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Perceived Gaze Direction Modulates Ad Memorization

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Gaze has important functions in human social interactions. A 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. Several studies in neuroscience and psychology demonstrate the role of gaze direction not only in orienting observer's attention but also in modulating his cognitive process. The detection of an averted gaze induces a shift of visual attention by means of reflexive gaze-following behavior. In marketing, little is known about gaze direction effect on ads' content processing. This research presents recent findings on neural correlates of the processing of gaze direction and its influence on orienting observer's visual attention. Then, using a folder test procedure, it investigates the influence of perceived gaze direction of a character in a print ad on product and brand memorization. Comparing 2 conditions—ads presenting a face with "averted gaze" toward the advertised product or "direct gaze" toward the observer—our results show that ad with gaze toward the product increases product and brand memorization. As these results were obtained by reproducing real-life conditions of ad processing—a folder magazine—we believe that they are of particular interest for managers, especially in an environmental context increasingly cluttered with advertising that marketers have to face nowadays. Further researches are needed to explore other effects of gaze direction in ads, such as for example the effects on advertising evaluation.

Keywords: ad memory, attention, folder test, gaze direction

Eyes play a fundamental role in social cognition: they are necessary to the recognition of identity and emotions, and they indicate the direction of attention and intentions of others. Several studies have shown that eyes are the most attended face feature and are most commonly used as source of information. Recent advances in cognitive neurosciences have revealed the existence of brain regions involved in the processing of social gaze (Pfeiffer et al., 2013). Poor eye contact and deficits in cognitive processing of gaze are specific diagnostic features of autism. Many researches (Akiyama et al., 2006; Georgescu et al., 2013; Pellicano, Rhodes & Calder, 2013) found that the ability to follow gaze direction is affected for individuals affected by autism and some psychopathological disorders associated to brain lesions.

A large amount of literature in psychology demonstrates that perceived gaze direction alters the environment exploration related behavior and the evaluation of the social environment (Bayliss et al., 2013). Attention is preferentially and automatically oriented to detect and follow eye gaze direction (Driver et al., 1999; Shepherd, 2010). Moreover, gaze direction seems to immediately modulate observers' cognitive processing. For example, a perceived direct gaze affects face memorization both at the encoding and at the retrieval levels (Hood et al., 2003; Vuilleumier et al., 2005), resulting in a delayed orientation of the attention toward peripheral targets (Senju & Hasegawa, 2005). In line with these studies, Conty et al. (2007) found that the perception of direct gaze evoked a N170 that was greater, later and longer lasting, compared with the averted gaze.

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In marketing, models' gaze direction in advertisement can quickly catch observer's attention. Hutton and Nolte (2011) and Sajjacholapunt and Ball (2014) found that we spend more time looking at the product when model's gaze was directed at it in a print advertisement. In this work we highlighted that gaze privileged attentional processing and also shed a light on its impact on ad memorization. We present an overview of the literature regarding gaze direction capacity to catch and orient observers' attention, and explore whether the perceived gaze direction in print ads can affect product and brand memorization.

Theoretical Framework and Hypothesis Development

Neural Architecture of Gaze Direction Processing

Specific gaze processing. Human brain has developed a very complex cognitive system for gaze direction processing based on perceptual features of eyes. Human eye has a unique morphology characterized by a white sclera surrounding the dark-colored iris, which facilitates the detection of gaze direction from other individuals (Kobayashi & Kohshima, 2001). Baron-Cohen (1994) has suggested the existence of an "eye direction detector," which detects eyes presence in the visual field and identifies their direction.

Some studies have examined gaze perception as part of the whole face processing. Wicker et al. (1998) have used positron emission tomography (PET) to localize brain areas involved in gaze processing. Subjects were exposed to face with direct gaze, averted gaze, and closed eyes (no gaze). They found that gaze triggered blood flow responses in some brain areas, which were different from those involved in face processing. These areas included the occipital part of the fusiform gyrus, the middle temporal gyrus, the right parietal lobule, and inferior temporal gyrus. In agreement with these findings, Puce et al. (1998) and Nummenmaa and Calder (2009) stated that human perception system involves neurons that selectively encode perceived gaze direction. Functional imaging studies further revealed that gaze direction on faces preferentially activates regions of the human superior temporal sulcus (STS) (Hoffman & Haxby, 2000), along with amygdala (Kawashima et al., 1999). Kawashima et al. (1999) stated that "the left amygdala plays a general role in the interpretation of eye gaze direction." Also, Okada et al. (2008) reported that amygdala is essential for reflexive shifts of attention in response to gaze cues.

Behavioral studies confirmed the independence of gaze direction perception from face processing. It was established that inversion has an effect on face perception (Yin, 1969; Leder & Carbon, 2006), but it was shown that inversion does not influence gaze direction perception. Schwaninger et al. (2005) and Tipples (2005) found that for both upright and inverted faces, RTs were shorter when the target was indicated by gaze direction than when it was on the opposite side. In parallel, many studies were conducted on monkeys, using techniques that allow direct recording of brain specific areas. Perrett et al. (1985) recorded the electrical activity of macaques exposed to monkeys' faces with different gaze directions (direct or averted). They observed that some parts of STS triggered stronger responses to direct gaze. This result was confirmed by Campbell et al. (1990), who found that lesions in STS in macaques' brain led to ability losses in following perceived gaze direction, while face processing ability remained unaffected.

Furthermore, studies of patients with brain damage support the existence of a specific neural network for gaze direction perception. Akiyama et al. (2006) report that a patient (MJ) suffering from damages in the right superior temporal gyrus (STG) shows significant difficulties with the fact of discriminating gaze direction. She was no longer able to differentiate the direct gaze from the averted one, but she was still able to recognize directions pointed by arrows. They concluded that lesions to the right STG impair the ability to perceive gaze direction (direct gaze or averted gaze), whereas the perception of other objects' orientation (left and right pointing arrows) remains unaffected. Likewise, Gamer et al. (2013) observed the case of a patient (MW) with bilateral amygdala damage; he did not show saccades toward the eye region area of the observed individual. They concluded that the amygdala might be involved in triggering shifts in overt attention toward specific facial features such as the eyes.

Direct versus averted gaze processing. Social cues provided by gaze direction (direct gaze or averted gaze) influence observers' allocation of visual attention. Thus, Emery (2000) distinguishes "mutual gaze" (attention of individuals A and B is directed at one another) from "gaze following" (individual A detects that B's gaze is not directed at him and follows the line of sight of B) and "joint attention" (individual A follows B's gaze to a novel focus of visual attention such as an object). Schilbach et al. (2010) examined activations when participants followed gaze direction of a virtual character fixating an object. They demonstrated the recruitment of the medial prefrontal cortex (MPFC) and the posterior cingulate cortex (PCC) regarding joint attention to an object. Conversely, looking at an object not gazed at by the virtual character led to the recruitment of a lateralized fronto-parietal network. For Schilbach et al. (2013), even when the participants were always staring at the same object, the underlying brain activity seemed to be significantly different depending on whether or not the participants were doing this "together" with the observed person. They concluded that joint attention "resulted in a differential increase of neural activity in a network which has been related to the human ability for grasping another person's mental states and her communicative intentions."

Many studies converge to propose that gaze specific neural circuits probably support the attentional processing of perceived gaze direction. These researches have revealed different activations during passive viewing of different gaze directions. Some cortical areas showed greater activations when observers were looking at direct gaze rather than averted gaze. For example, Kawashima et al. (1999) found that the activity of the right amygdala increases when a person perceives another individual's gaze directed toward him. Using functional MRI (fMRI), George et al. (2001) exposed subjects to faces with direct or averted gaze. They found that some regions of the fusiform gyrus showed greater responses to faces with direct gaze (also Kampe et al., 2003; Farroni et al., 2004). In a review, Senju and Johnson (2009) reported that six regions show differential activity between direct and averted gaze: fusiform gyrus (Calder et al., 2002; Pageler et al., 2003), anterior (Calder et al., 2002; Wicker et al., 2003), and posterior (Conty et al., 2007; Schilbach et al., 2006) parts of superior temporal sulcus (STS), medial prefrontal (Calder et al., 2002; Conty et al., 2007; Schilbach et al., 2006; Kampe et al., 2003) and orbitofrontal (Wicker et al., 2003; Conty et al., 2007) cortex and amygdala (Wicker et al., 2003; Kawashima et al., 1999; Sato et al., 2004). Senju and Johnson (2009) proposed a model where direct gaze perception induces an "eye contact effect," which is mediated through a "fast-track modulator" via the amygdala, the superior colliculus and the pulvinar, and a "slow information processing" including STS and fusiform gyrus.

Gaze Direction Orients Attention

From early infancy, when we look at a face, gaze is the primary focus of our visual attention (Haith et al., 1977). Infants prefer looking at faces with open eyes than faces with closed eyes (Batki et al., 2000). The same applies to adults, as numerous studies have shown that eyes are the most attended facial feature (Vinette et al., 2004; Itier et al., 2007; Sæther et al., 2009).

Kano and Call (2014) defined gaze following as looking in the same direction as others after seeing their gaze direction and found that all species follow their conspecific gaze. The tendency to follow the direction of another individual's gaze appears very early in life. For Marotta, Casagrande, and Lupiáñez (2013), it marks an important breakthrough in the development of social communication, according to which gaze is providing information about other's interests and mental states. Engell et al. (2010) compared gaze cues and arrows cues, and found that gaze direction perception activates a more reflexive attentional system than the one activated by arrow perception.

Several studies have shown that gaze direction affects the orientation of observer's visual attention. Farroni et al. (2002) reported that newborns stared longer at a face gazing at them (direct gaze) than on a face that looks away (averted gaze). Also, compared with faces with averted gaze, faces displaying a direct gaze are more prone to catching attention (Frischen, Bayliss, & Tipper, 2007) and are more rapidly detected (Yokoyama, Noguchi, & Kita, 2013). Moreover, gaze direction seems to have consequences on observer's cognitive process. Some studies investigated the effect of gaze direction

on face recognition for children and adults. Averted gaze seems to disrupt face configural encoding compared with direct gaze (Young et al., 2014). It was established that faces with direct gaze were better recognized than faces with averted gaze (Hood et al., 2003; Mason et al., 2004; Yamashita, Kanazawa, & Yamaguchi, 2012).

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. For example, Senju and Hasegawa (2005) reported that peripheral target detection becomes slower when participants look at faces with direct gaze rather than at faces with averted gaze. Conversely, it is well established that when averted gaze is noticed, observer's attention is rapidly and automatically oriented toward the same location in space. It was shown that gaze cues facilitate responses to an upcoming target if the target location is compatible with the direction of the cue (Driver et al., 1999; Marotta, Casagrande, & Lupiáñez, 2013).

Hypotheses

Psychology and neuroscience literature demonstrates that, on one hand, gaze presence in a visual field increases attention catching more than other visual stimuli and perceived gaze direction orients automatically the attention. On the other hand, gaze direction moderates face memorization and target detection in such way that averted gaze decreases face memorization and increases target detection located around the face compared to direct gaze. Interestingly, although considerable advances have been made in understanding the neural basis of gaze direction detection and following, little is known about the extent to which gaze direction impacts memory.

In marketing, to the best of our knowledge, no work has examined whether memorization of ad's content was affected by perceived gaze direction in a print ads, especially under natural exposure conditions (e.g., using a folder test procedure to avoid forced exposure effects). Previous evidence suggests that perceived gaze direction cannot only cause shifts in attention, but can also changes the perception of objects located in the direction of the gaze. Hutton and Nolte (2011) examined the influence of model's gaze direction in a print advertisement on attention toward product and brand. They found that participants spend more time looking at the product and the brand when the model's gaze was directed at them. Sajjacholapunt and Ball (2014) investigated whether faces within banner advertisement can influence attention value. Compared with faces with a direct gaze toward observer, they found that faces with averted gaze increase attention to banner and enhance brand recognition. The possibility of such positive attention related effects occurring in print advertisement and banner advertising leads us to suppose that product and brand memorization would be enhanced because the link between attention toward a stimulus and its memorization has been widely studied and was a subject of a large consensus: greater allocation of attention to a stimulus facilitates its memorization (Unsworth & Spillers, 2010). Uncapher and Wagner (2009) suggest that the formation of memories of an event is affected by attention during its encoding: "allocating goal-directed attention during event processing increases the probability that the event will be remembered later."

Based on this, one might expect that the direct gaze of a character in a print ad will induce attention focus of the observer on the character's face and will thus reduce peripheral element processing, whereas an averted gaze oriented toward the product should enhance its processing and by consequence its memorization. Thus, we state:

> *Hypothesis 1:* Recall scores for product (H1a) and brand (H1b) are higher for ads in which the character's gaze is directed toward the product than for ads with direct gaze oriented toward the observer.
>
> *Hypothesis 2:* Recognition scores for product (H2a) and brand (H2b) are higher for ads in which the character's gaze is directed toward the product than for ads with direct gaze oriented toward the observer.

Method

Participants

One hundred thirty young adults, students and people starting a professional activity, were recruited (66 women), ranging from 17 to 31

years old ($M = 19.53$, $SD = 1.48$). They were naive as to the purpose of the experiment.

Materials

We created a fictive travel magazine of 10 pages (folder test), in which we inserted four ads. Two target ads featured products which may be purchased and/or consumed by both men and women. To avoid effects related to a prior exposure to the brand (uncontrolled source of variance), we selected unknown foreign brands, not marketed in the country hosting the test (mineral water *Spa*, yogurt *Baïko*). Two distractive ads for well-known brands (*ClubMed* and *Eurostar*) were also inserted to ensure that participants would not question the presence of unknown brands only.

We created two versions for each target ad. In one version, we featured an unknown (to avoid celebrity effect), young Caucasian female face with a neutral expression and a direct gaze at the observer (the reader). In the second one, the same face was presented but gazing this time at the product. The other advertising elements remained strictly identical.

These advertisements of the same size (7.3 in. $\times$ 5.4 in.) were inserted in the same position (bottom of the right-hand page) on pages 3 and 9. Ads order of appearance and model/product binomial were randomized.

Experimental Procedures

Participants were divided in two groups, each assigned to one condition (between subject design): ads with gaze at the observer (direct gaze; $n = 65$) or ads with gaze at the product (averted gaze; $n = 65$). They were asked to evaluate a new magazine. They paged through the magazine for four minutes without interruption. Then, they put the magazine in an envelope and started answering a first questionnaire. A "surprise" memory task was proposed including a cued recall of product categories (*You saw four ads in the magazine. Could you list the categories of products seen in these ads?*) and brands presented in ads (*You saw four ads in the magazine. Could you list the brands seen in these ads?*). Then a recognition task for target product categories and brands was carried out (with a list of 12 items, one target for five distractors). Finally, they took the magazine again to answer a second questionnaire including questions about brand knowledge, involvement toward target product category, models' attractiveness, and individual characteristics.

Results

In the current study, one issue in particular was whether perceived gaze direction in a print advertisement affects product and brand memory. To address this question, first it was necessary to verify the comparability of the two surveyed samples regarding some individual characteristics and control variables. As expected there were no difference between sample 1 (direct gaze) and sample 2 (averted gaze) for product category involvement and purchase frequency ($M_{\text{sample1}} = 39.65$, $M_{\text{sample2}} = 43.34$, $F(1, 128) = 2.017$, $p = .15$; $M_{\text{sample1}} = 8.15$, $M_{\text{sample2}} = 7.52$, $F(1, 128) = 1.90$, $p = .11$), the difference was not significant either for models' attractiveness ($M_{\text{sample1}} = 14.63$, $M_{\text{sample2}} = 14{,}12$, $F(1, 128) = 0.49$, $p = .11$) or for age and gender ($M_{\text{sample1}} = 19.95$, $M_{\text{sample2}} = 19.49$, $F(1, 128) = 2.254$, $p = .13$; $\phi = 0.197$, $p = .16$).

Product Recall and Recognition

Product recall scores were higher (at the marginal threshold of .06) in the model's-gaze-at-product condition (averted gaze) than in the model's-gaze-at-observer condition (direct gaze; $M_{\text{averted gaze}} = 1.32$, $M_{\text{direct gaze}} = 1.06$, $F(1, 128) = 3.74$, $p = .055$, $r = .168$). Furthermore, we found a significant positive effect of gaze-at-product in print ads on product recognition ($M_{\text{averted gaze}} = 1.66$, $M_{\text{direct gaze}} = 1.45$, $F(1, 128) = 4.52$, $p = .035$, $r = .166$). Hypotheses H1a and H1b are supported (at a threshold of .06 for H1a).

Brand Recall and Recognition

Brand recall scores were higher (at the marginal threshold of .06) in ads with gaze-at-product ($M_{\text{averted gaze}} = .65$, $M_{\text{direct gaze}} = .43$, $F(1, 128) = 3.65$, $p = .058$, $r = .184$). Also, brand was better recognized in the condition with gaze-at-product (averted gaze) than in the condition with gaze-at-observer (direct gaze; $M_{\text{averted gaze}} = 1.03$, $M_{\text{direct gaze}} = .77$, $F(1, 128) = 4.48$, $p = .036$, $r = .183$). Hypotheses H2a and H2b are supported (at .06 threshold for H2a).

Analysis of recall and recognition scores for each experimental condition shows enhanced product and brand memorization for subjects exposed to ads with averted gaze rather than ads with direct gaze (see Table 1).

Discussion

In the present experiment we used the folder test procedure to explore the effect of models' gaze direction in a print advertisement on viewer's memorization of product and brand. As predicted, participants recalled and recognized product and brand more when the model's gaze was directed at them. This result support previous findings, which demonstrated that perceived gaze direction is an influential cue in the attention orienting process (Bayliss et al., 2011), which can facilitate the processing of objects (Reid et al., 2004).

Hutton and Nolte (2011) have examined gaze direction influence on attention to print advertisement and have found that participants looked at the product longer when the model's gaze was directed toward it. Beyond simply drawing attention to the cued area of the advertisement, we show that gaze cues in print ads influence ads' content processing and modulates product and brand memorization.

According to Brasel (2011), a consumer's visual attention depends on the nature of the media he is exposed to. Sajjacholapunt and Ball (2014) have investigated gaze cues effect on attention to banner advertising (interactive media). They found that averted gaze enhances attention to banner advertising and by consequence increases brand recognition. Using print advertisement (passive media), our results corroborate Sajjacholapunt & Ball findings: Averted gaze increases product and brand memorization.

Table 1
Product and Brand Recall and Recognition Scores (Standard Deviation in Parentheses)

Measure	Ads with gaze toward the product	Ads with gaze toward the observer	*p* two tailed
Product recall	1.32 (.73)	1.06 (.80)	.055
Brand recall	.65 (.67)	.43 (.61)	.058
Product recognition	1.66 (.50)	1.45 (.63)	.035
Brand recognition	1.03 (.72)	.77 (.67)	.036

Note. Scores are expressed as the number of recalled and recognized products and brands; they may vary between 0 and 2.

Research on advertising mainly focused on two distinct yet complementary avenues related to ad performance: ad character specificity on one hand, as expressed by attractiveness effect (Baker & Churchill, 1977) or celebrity endorsement effect (Friedman & Friedman, 1979; Atkin & Block, 1983; Stallen et al., 2010) for example, and ad layout and execution on the other hand, questioning the role and influence of ad elements' design and position on ad effectiveness (Rossiter, 1982; Lohtia et al., 2003). Nevertheless, these two research fields remained quite independent, and little is known about possible effects induced by the combination of human presence and overall ad layout on ad performance. Our study aimed at contributing to fill this gap by investigating a specific ad-layout and character-specificity related element—the gaze direction—and demonstrating its positive effect on ad memorization. We hope that these first results will draw the attention of marketing researchers to the need for further investigation in this field, especially in light of the considerable and highly direct managerial implications they suggest.

Besides, extensive literature in psychology and neurosciences showed that perceived gaze direction orients observer's visual attention and modulates cognitive functioning (Bayliss et al., 2013; Burra et al., 2014). The present study extended these findings to a marketing context, by demonstrating that gaze direction in print ads has a significant influence on product and brand memorization. Specifically, our results indicate that direct gaze toward the observer impairs brand and product memorization, as it is assumed that consumers will focus more on the face gazing at them (Yokoyama, Noguchi, & Kita, 2013; Young et al. 2014) and therefore exhibit fewer interest for other ad elements. One the other hand, averted gaze toward the product enhances brand and product memorization, as it was established that targets elicit more rapid responses when they appear in a location congruent with perceived gaze direction (Senju & Hasegawa, 2005; Marotta, Casagrande, & Lupiáñez, 2013). Conversely, our research further demonstrates that ad character's gaze directed toward the advertised product encourages observers' attention to the product, enhancing

product and brand memorization. As these results were obtained by reproducing real-life-ad-processing conditions—a folder magazine—we believe that they are of a particular interest for managers, especially with the advertising environment becoming increasing cluttered, which is a challenge for today's marketers.

Conclusion

Gaze direction has a demonstrable effect on attention to print advertisements. Inserting an averted gaze toward the product in ads orients attention toward it and by consequence enhances its memorization. In an extremely complex advertising environment, it seems important that advertisers pay the utmost attention to their ads ability to catch the reader's interest and attention.

Cognitive neuroscience theories and methods favor scientific progress in the field of marketing. The present research shows that marketing research can take advantage of neurosciences development, not only by using sophisticated neuroscientific techniques (fMRI, EEG, MEG, TMS . . .), but also by importing novel theoretical insights to explore consumer behavior.

Limitations of this study offer opportunities for future research. This experiment was conducted using convenience goods. It would be interesting to replicate it with other types of products, or even services because of the absence of tangible product make it more challenging to investigate. Also, we only used female models; we can imagine for the future to study the influence of gender and congruence model/reader. Finally, the moderating effect of age could be investigated. Older people tend to visually explore, in an advertisement, fewer elements than younger observers. Furthermore they tend to focus more on the selected elements for further processing. Therefore one might expect that the impaired product and brand memorization highlighted in this research could be stronger for senior consumers, who may tend to fix even longer the character's direct gaze.

Future studies could also examine other variables that seem to be affected by gaze direction. Direct gaze has a positive effect on the perceived attractiveness of the gazing face (Mason et al., 2005) and the likability of objects associated to him (Strick et al., 2008), therefore further research could explore how gaze direction in ad affects ad evaluation.

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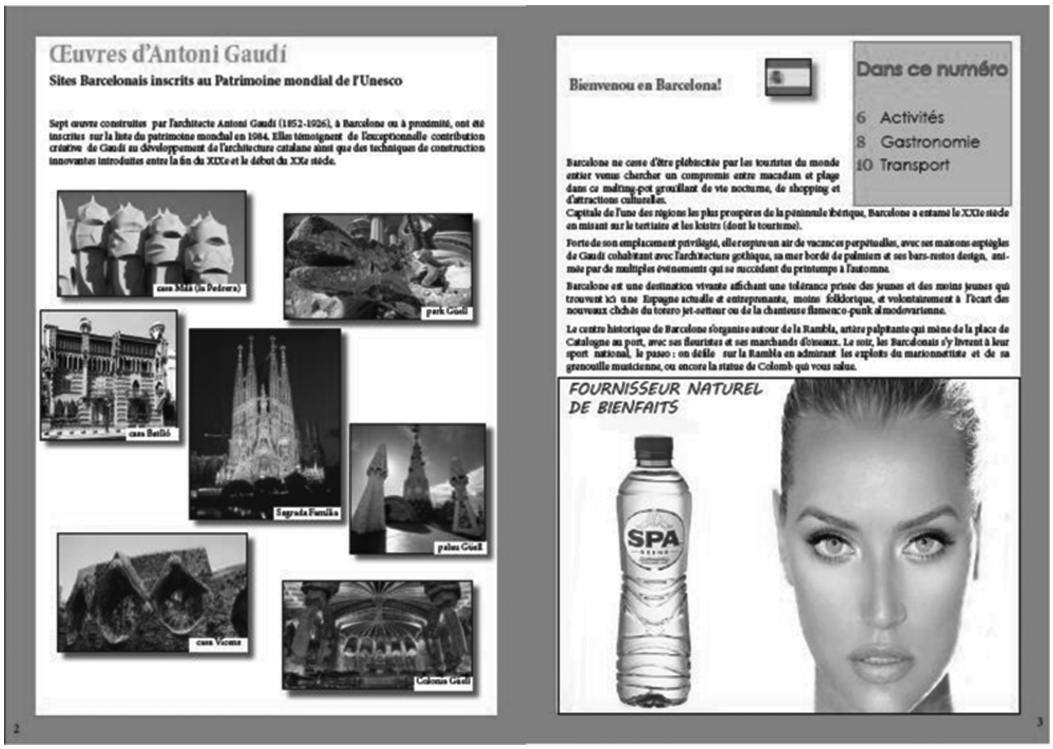
Appendix

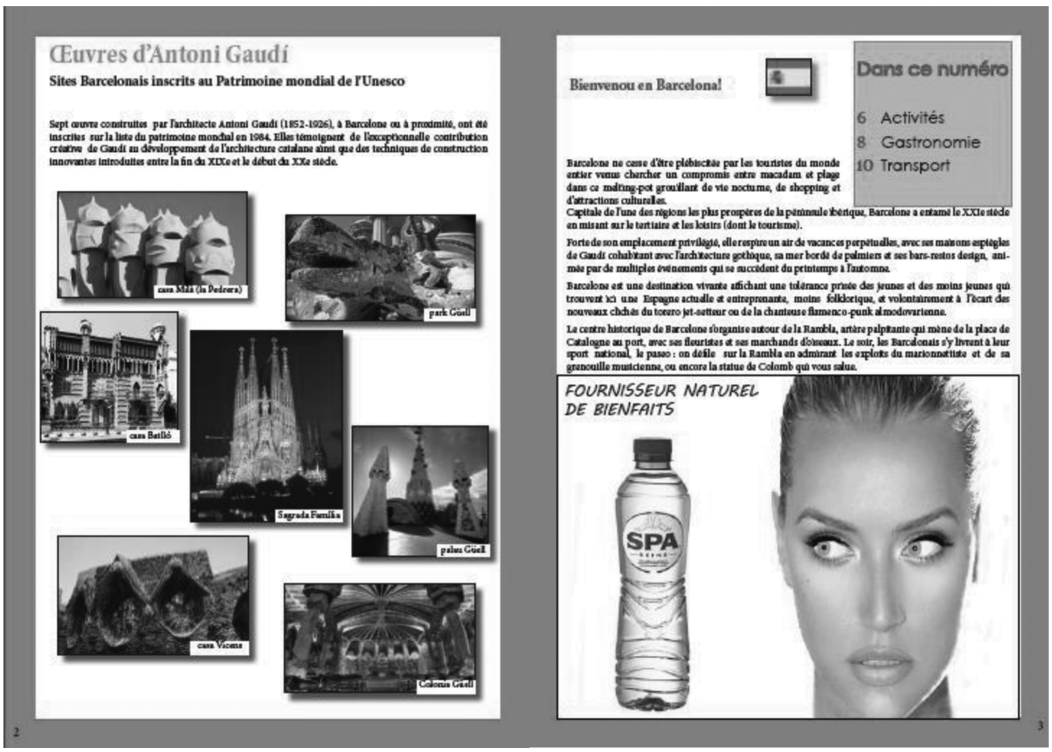
Examples of Stimuli (Extracted From the Folder Test)

Condition 1: Spa ad with direct gaze.



(*Appendix continues*)

Condition 2: Spa ad with averted gaze.



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