Models in print advertisements modulate attention: insights from an eye tracking study

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Abstract: Model's faces are often used in advertising. A large amount of literature in psychology and neurosciences demonstrates that attention is preferentially oriented towards face. This stimulus is fixed longer and processed faster compared to other classes of visual stimuli (objects). Furthermore, eyes are the most attended face feature. They convey a wealth of information about other's attention and intention. Attention is automatically oriented to detect and follow gaze direction. For example a direct gaze towards the viewer can be used to focus observer's attention on a face, whereas an averted gaze can be used to direct observer's attention to an object or a point in space. Several studies demonstrate the role of gaze cues in orienting observer's cognitive processes. In marketing, little is known about gaze direction effect on consumer attention and memory towards advertisement. This paper aims to examine the influence of model's gaze direction in print advertisements on observer's responses.

Sixty four adults participated in an eye-tracking experiment. Participants were asked to read an on-screen magazine containing advertisements. All participants showed three experimental conditions (within-subjects design): no face condition, the model's-gaze-at-observer condition (direct gaze), and the model's-gaze-at-product condition (averted gaze).

Results showed that attention towards the ads is stronger in face condition (vs. no face condition) and in averted gaze condition (vs. direct gaze). Moreover averted gaze, relative to direct gaze, increased recall and recognition of executional elements. The present study demonstrates that advertisers should consider the "eye contact effect" in their ads.

Keywords: advertising, attention, gaze direction, eye tracking, memory

Introduction

Faces are a special class of stimuli due to the wealth of information they convey and they are an important source of information in human social interactions. In psychology, many studies underline the existence of a preference to treat face visual stimuli to which we automatically give more attention than other visual stimuli (Awh et al., 2004; Reddy et al., 2004). According to Weaver and Lauwereyns (2011, p. 10) "faces receive mandatory processing when competing for attention with stimuli of less sociobiological salience". Some studies propose that faces are fixed longer and processed faster compared to other classes of visual stimuli (for example, objects) (Franck et al., 2009; Caldara et al., 2003). Frank et al. (2014) claimed that attributing more attention to faces is a phenomenon that appears very early in a human life, moreover they noted that this tendency of tracking human face seems to increase with age. In neuroscience, some studies demonstrate that face is processed in specific brain areas (Gauthier et al., 2000; Rossion et al., 2012). These complementary approaches emphasize that face has a special visual processing advantage as well as a special ability to engage attention over other types of stimuli.

Nevertheless, humans are not equally sensitive to all face parts. Eyes are the most attended face feature and are most commonly used as source of information (Saether et al., 2009). Eyes are characterized by a white sclera surrounding the dark-colored iris. This unique morphology facilitates the detection of gaze direction from other individuals (Kobayashi and Kohshima, 2001). Gaze has important functions in human social interactions: a gaze directed towards the viewer (direct gaze) can be used to focus observer's attention on a face, whereas an averted gaze can be used to direct observer's attention to an object or a point in space (Emery, 2000). Several studies in psychology and neuroscience demonstrate the role of gaze direction not only in orienting observer's attention but also in influencing memory processes (Mason et al., 2004).

Despite the frequent presence of faces in advertisements scarce marketing research addresses this topic. It could be interesting to gain a more in-depth understanding about gaze direction effect on consumer attention towards ads and its influence on ad's content memorization. In this manuscript, we shed a light on gaze direction's capacity to catch observers' attention and to benefit from a privileged attentional processing. In this study, we will examine the following research question: How the perceived gaze direction in print advertisement could affect observer's attention and memory? We compare the model's-gaze-at-observer condition (direct gaze) and the model's-gaze-at-product condition (averted gaze). Based on a literature review in psychology and neurosciences demonstrating that attention is preferentially and automatically oriented to detect and follow eye gaze direction (Driver et al., 1999; Shepherd, 2010), we expected that averted gaze will orient observer's attention towards the product and will improve its processing.

Theoretical framework and hypothesis

Effects of gaze direction on cognitive processing

Over the past years, researchers in psychology have found that human beings give a great attention to gaze. The "eye contact effect" is a phenomenon that occurs when a person detects an eye contact. It immediately modulates observers' cognitive processing (Senju and Johnson 2009). The preference for gaze compared to other visual stimuli occurs at a very early stage of an infant's life. Many studies found that from the earliest months, infants showed a preference

for eyes they gazed more than other face parts (Haith et al., 1977; Batki et al. 2000). Infants also showed a capacity to follow the gaze direction (Marotta et al., 2013). This gaze following behavior was defined as looking in the same direction as others after seeing their gaze direction (Kano and Call, 2014). Gaze direction perception activates a more reflexive shift of attention in response to gaze cues than the one activated by other direction indicators such as for example arrows (Engell et al., 2010). Recent researches in neuroscience infer that gaze preferential processing could be explained by the existence of neural networks specifically dedicated to gaze processing (Puce et al., 1998; Nummenmaa and Calder, 2009). Baron-Cohen (1994) has suggested the existence of an "eye direction detector", which detects eyes presence in the visual field and identifies their direction.

Emery (2000) distinguishes the "mutual gaze" from the "joint attention". In "mutual gaze" case, attention of individuals A and B is directed at one another, while in "joint attention" case individual A follows B's gaze to a novel focus of visual attention such as an object. Faces displaying a gaze directed towards the viewer (direct gaze) are more rapidly detected (Yokoyama et al., 2013) and gazed longer compared to faces with an averted gaze (Farroni et al., 2002). Moreover, when a direct gaze is noticed, it dominates observer's cognitive processing: the observer's attention is focused on the gaze itself hindering peripheral target detection. Senju and Hasegawa (2005) reported that peripheral target detection becomes slower when participants look at faces with gaze directed towards the viewer rather than at faces with averted gaze. Contrariwise, several studies have shown that when averted gaze is noticed, observer's attention is rapidly and automatically oriented towards the direction indicated by gaze. Moreover, some authors have demonstrated that if the target location is compatible with the direction of the cue, gaze cues facilitate responses to an upcoming target too (Driver et al., 1999; Marotta et al., 2013). Furthermore, some studies investigated the effect of gaze direction on memory processes. Faces with direct gaze were better recognized than faces with averted gaze (Hood et al., 2003; Mason et al., 2004; Yamashita et al., 2012). Averted gaze seems to disrupt face configural encoding compared with direct gaze (Young et al., 2014).

Effects of gaze direction in advertising

To the best of our knowledge, there are very few published articles using eye-tracking to examine the influence of gaze direction in an advertising context.

Hutton and Nolte (2011) explored the influence of model's gaze direction in print advertisement. The authors compared two conditions: direct gaze versus averted gaze (without examining a no-face condition). They found that observer's attention towards a) the advertisement (whole content), b) the product and c) the brand was higher in averted gaze condition compared to direct gaze condition (memory measures were not assessed).

Sajjacholapunt and Ball (2014) examined the influence of model's gaze direction in banner advertisements. The authors compared the influence of three conditions (no face, face with direct gaze, and face with averted gaze) on attention to whole advertisement content and to each executional element (face, text and product). They also explored the influence of these three conditions on ad memorization. Sajjacholapunt and Ball (2014) found that observer's attention to banner advertisement is higher in "face" condition (direct gaze or averted gaze) compared to "no face" condition. But attention to banner advertisement did not differ between direct gaze and averted gaze conditions. For horizontal banner advertisements, observer's attention to face was identical in averted gaze and direct gaze conditions, while attention to face in direct gaze condition was higher than in averted gaze condition for horizontal banner

advertisements. Furthermore, they found that banner advertisements with averted gaze increased attention to the text and the product compared to banner advertisements with direct gaze. Finally, advertisement memorization was measured explicitly (recognition test) and implicitly (word fragment completion test). Results showed that banner advertisements containing a face were better memorized than banner advertisements without face. Also, averted gaze increased advertisement memorization compared to direct gaze.

Hypotheses
In this study, we propose to measure the influence of gaze cues on both attention and memory in print advertisement context.

Based on past research, our first corpus of hypotheses postulate, on the one hand, that attention to ad's content should be higher in the face condition versus no face condition and, on the other hand, that attention to ad's content should be higher in the model's-gaze-at-product condition than model's-gaze-at-observer condition.

Our second corpus of hypotheses, thus, postulate, on the one hand, that memorization of ad's content should be higher in the face condition versus no face condition and, on the other hand, that memorization of ad's content should be higher in the model's-gaze-at-product condition than model's-gaze-at-observer condition.

Method

Participants
Sixty-four adults (32 women) aged 21–48 years (M = 30.75, SD = 7.60) participated. Participants, recruited through a lifelong learning program, were volunteered to take part in the study without any incentive.

Stimuli
The experimental procedure should reproduce real-life conditions to avoid the bias of a forced exposure to advertising. Thus, participants were asked to read an on-screen magazine containing advertisements. A fictive travel magazine containing 12 pages with 5 advertisements was created. The three target advertisements concerned products that may be purchased and/or consumed by both men and women and brands not marketed in the country of the test were chosen: Doo (orange juice), Crystal (ice cream), Baïko (yogurt). Two well-known brands (Club Med and Lay's) were used for distractive advertisements to ensure that participants will not question the presence of unknown brands only.
Two attractive models were selected. A pre-test and a post-test showed the same level of attractiveness for both models. For the three target advertisements, five versions were created: one version with only a product, two versions (model 1 and model 2) with the model's gaze directed towards the viewer and two versions (model 1 and model 2) with the model's gaze directed towards the product. Facial expression (neutral) and head orientation remain identical. A total of 15 advertisements were designed [3 brands with no face + (3 brands x 2 models x 2 gaze directions)]. All advertisements were inserted in the same position (bottom of the right-hand pages) and their order of appearance was randomized.

Equipment
Participants were comfortably seated in an eye-tracking laboratory, and their eye movements were recorded with an eye tracker [SensoMotoric Instruments (SMI) RED 500, Berlin, Germany]. We used the corneal reflection eye-tracker SMI which records the gaze position

every 4 milliseconds (sampling frequency 250 Hz). This system is equipped with two diodes emitting infrared rays and an image recognition software to track the movements of the pupil center and corneal reflection. The eye-tracker was installed 70 cm from participants and 20 cm in front of the screen on which was projected in the magazine (Dell 22-inch screen). Eye movement recordings and stimulus timing were controlled by Experiment Center™ software [by SMI]. Fixations, saccades, and blinks were extracted with the BeGaze™ software [by SMI]. The resulting values were analyzed with SPSS Version 19.

Measures

To test how attention was distributed across the magazine, we divided each target pages into seven areas of interest, AOIs [face, product, brand name, and headline into the ad, the whole ad, the informative text, and the page (text and ad)]. The AOIs were defined by drawing rectangles over different parts of the stimulus page by using the analysis software. Two main eye-tracking measures were considered: total fixation duration (the length of the fixations in seconds within an AOI) and fixation count (the total number of fixations detected within an AOI).

For memorization, recall and recognition tests were used: free recall of ad elements (participants should restitute all the elements of the advertisements they remembered), cued recall of product categories, brands and headlines presented in advertisements; recognition task for product categories, brands and headlines (with a list of 12 items; 1 target for 3 distractors). Scales were used to measure attitude towards the advertisement (Aad) (Holbrook and Batra, 1987), and product categories involvement (Strazziéri, 1994).

Procedure

Upon their arrival at the laboratory, participants were escorted to a soundproof room equipped for eye tracking and seated in a chair 60 cm from a 17-inch LCD color monitor. The eye tracker was then calibrated, and participants were informed that they were going to view an on-screen magazine. Participants were briefed to evaluate this new magazine.

This procedure was similar to real conditions of exposure to advertising. There is no device on the face so participants were free to move (to a certain limit). They were asked to simply watch the slides as if, for example, they were looking at a new magazine at home. They could simply page down or page up (when a participant had finished reading one page, he could move on to read the next page by clicking on the right narrow of the keyboard or go back to the previous page by clicking on the left narrow). Finally, the exposure time was free.

After the exposure time to the magazine, a "surprise" memory task was proposed including a free recall test for ads, and then a recognition task for product categories, brands and headlines was carried out. Finally, participants were exposed only to the three target ads in order to complete Aad scale. They were also asked if they knew the brands, if they find the two models attractive or not (10 points scale), their product categories involvement, and their personal characteristics.

Results

In this experiment, each participant was exposed to the three conditions: no face, direct gaze towards the observer, and averted gaze towards the product (within-subject design). It was therefore conducted analysis of variance with repeated measures. Most of the eye-tracking and memory data did not follow a normal distribution; therefore nonparametric tests were implemented (Friedman's ANOVA and Wilcoxon signed-rank test). For normally distributed data, *t* tests for paired samples were used.

Manipulation Check

Some executional elements in the ads were changed for experiment (direction of gaze), so we had to check that advertisements evaluation remained constant. We used the attitude towards the advertisement (Aad) scale as a measure of control. Results showed that Aad was not significantly different between direct and averted gaze condition (p = .31). This result indicated that ads with direct gaze and averted gaze were equally appreciated.

Main Results

Eye Tracking Measures: Did Gaze Direction in Ad Change Gaze Patterns?

- *Magazine page (informative text and target ads)*

On average, participants spent a total of 10.68 seconds reading the on-screen page in no face condition, 15.31 seconds in direct gaze condition, and 17.49 seconds in averted gaze condition ($\chi^2(2) = 15.03$, $p = .001$). Total fixation duration was shorter in no face condition (vs. face condition) ($p = .000$). No significant difference was observed between direct and averted gaze condition ($p = .16$).

Fixation count also differed between conditions ($M_{\text{no face}} = 43.03$, $M_{\text{direct gaze}} = 59.34$, $M_{\text{averted gaze}} = 70.71$, $\chi^2(2) = 22.56$, $p = .000$). Fixation count was shorter in no face condition (vs. face condition) ($p = .000$), and in direct gaze condition (vs. averted gaze) ($p = .014$).

- *Ads (bottom of the right-hand pages)*

The average amount of time spent looking at advertisements was 1.78 seconds in no face condition, 3.21 seconds in direct gaze condition, and 4.54 seconds in averted gaze condition ($\chi^2(2) = 26.22$, $p = .000$). Total fixation duration was shorter in no face condition (vs. face condition) ($p = .000$), and in direct gaze condition (vs. averted gaze) ($p = .005$).

Fixation count also differed between conditions ($M_{\text{no face}} = 7.68$, $M_{\text{direct gaze}} = 13.34$, $M_{\text{averted gaze}} = 17.48$, $\chi^2(2) = 27.49$, $p = .000$). Fixation count was shorter in no face condition (vs. face condition) ($p = .000$), and in direct gaze condition (vs. averted gaze) ($p = .020$).

- *Informative text (top of the right-hand pages)*

The average amount of time spent looking at informative text was 8.87 seconds in no face condition, 12.03 seconds in direct gaze condition, and 12.99 seconds in averted gaze condition ($\chi^2(2) = 4.34$, $p = .114$). Total fixation duration was shorter in no face condition (vs. face condition) ($p = .000$). No significant difference was observed between direct and averted gaze condition ($p = .76$).

Fixation count also differed between conditions ($M_{\text{no face}} = 35.35$, $M_{\text{direct gaze}} = 46.76$, $M_{\text{averted gaze}} = 52.06$, $\chi^2(2) = 5.28$, $p = .07$). Fixation count was shorter in no face condition (vs. face condition) ($p = .000$). No significant difference was observed between direct and averted gaze condition ($p = .32$).

- *Executional elements in ads*

Total fixation duration did not significantly change among the three conditions in AOI product ($\chi^2(2) = 3.95$, $p = .13$), in AOI brand ($\chi^2(2) = 4.95$, $p = .08$), and in AOI headline ($\chi^2(2) = 3.15$, $p = .20$). However total fixation duration in AOI face was shorter in direct gaze condition (vs. averted gaze) ($M_{\text{direct gaze}} = 1085.31$, $M_{\text{averted gaze}} = 2197.57$, $z(63) = -2.74$, $p = .006$).

Fixation count in AOI brand did not significantly change among the three conditions ($\chi^2(2) = 3.26$, $p = .19$). However fixation count differed between conditions in AOI product ($M_{\text{no face}} = 2.23$, $M_{\text{direct gaze}} = 3.65$, $M_{\text{averted gaze}} = 4.87$, $\chi^2(2) = 29.44$, $p = .000$), and in AOI headline (M_{no}

$_{face}$ = 2.56, $M_{direct\ gaze}$ = 3.40, $M_{averted\ gaze}$ = 3.21, $\chi^2(2) = 6.89$, $p = .032$). Fixation count was shorter in no face condition (vs. face condition) ($p = .000$, $p = 0.032$). Fixation count in AOI product was shorter in direct gaze condition (vs. averted gaze) ($p = .007$). Fixation count in AOI face was also shorter in direct gaze condition (vs. averted gaze) ($M_{direct\ gaze} = 4.21$, $M_{averted\ gaze} = 7.54$, $z(63) = -2.99$, $p = .003$).

Recall and Recognition Measures: Did Gaze Direction in Ad Change Memorization?

On average, participants recalled a total of .53 elements of the ad in no face condition, 2.22 elements in direct gaze condition, and 3.73 elements in averted gaze condition ($\chi^2(2) = 82.69$, $p = .000$). Recall was lower in no face condition (vs. face condition) ($p = .000$), and in direct gaze condition (vs. averted gaze) ($p = .000$).

Regarding specific recall scores, product recall [$M_{direct\ gaze} = .36$, $M_{averted\ gaze} = .72$, $t(63) = 4.58$, $p = .000$], brand recall [$M_{direct\ gaze} = .06$, $M_{averted\ gaze} = .22$, $t(63) = 2.61$, $p = .001$], and headline recall [$M_{direct\ gaze} = .06$, $M_{averted\ gaze} = .13$, $z(63) = -2.00$, $p = .046$] scores were lower in direct gaze condition (vs. averted gaze).

In the same way, product recognition [$M_{direct\ gaze} = .67$, $M_{averted\ gaze} = .80$, $t(63) = 1.92$, $p = .05$] and brand recognition [$M_{direct\ gaze} = .27$, $M_{averted\ gaze} = .50$, $t(63) = 3.21$, $p = .002$] scores were lower in direct gaze condition (vs. averted gaze). No significant difference was observed for headline recognition.

Finally, no significant effects of product categories involvement and gender on attention and memorization were observed in this study.

Discussion

This research highlights the importance of gaze cues in advertising and its impact on consumer cognitive processes. The results have both theoretical and practical implications.

Theoretically, these findings build on the emerging research on gaze direction in advertisement (Hutton and Nolte 2011; Sajjacholapunt and Ball 2014; Droulers and Adil 2015) and, more broadly, add to the literature of gaze direction perception effect (Driver et al., 1999; Marotta et al., 2013) by investigating how gaze cues influence consumer responses to print advertisements. Our results indicate a gaze direction effect in print advertisements: gaze direction impact attention towards the magazine page and towards the ad, and memorization of ad's elements. These results, using non-declarative (eye-tracking) and self-reporting methods, support first marketing research on this topic.

Gaze direction impacts attention towards the ad. Averted gaze condition increased total fixation duration and fixation count on face relative to direct gaze condition. These results are not in line to those of Farroni et al. (2002) which showed that faces displaying a direct gaze are gazed longer compared to faces with an averted gaze but exposition context was very different between the two studies.

Moreover averted gaze condition increased fixation count on product. The model's-gaze-at-product condition encourages the viewer to make numerous trips from the model face to the informative area including product, brand and headline. These results corroborate recent research: Hutton and Nolte (2011) found that observer spent longer time looking at the brand in model's-gaze-at-product condition compared to model's-gaze-at-observer condition; and Sajjacholapunt and Ball (2014) found that, relative to direct gaze condition, averted gaze condition increases attention to the advertising text and product. In addition, various media

were used: print ads (Hutton and Nolte, 2001 and our study), banners (Sajjacholapunt and Ball, 2014). However, the results of these various studies converge to demonstrate the effect of gaze direction in ad on attention and memory. Moreover, this study underline that faces in ads impact not only attention towards the ads, but also attention towards the informative content of the magazine.

Furthermore, gaze direction impacts memorization of ads. Averted gaze condition increased mean recall and recognition of product and brand relative to direct gaze condition. Prior work on gaze cues in advertisement revealed the same effects. In advertising banners context, Sajjacholapunt and Ball (2014) showed that advertisements involving faces with averted gaze increased the memorability of the brand and advertising message compared to those involving faces with direct gaze. Also, Droulers and Adil (2015) found that averted gaze enhances product and brand memorization. Averted gaze ability to increase ad memorization can be explained by his capacity to catch and orient observer's attention. The relationship between attention and memorization has been a subject of a large consensus, greater allocation of attention towards a stimulus enables its memorization.

In practical terms, our results indicate that advertisers should take into account potential effects associated with model's gaze cue in advertising conception to control attention value of their message. When designing print or Internet advertisements, advertisers should consider the "eye contact effect" in their ads. To improve ad effectiveness, it is recommended to guide the gaze of the model towards the product. Thus, the model in advertisement is not only an "attractiveness" element, but his gaze oriented towards the product gives meaning to the ad execution by creating the link between the various elements of ad. Guiding the viewer's gaze to the product makes the ad more effective.

Limitations of this study offer opportunities for future researches. One limitation of the current study is that we modified only eyes position and have used only faces with neutral expression, so we cannot anticipate combined effects of gaze direction and other facial elements such as facial expressions and head orientation. Another limitation of our study is the relative simplicity of advertisements created for experimentation, in order to control all elements in ads and thus isolate the effects of gaze direction. A follow-up study measuring effects for real ads and real brands might be necessary (providing that product and brand familiarity were measured before).

Future research should also investigate the efficacy of gaze direction for other categories of non-food products or even services because of the absence of a tangible product visual make it more challenging to consider. Another interesting way to explore gaze cues effects in advertisement that could be investigated in future research is to test gaze cues in another media. According to Brasel (2011), visual attention to advertisement depends on the nature of the media the consumer is exposed to. We have examined the influence of gaze cues in print advertisements; future research should replicate this study using interactive media. Finally, while we demonstrate the effect of gaze cues on observer's attention, we did not gather direct evidence for cerebral mechanism mediating this effect. Future research should investigate the mechanism behind this gaze effects, especially looking into the brain activations during exposition to advertisement with different gaze cues.

Conclusion

This study was designed to measure impact of gaze direction in print advertisements using a naturalistic procedure. Two key findings emerged from the present study. Firstly, as predicted, the presence of a face in an ad (whatever gaze direction) has a positive effect on attention to the magazine page, and on attention to the ad. Attention to the ad was even stronger in averted gaze condition towards the product (*vs* direct gaze towards the viewer). Secondly, the positive effect of averted gaze also occurred for memorization of ads. Thus, advertisers should consider not only attractiveness of the model but also the "eye contact effect" between model and observer. Advertising effectiveness is enhanced in model's-gaze-at-product condition than model's-gaze-at-observer condition.

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