AOI reflected the number of times a participant fixated on the AOI, in total (i.e., across all visits) ($M = 7.71$, $SD = 7.19$). Fixation duration on an AOI was the average duration (in seconds) of each individual fixation on the AOI ($M = 0.20$, $SD = 0.11$). Dwell count on an AOI represented the number of individual visits of a participant to the AOI ($M = 2.01$, $SD = 1.42$), and dwell duration on AOI was the average duration (in seconds) of each individual visit to the AOI ($M = 0.82$, $SD = 0.78$).

3.4.2. Self-reported measures

We measured all constructs with 7-point Likert scales or semantic differentials (see Appendix C). We measured perceived intrusiveness with seven items from Edwards et al. (2002) ($M = 3.16$, $SD = 1.21$, $\alpha = 0.910$), and attitudinal persuasion knowledge with three items from Boerman et al. (2017). We reverse-coded the items, such that higher scores of attitudinal persuasion knowledge corresponded to more critical, distrusting attitudes ($M = 4.03$, $SD = 0.82$, $\alpha = 0.660$). We assessed attitude toward the ad with four items from Holbrook and Batra (1987) ($M = 3.97$, $SD = 0.91$, $\alpha = 0.863$), job-pursuit intentions with four items adapted from Cable and Turban (2003) ($M = 3.55$, $SD = 1.21$, $\alpha = 0.883$), and privacy concerns with five items from the global information privacy concern scale by Malhotra et al. (2004) ($M = 4.40$, $SD = 1.26$, $\alpha = 0.847$). As a manipulation check, participants answered, “Did the advertisement contain your first name and your photograph?” (0 = “No,” 1 = “Yes”). Finally, because we used a fictitious brand but wanted to ensure a realistic ad, we measured ad realism with two items adapted from Bechwati and Morrin (2003) ($M = 4.71$, $SD = 1.14$, $\alpha = 0.908$) and employer familiarity with three items from Cable and Turban (2003) ($M = 1.49$, $SD = 1.01$, $\alpha = 0.925$).

4. Results

4.1. Manipulation check and controls

In the personalized condition, 86.1% of the participants correctly identified that the ad contained their own name and photo. In the non-personalized condition, 97.2% correctly indicated that it did not. A chi-square test of independence yielded a significant association between the experimental conditions and the manipulation check question, indicating that our manipulations were successful ($\chi^2(1) = 50.625$, $p < .001$). As expected, participants were not familiar with the (fictitious) employer ($M = 1.49$, $SD = 1.01$). An independent samples t-test revealed no significant difference in the perceived ad realism between the two conditions ($M_{\text{personalized}} = 4.59$, $M_{\text{non-personalized}} = 4.81$, $t = -0.825$, $p = .412$).

4.2. Testing H1

To test H1, we test the differences in means of the eye-tracking metrics (i.e., fixation likelihood, time to first fixation, fixation count, fixation duration, dwell count, and dwell duration) between the two conditions, for each of the four AOIs (i.e., ad as a whole, photo, recruiter logo, advertisting copy). Because it has been demonstrated that many eye tracking measures do not follow a normal distribution (Holmqvist et al., 2011), we performed a Shapiro-Wilk test prior to the statistical analysis. Because the majority of our eye-tracking measures were indeed not normally distributed, we analyzed the data using the Mann-Whitney U test. The Mann-Whitney U test is a non-parametric test used to compare two independent groups. We used logistic regression for the fixation likelihood metric, since fixation likelihood is a binary dependent variable. Table 2 shows the means, standard deviations, and significance tests for the eye-tracking measures per condition for the four AOIs.

Personalization of the ad significantly increases both the fixation count and the dwell duration on the ad as a whole, partially supporting H1a; however, the effect of personalization on the fixation likelihood, time to first fixation, fixation duration, and dwell count on the advertisement is not significant. As predicted by H1b, personalization of the ad significantly influences the fixation count, dwell count and dwell duration on the photo, but the effects for the fixation likelihood, time to first fixation and fixation duration on the photo is not significant. Personalization does not increase the visual attention on the recruiter logo for any of the metrics, rejecting H1c. However, personalization does exert a positive significant effect on all eye-tracking metrics, except for the time to first fixation, for the ad copy, partially confirming H1d. Appendix B visually represents these results in heat maps, which

Table 2
Means, standard deviations, and significance tests of the eye-tracking measures per condition for the four AOIs.

		Advertisement (as a whole)		Photograph		Recruiter logo		Advertising copy	
Dependent variable	Personalization	Mean (SD)	Significance test	Mean (SD)	Significance test	Mean (SD)	Significance test	Mean (SD)	Significance test
Fixation likelihood	No	0.80 (0.40)	$\chi^2(1) = 0.402$	0.55 (0.50)	$\chi^2(1) = 3.03$	0.53 (0.51)	$\chi^2(1) = 0.51$	0.47 (0.51)	$\chi^2(1) = 15.30^{***}$
	Yes	0.86 (0.35)		0.75 (0.19)		0.61 (0.24)		0.89 (0.31)	
Time to first fixation	No	13.29 (17.59)	$U = 405$	21.82 (19.82)	$U = 207$	25.19 (18.97)	$U = 141$	27.48 (19.25)	$U = 183$
	Yes	13.32 (16.54)		15.65 (17.68)		14.18 (16.60)		16.71 (15.78)	
Fixation count	No	5.00 (7.29)	$U = 275^{***}$	0.94 (1.31)	$U = 436^{*}$	0.72 (0.91)	$U = 515$	1.83 (3.86)	$U = 213.5^{***}$
	Yes	10.42 (6.06)		1.67 (1.45)		1.28 (1.45)		6.42 (5.30)	
Fixation duration	No	0.19 (0.13)	$U = 504$	0.14 (0.16)	$U = 536$	0.14 (0.15)	$U = 601.5$	0.10 (0.14)	$U = 255^{***}$
	Yes	0.21 (0.10)		0.18 (0.14)		0.16 (0.18)		0.24 (0.10)	
Dwell count	No	1.72 (1.32)	$U = 499$	0.92 (1.30)	$U = 479.5^{*}$	0.58 (0.60)	$U = 497$	0.86 (1.61)	$U = 290.5^{***}$
	Yes	2.31 (1.49)		1.36 (1.20)		1.14 (1.22)		1.86 (1.22)	
Dwell duration	No	0.49 (0.46)	$U = 301.5^{***}$	0.15 (0.17)	$U = 470.5^{*}$	0.16 (0.18)	$U = 607.5$	0.21 (0.30)	$U = 208^{***}$
	Yes	1.15 (0.89)		0.22 (0.16)		0.17 (0.19)		0.87 (0.61)	

*** $p \leq .001$.
* $p \leq .05$.

indicate more "heat" (green or yellow shade) on the personalized ad than the non-personalized ad. That is, it attracts more visual attention, especially to the photo and the ad copy, in line with our hypotheses tests.

4.3. Testing H2–H7

To test our conceptual framework (Fig. 1), we analyzed the data using Hayes's (2017) PROCESS macro for SPSS (version 3) with 5000 bootstrap samples. The PROCESS macro has become a standard methodological approach to test moderated mediation (Hayes, 2017), widely used in marketing (e.g., De Meulenaer, De Pelsmacker, & Dens, 2018). Unlike sequential approaches, which test effects separately, this method supports simultaneous tests of the various effects in one comprehensive model. We also can calculate conditional indirect effects, at different levels of the moderator. Moreover, we obtain more rigorous, accurate results through the generation of confidence intervals for significance testing with the bootstrap method (Hayes, 2017). To check for ordinary least squares (OLS) regression underlying assumptions, regression residuals were screened for the normality, linearity, independence, and homoscedasticity using procedures from Tabachnick and Fidell (2012). Note that OLS regression requires only for the regression residuals to be normally distributed, not the variables themselves (Hayes, 2017). It is therefore not problematic that visual attention is not normally distributed.

Because our model contains both serial and parallel (moderated) mediation, which is not one of the preprogrammed options in PROCESS, we designed a customized model. We entered personalization as a dichotomous independent variable (0 = no personalization, 1 = personalization), visual attention as the first serial mediator (M_1), perceived intrusiveness as the first parallel mediator (M_2), attitudinal persuasion knowledge as the second parallel mediator (M_3), attitude toward the ad as the final serial mediator (M_4), job-pursuit intention as the dependent variable, and privacy concerns as a continuous moderator. We entered dwell duration on the ad AOI in the process model as the visual attention variable, because it indicates that the ad is an interesting or relevant stimulus (Gwizdka, 2014; Orquin & Mueller Loose, 2013). Moreover, to provide better estimates of the hypothesized model, we entered two variables as covariates: participant's level of education and interest in job opportunity. Both differences in educational background and interest in future career opportunities influence the pursuit of employment opportunities (Lemmink, Schuijf, & Streukens, 2003). The model translates into five equations (see also Table 3):

$$M_1 = i_{M1} + a_{11}X + f_1C_1 + f_2C_2 + e_{M1}; \quad (1)$$

$$M_2 = i_{M2} + a_{12}X + d_{21}M_1 + a_{21}W + d_{22}M_1W + f_3C_1 + f_4C_2 + e_{M2}; \quad (2)$$

$$M_3 = i_{M3} + a_{13}X + d_{31}M_1 + a_{22}W + d_{32}M_1W + f_5C_1 + f_6C_2 + e_{M3}; \quad (3)$$

$$M_4 = i_{M4} + a_{14}X + d_{41}M_1 + d_{42}M_2 + d_{43}M_3 + f_7C_1 + f_8C_2 + e_{M4}; \quad (4)$$

and

$$Y = i_Y + b_1M_4 + g_1C_1 + g_2C_2 + e_Y, \quad (5)$$

where X is the independent variable; M_1, M_2, M_3, and M_4 are the mediating variables; W is the moderating variable; M_1W is the interaction between M_1 and W; Y is the dependent variable; C_1 and C_2 are the covariates; i_{M1}, i_{M2}, i_{M3}, i_{M4}, i_{M5}, and i_Y are the regression intercepts; e_{M1}, e_{M2}, e_{M3}, e_{M4}, and e_Y are errors in the estimates of M_1, M_2, M_3, M_4, and Y, respectively; and a, b, d, f, and g are the regression coefficients for the antecedent variables use to estimate the consequences. For H2 and H4, we report tests of indirect effects that are not directly provided for in the full model but stem from separate analyses conducted according to Hayes's (2017) "model 4," which contains only mediation, without moderators. The indirect effects are significant if their 95% confidence interval (CI) does not include 0.

Table 3 provides the unstandardized regression weights for all estimated paths in the model. The positive, significant effect of personalization on visual attention to the ad ($b = 0.769$, $SE = 0.183$, $p < .001$, 95% CI = [0.405; 1.133]) reconfirms H1a. Visual attention exerts a positive, significant influence on perceived intrusiveness ($b = 0.430$, $SE = 0.211$, $p < .05$, 95% CI = [0.009; 0.850]). The indirect effect of personalization on perceived intrusiveness, mediated through visual attention, is positive and significant (0.328, $SE = 0.178$,

Table 3
Unstandardized regression weights.

Antecedent	Consequent									
	Visual attention (M_1)		Perceived intrusiveness (M_2)		Attitudinal persuasion knowledge (M_3)		Attitude toward the ad (M_4)		Job-pursuit intention (Y)	
	Path	Coeff.	Path	Coeff.	Path	Coeff.	Path	Coeff.	Path	Coeff.
Personalization (X)	a_{11}	0.769***	a_{12}	0.266	a_{13}	0.312	a_{14}	0.117		—
Visual attention (M_1)		—	d_{21}	0.430*	d_{31}	−0.278*	d_{41}	0.083		—
Privacy concerns (W)		—	a_{21}	0.093	a_{22}	0.187*		—		—
Visual attention × Privacy concerns (M_1W)		—	d_{22}	−0.024	d_{32}	−0.340*		—		—
Perceived intrusiveness (M_2)		—		—		—	d_{42}	−0.367***		—
Attitudinal persuasion knowledge (M_3)		—		—		—	d_{43}	−0.465***		—
Attitude toward the advertisement (M_4)		—		—		—		—	b_1	0.528***
Level of education (C_1)	f_1	−0.017	f_3	0.008	f_5	0.060	f_7	0.017	g_1	−0.140
Interest in job opportunity (C_2)	f_2	0.340	f_4	0.091	f_6	−0.030	f_8	−0.023	g_2	0.527
Constant	i_{M1}	−0.482	i_{M2}	2.942***	i_{M3}	3.545***	i_{M4}	6.888***	i_Y	1.843*
R^2	0.221***		0.130		0.203*		0.389***		0.281***	

*** $p \leq .001$.
* $p \leq .05$.

95% CI = [0.050; 0.741]), in support of H2. Perceived intrusiveness exerts a significant negative effect on attitude toward the ad ($b = -0.367$, $SE = 0.078$, $p < .001$, 95% CI = [−0.523; −0.212]), in line with H3.

Unexpectedly, visual attention significantly reduces, rather than increases, attitudinal persuasion knowledge ($b = -0.278$, $SE = 0.137$, $p < .05$, 95% CI = [−0.552; 0.005]), and the indirect effect of personalization on attitudinal persuasion knowledge through visual attention is not significant (−0.180, $SE = 0.120$, 95% CI = [−0.412; 0.076]), so we must reject H4. Attitudinal persuasion knowledge exerts a negative significant effect on attitude toward the ad ($b = -0.465$, $SE = 0.111$, $p < .001$, 95% CI = [−0.686; −0.243]), confirming H5, and attitude toward the ad has a positive and significant influence on job-pursuit intention ($b = 0.528$, $SE = 0.136$, $p < .001$, 95% CI = [0.256; 0.799]), in support of H6. Finally, the interaction effects of visual attention with privacy concerns are not significant for perceived intrusiveness ($b = -0.024$, $SE = 0.206$, $p < .908$, 95% CI = [−0.435; 0.387]) but are positive and significant for attitudinal persuasion knowledge ($b = 0.340$, $SE = 0.134$, $p < .05$, 95% CI = [0.073; 0.607]), so we reject H7a but confirm H7b. The total effect of personalization on job-pursuit intentions is not significant (−0.023, $SE = 0.302$, $t = -0.077$, $p = .939$, 95% CI = [−0.626; 0.580]).

Fig. 2 offers a graphic representation of the visual attention × privacy concerns interaction on attitudinal persuasion knowledge. The solid line maps the conditional direct effect of visual attention (i.e., dwell duration on the ad AOI) on attitudinal persuasion knowledge at different levels of privacy concerns. The dotted lines around the solid line mark the 95% CI. According to the upward slope, visual attention exerts a greater effect on attitudinal persuasion knowledge when people are more concerned about their privacy. At low levels of privacy concern (left side of graph), visual attention exerts a more negative effect on attitudinal persuasion knowledge. Recall that we coded attitudinal persuasion knowledge such that higher scores represent more negative opinions about the honesty, trustworthiness, and convincing nature of the ad. Those with less privacy concerns are less likely to develop negative attitudes while they look at the ad longer. Those who are more concerned about their privacy are more likely to develop attitudinal persuasion knowledge the longer they look at the ad. However, this effect is not significant; the 95% CIs contain 0 once respondents' privacy concerns scores exceed 4.42.

Consistent with our result for H7a, the index of moderated mediation (i.e., the direct quantification of the linear association between the indirect effect and the putative moderator of that effect) between personalization and job-pursuit intention through the perceived intrusiveness parallel path is not significant (index = 0.004, $SE = 0.038$, 95% CI = [−0.093; 0.064]). The index between personalization and job-pursuit intention through the attitudinal persuasion knowledge parallel path is negative and significant (index = −0.064, $SE = 0.040$, 95% CI = [−0.155; −0.002]).

5. Discussion and conclusion

5.1. Theoretical implications

From a theoretical standpoint, this eye-tracking experiment confirms that personalizing job ads with potential employees' first names and photos attracts greater visual attention, such that people fixate on the ad more frequently (fixation count) and visit it longer (dwell duration). This evidence suggests greater involvement with and deeper processing of such ads (Petty et al., 2002). In line with Bang and Wojdynski (2016), we find that personalized ads do not attract visual attention faster (time to first fixation). In our study, unlike in theirs, personalization does not make people visit the ad more frequently (dwell count). One explanation for the lack of effect of personalization on time to first fixation and dwell count may be that users are mostly aware that their personal information is known to the system, especially on social networking sites, and they are growing accustomed to such advertising; 43.1% of respondents reported having seen this type of personalized advertising before. Therefore, personalization may be less “surprising” to users. Recent research on personalized advertising on social networking sites suggests that people now expect personalization, especially on social media (De Keyzer et al., 2018).

Although personalization increases visual attention, the increase is detrimental to people's attitudes toward the ad and their resulting job-pursuit intentions, because it enhances their perceptions that the ads are intrusive. The attention devoted to highly personalized ads distracts users from their primary goals (i.e., whatever they were interested in doing on LinkedIn) (e.g., Cho & Cheon, 2004; Edwards et al., 2002; Simola et al., 2013). This effect is consistent regardless of people's level of privacy concern. This lack of interaction could be explained by the fact that our measure of perceived intrusiveness relates more to task interference than to invasion of privacy.

Surprisingly, ad personalization does not have an influence on attitudinal persuasion knowledge through visual attention paid to the ad.

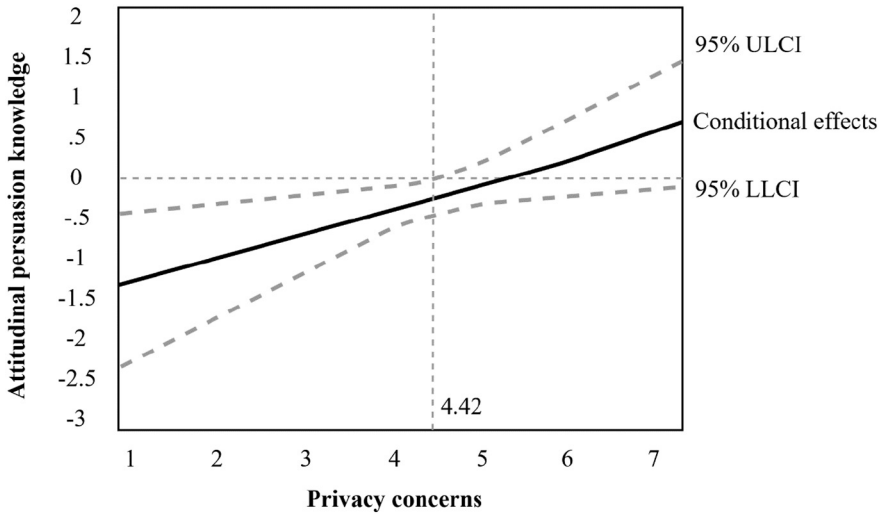


Fig. 2. Conditional direct effect of visual attention (i.e., dwell duration to the ad AOI) on attitudinal persuasion knowledge at different levels of the moderator (privacy concerns).
Notes: LLCI = lower limit confidence interval; ULCI = upper limit confidence interval.

Based on prior literature, we expected that personalization would signal persuasion, and enhanced attention to the ad would lead to the development of (negative) persuasion knowledge. However, our results proved the opposite: the longer people visit the ad, the more they find it trustworthy and convincing. This finding is consistent with the results of Maslowska et al. (2016), who found that increased attention lead to both more positive and more negative thoughts and that the total effects of perceived personalization and of attention on recipients' attitudes toward the message were positive. Processing personalized ads may put people in a self-referencing mode. Research shows that using self-referent cues induces positively biased processing of a message (Burnkrant & Unnava, 1989). Moreover, it could be that people do not perceive recruitment advertising as a "selling" attempt, but rather a genuine attempt by organizations or social network algorithms to recognize their skills and inform them about appropriate job opportunities. Personalized recruitment ads could signal considerateness on the part of the recruiter. In this sense, more research is needed on persuasion knowledge in recruitment advertising contexts. Our results further indicate that ad personalization reduces negative attitudinal persuasion knowledge through visual attention only among those who are less concerned about their privacy. Possibly, the less people are concerned about their privacy, the less skeptical they are of advertising and the more they trust it.

5.2. Managerial implications

Our research offers important implications to advertisers, employers, and social media page administrators. Recruitment advertising on social networking sites is becoming increasingly popular to reach potential employees. However, as with any type of advertising, it is difficult to attract the attention of potential employees, due to advertising clutter and banner blindness (Resnick & Albert, 2014). Personalization using potential employees' first names or photos is an effective attention-capturing strategy, participants not only fixate on their own photos more frequently and visit it longer and more frequently, but also devote more visual attention to the ad copy. Personalization with a user's name and photo thus offers a great way to increase message processing and possibly raise click-through rates.

At the same time, there is a concern that personalization could reflect negatively on a brand or organization because personalized ads would be perceived as more intrusive and could raise suspicion of advertising motives. While we do find that, by boosting visual attention, personalization raises perceptions of intrusiveness, it actually helps to reduce negative thoughts about the trustworthiness of the ad. When adding up all the different effects, personalization does not exert any significant effect on job-pursuit intentions, either positive or negative. Although the overall effect of personalized ads on job-pursuit intention is not greater than the overall effect of non-personalized ads, managers may wish to benefit from the attention-capturing nature of personalized ads, especially in cluttered advertising contexts.

5.3. Limitations and avenues for further research

This study has some limitations. First, it uses a relatively small convenience sample ($N = 72$), because the procedure requires participants to be physically present in the lab. Although smaller samples are common to eye-tracking experiments (e.g., Bang & Wojdynski, 2016; Purucker et al., 2013; Resnick & Albert, 2014), our study could suffer from a lack of power, which could explain why some of our eye-tracking metrics do not differ significantly between groups (Type II errors).

Second, even participants who did not visually fixate on the advertisement ($N_{\text{personalized}} = 5$, $N_{\text{non-personalized}} = 7$) or did not answer the manipulation check question correctly ($N_{\text{personalized}} = 5$, $N_{\text{non-personalized}} = 1$) were included in the conditional process analysis. This choice could be questioned from a methodological perspective. From a managerial perspective, however, it is relevant to measure attitude and behavior for all those exposed, not just those who visually fixate on the ad or fully recall its content elements.

Third, we tested an "advanced" form of personalization that currently exists only on LinkedIn; personalized ads that integrate personally identifiable information such as name are common in email marketing (White et al., 2008), but the inclusion of personalized names or photos is not currently possible in display ads (Malheiros et al., 2012). However, because social networking sites are becoming ubiquitous and more personal information is publicly available (Acquisti, Brandimarte, & Loewenstein, 2015), this form of personalization might be introduced on other social networking sites as well. In its news feed, Facebook already produces personalized videos that include users' first names and personalized photos on special occasions (e.g., friendship anniversaries). Although not currently used for external advertising, it is conceivable that this practice will become more widespread. We expect our results to hold on other platforms and for other products, but further research is needed.

Fourth, the hypothesized relation from attention to attitudinal persuasion knowledge is consistent with, for example, Campbell (1995)

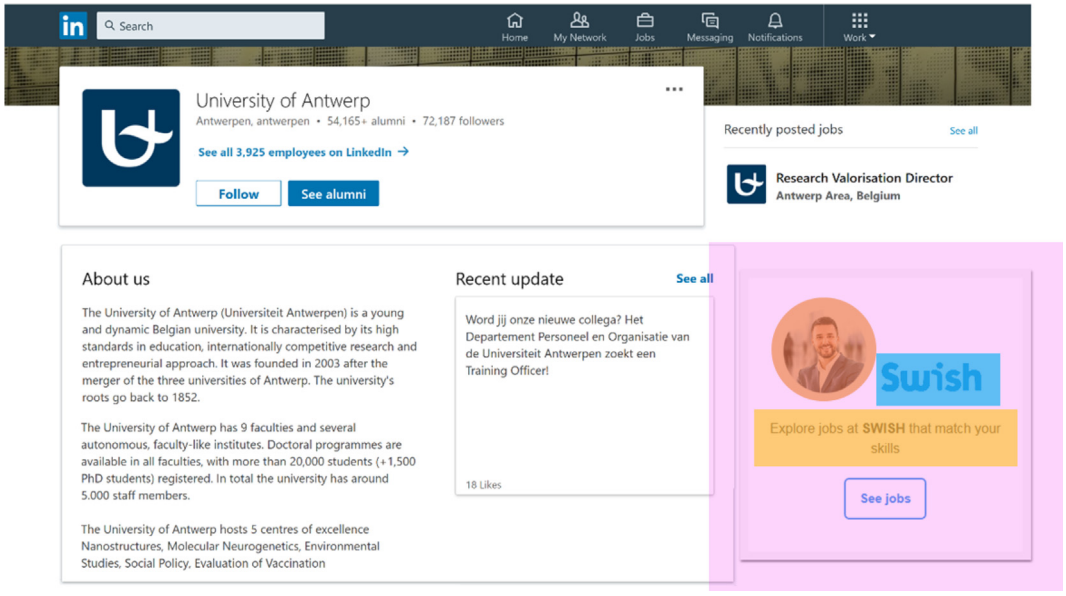
and Maslowska et al. (2016). However, our model is purely correlational and cannot establish causality. While we believe there is less theoretical support for a reverse causality, further research should explore the causal relations between the two constructs. In the context of disclosures for product placements, persuasion knowledge has been shown to exert a positive effect on brand memory through priming (Matthes & Naderer, 2016; van Reijmersdal, Lammers, Rozendaal, & Buijzen, 2015). However, these studies did not measure attention. It is quite possible that here, too, attention mediates the effect of disclosure on persuasion knowledge, which then results in increased brand memory. In addition, these studies are correlational as well. This relation therefore deserves further research.

Fifth, we suggest that academics examine whether perceived intrusiveness differs depending on the type of social networking sites on which the personalized ad appears because behavioral outcomes are more engaging and decision-oriented on job-related social networking sites (e.g., LinkedIn) than on other social networking sites (e.g., Facebook).

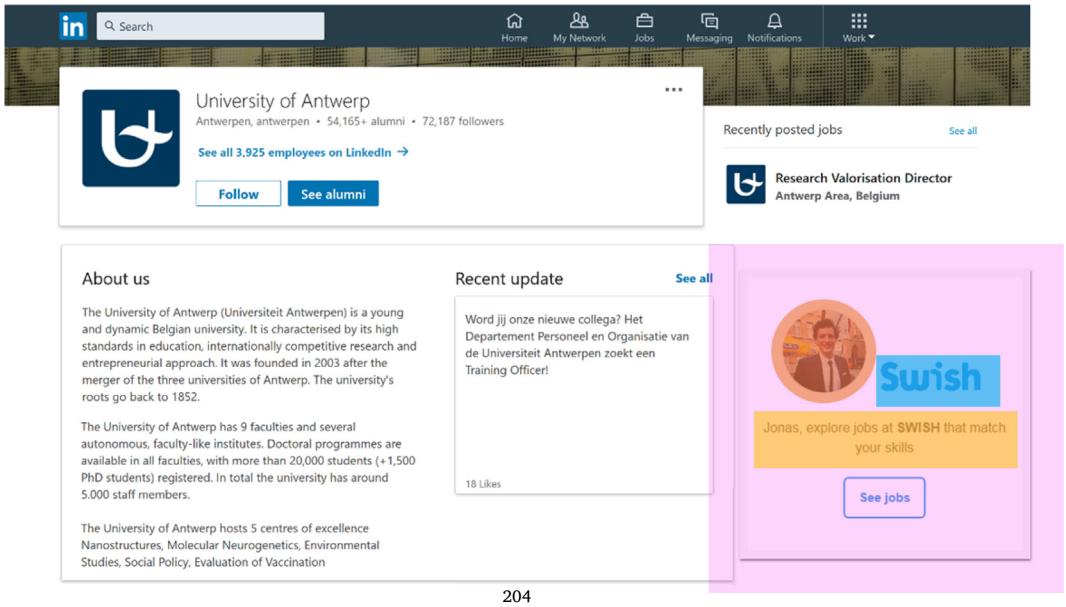
Finally, our finding that visual attention reduces attitudinal persuasion knowledge deserves further attention. Do other moderators (e.g., cognitive capacity, need for cognition) explain this effect, or is it context-specific? Perhaps recruitment ads do not trigger the same levels of persuasion knowledge as product ads with clear selling intent. Researchers could investigate this question to uncover other potential mediators and moderators.

Appendix A. Stimuli with AOIs

A.1. Non-personalized advertisement with AOIs (version for male)



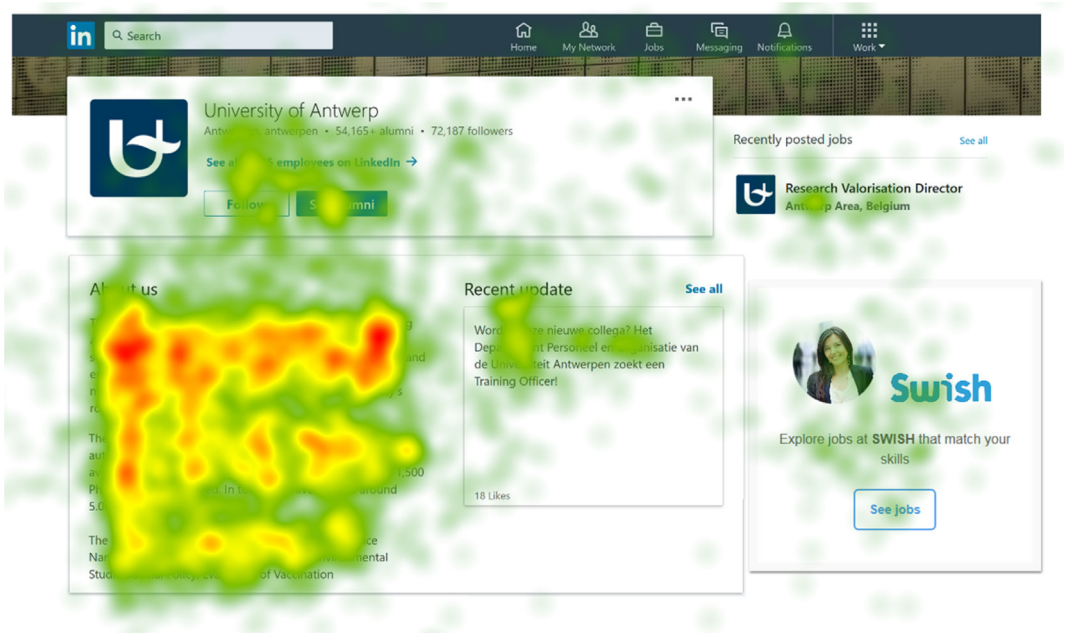
A.2. Personalized advertisement with AOIs (name and photograph differ per participant)



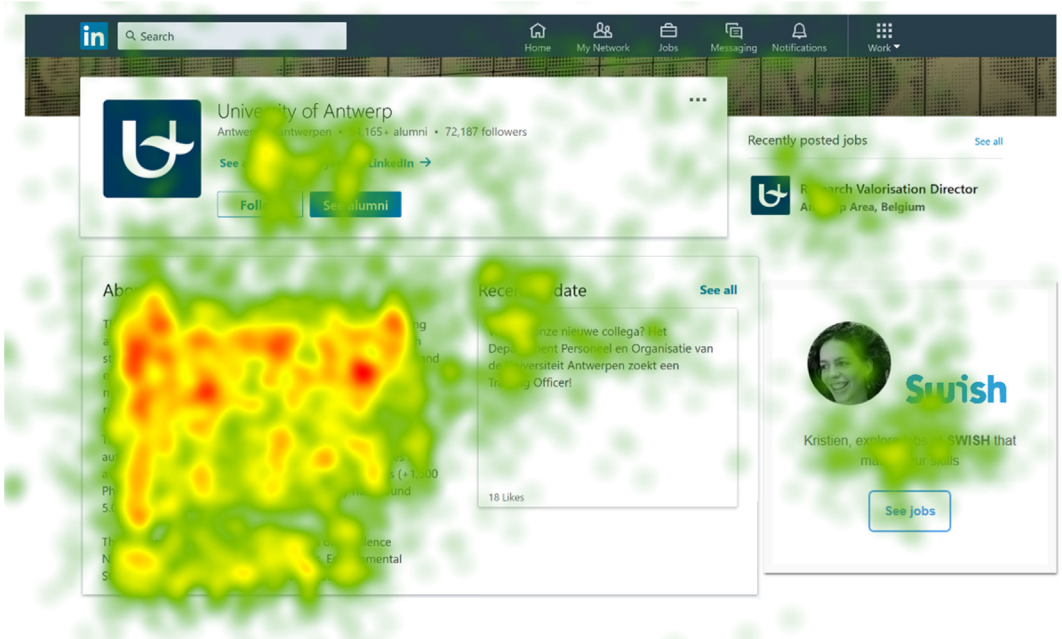
AOIs legend: Violet = Advertisement (as a whole); Red = Photograph; Blue = Recruiter logo; Yellow = Advertising copy.

Appendix B. Visual heat maps

B.1. Heat map for non-personalized advertisement (version for female)



B.2. Heat map for personalized advertisement



Appendix C. Constructs, items, and scale sources

Items	Factor loading
Perceived intrusiveness (α = 0.910) (Edwards et al., 2002)	

• The advertisement was distracting.	0.714
• The advertisement was disturbing.	0.770
• The advertisement was forced.	0.794
• The advertisement was interfering.	0.853
• The advertisement was intrusive.	0.843
• The advertisement was invasive.	0.874
• The advertisement was obtrusive.	0.833
Attitudinal persuasion knowledge (α = 0.660) (Boerman et al., 2017)	
• I think the advertisement was honest.[a]	0.828
• I think the advertisement was trustworthy.[a]	0.819
• I think the advertisement was convincing.[a]	0.688
Attitude toward the advertisement (α = 0.863) (Holbrook & Batra, 1987)	
• I dislike/like the advertisement.	0.856
• I react unfavorably/favorably to the advertisement.	0.892
• I feel negative/positive toward the advertisement.	0.885
• The advertisement is bad/good.	0.739
Job-pursuit intention (α = 0.883) (Cable & Turban, 2003)	
• I would exert a great deal of effort to work for this company.	0.818
• I would like to work for this company.	0.832
• I would be interested in gathering more information about this job opening.	0.873
• I would be willing to attend an information session about this job.	0.937
Privacy concerns (α = 0.847) (Malhotra et al., 2004)	
• All things considered, the Internet would cause serious privacy problems.	0.693
• Compared to others, I am more sensitive about the way online companies handle my personal information.	0.874
• To me, it is the most important thing to keep my privacy intact from online companies.	0.790
• I believe other people are not enough concerned with online privacy issues.	0.716
• I am concerned about threats to my personal privacy today.	0.854
Advertisement realism (α = 0.908) (Bechwati & Morrin, 2003)	
• The advertisement is not realistic/realistic.	0.957
• The advertisement could exist unlikely/likely in real life.	0.957
Employer familiarity (α = 0.925) (Cable & Turban, 2003)	
• Before this survey, I knew quite a bit about the company Swish.	0.946
• Before this survey, I was very familiar with the company Swish.	0.926
• Before this survey, I was familiar with Swish's products or services.	0.943

[a] Reverse coded.

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