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The Influence of Gaze Cues on Product Evaluation“

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Look Where I Look – The Influence of Gaze Cues on Product Evaluation

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Abstract

Recent studies have shown that gaze cueing can influence object evaluation, but it is not clear what functional mechanisms drive this effect. Based on extant literature, two explanatory models are proposed: an attention model and a social information model. Both models are explored using eye tracking methodology. Participants saw and rated genuine Asian cosmetics advertisements featuring a model's face and a product. The models' eyes were manipulated to gaze at the product, at the participant or away from the product. Eye tracking data did not support the attention model. The social information model is discussed as more likely to explain the effects found in this study.

Keywords: gaze cueing, visual attention, product evaluation, advertising, eye tracking

Theoretical Background

Humans are fundamentally social in their nature. Knowing this, advertisers have capitalized on social stimuli since the dawn of their art. One very powerful social stimulus excessively present in advertising is a person's gaze. Advertising has faces staring at us from every billboard and magazine cover, but researchers have only very recently begun to investigate the relationship between gaze and product liking. This paper aims to further our understanding of how a model's gaze affects a viewer's attention and subsequent liking of an advertisement and a product.

Overview

When we observe another person looking at an area, we automatically tend to follow that person's gaze (e.g. Langton & Bruce, 1999; Senju, Csibra, & Johnson, 2008). This effect is called gaze cueing. In a recent study, Bayliss, Paul, Cannon, and Tipper (2006) found that gaze cueing, i.e. a person looking at an object, increases liking of that object. Gazes are abundantly present in print advertisements but have not yet been investigated in an advertising context. This paper aims to fill this gap by studying the functional mechanisms underlying the effect of gaze cueing on object evaluation in print advertisements.

A review of the existing literature on this topic allowed the deduction of two explanatory models that propose different underlying functional mechanisms of the effect of gaze cueing on evaluation: an attention model and a social information model.

Tracking participants' gazes while they viewed cosmetic advertisements allowed for a close examination of the effect a model's gaze has on a viewer's attention. Contrary to previous studies, this study employed genuine advertisements which were only marginally altered to fit the experimental requirements: the models' eyes were retouched so her gaze appeared to be directed either at the product, at the participant or away from the product, thus

establishing either congruent, participant-directed or incongruent gaze cues. The aim of this study was to examine the different effects these three types of gaze cues have on participants' attention and evaluation of the advertisement and the product in order to discern the functional mechanism of the effect of gaze cueing on evaluation.

Gaze Cueing

Gaze cueing is a form of social influence that triggers attention to an area that is being looked at by another person. Research has shown that this attention cueing effect increases reaction speed to stimuli presented in areas that are being looked at by a person (e.g. Alwall, Johansson, & Hansen, 2010; Bayliss, Frischen, Fenske, & Tipper, 2007; Bayliss, Griffiths, & Tipper, 2009; Bayliss et al., 2006; Bayliss & Tipper, 2006; King, Rowe, & Leonards, 2011), a computer animated face (Driver, Davis, Ricciardelli, Kidd, Maxwell, & Baron-Cohen, 1999; Langton & Bruce, 1999) or even a schematic drawing of a face (Friesen & Kingstone, 1998; Hietanen & Leppänen, 2003).

Gaze Cueing and Evaluation. Gaze cueing does not only influence reaction speed but also evaluation of the cueing face and the cued object. In reaction speed tasks where participants had to categorize objects appearing to the right or left of a centrally placed face, faces that repeatedly looked at areas where an object appeared (i.e. correctly cueing faces) were deemed more trustworthy than faces that look at areas where nothing appeared (i.e. incorrectly cueing faces) (Bayliss et al., 2009; Bayliss & Tipper, 2006). Also, when a face that is labeled trustworthy looks at an object, this object is preferred to objects that are ignored by those trustworthy faces or looked at by a face that is labeled untrustworthy (King et al., 2011). These two effects taken together already suggest that objects which are cued by a face which repeatedly cued correctly should be preferred to objects that are not cued or cued by faces which cue incorrectly.

Research in fact suggests that liking of an object increases if it is repeatedly cued by the same head even if the cueing head is that of a dog (Corneille, Mauduit, Holland, & Strick, 2009). But even if it is not always the same but different heads that cue an object, liking of that object increases compared to objects that are incongruently cued. This has been shown for household objects (Bayliss et al., 2006; Bayliss et al., 2007; Bayliss et al., 2009), modern art paintings (Bry, Treinen, Corneille, & Yzerbyt, 2011), peppermint brands (Corneille et al., 2009) and water bottles (Van der Weiden, Veling, & Aarts, 2010).

The effect of gaze cueing on evaluation can be increased by altering certain characteristics of the cue. Thus it has been found that the effect is stronger if the cueing face is smiling (Bayliss et al., 2007) and, as mentioned before, if the cueing person is perceived as trustworthy (King et al., 2011). Also, some studies only found the effect when participants were aware of the congruent gaze cue (Bry et al., 2011; Corneille et al., 2009).

The majority of these studies adopted designs from classic gaze cueing studies concerned with the effect of gaze cueing on reaction speed: participants saw a face looking straight ahead, which was then replaced by the same face looking either left or right, suggesting a shift of attention, shortly after which an object appeared to the left or right of the face which participants then had to categorize as fast as possible (Bayliss et al., 2006; Bayliss et al., 2007; Bayliss et al., 2009; King et al., 2011). Those studies not asking participants to categorize objects still used dynamic gaze cues, i.e. the cueing face visibly shifted attention to the cued object (Bry et al., 2011; Van der Weiden et al., 2010).

Those studies employing static gaze cues yielded less conclusive results. A study concerned with the influence of emotional expression of the cueing face found no effect on evaluation when objects were associated with direct gaze at the participant but did find an effect when the face shifted attention toward the object (Bayliss et al., 2007). Van der Weiden

et al. (2010) directly tested the effectiveness of different cueing sequences, i.e. in which order the cueing face looks where, and also found no effect on object evaluation if an object was paired with direct static gaze at the participant. Corneille et al. (2009) used static gaze cues provided by dogs' heads. They found that peppermints that were being looked at were preferred to peppermints that were associated with direct gaze at the participant, but that those were still preferred to peppermints that were associated with incongruent gaze. In short, they found a linear effect of preference, with liking increasing from incongruent gaze cue to gaze at the participant to congruent gaze cue. A study by Strick, Holland and van Knippenberg (2008) found that products associated with direct static gaze at the participant receive better evaluation than products that are being looked at. This effect, however, was only found with attractive faces. When employing unattractive faces looking at the participant, a tendency towards the inverse effect was found, i.e. products associated with averted gaze were preferred to products associated with direct gaze at the participant. The authors hypothesized that this was due to an inherent reward value of attractive faces. They assume that direct gaze by an attractive face is perceived as pleasant and that this experience of pleasure would carry over to the product associated with it. Interestingly, the authors did not find a difference in product evaluation whether the face looked at the product (congruent gaze cue) or away from the product (incongruent gaze cue).

In summary, studies concerned with the effect of gaze cueing on evaluation have thus far yielded inconclusive results. Most studies that found that looked-at objects are preferred used dynamic gaze cues (Bayliss et al., 2007; Bayliss et al., 2009; Bayliss et al., 2006; Br et al., 2011; King et al., 2011; Van der Weiden et al., 2010).

Print advertisements can only employ static gaze cues. Of the four studies investigating static gaze cues, one found increased liking when the object is being looked at (Corneille et

al., 2009) and one found increased liking of objects associated with gaze at the viewer (Strick et al., 2010). Two found no effect of gaze on object evaluation but only investigated direct gaze at the viewer (Bayliss et al., 2007; Van der Weiden et al., 2010). Neither study used material that would allow a transfer of their findings to an advertising context.

Attention and Evaluation. Gaze cueing has been shown to increase attention to a certain area (Hutton & Nolte, 2011) and attention has been shown to affect evaluation (e.g. Armel, Beaumel, & Rangel, 2008; Krajbich & Rangel, 2011; Shimojo, Simion, Shimojo, & Scheier, 2003; Glaholt & Reingold, 2009a; Glaholt & Reingold, 2009b; Pieters & Warlop, 1999). This suggests that the effect of gaze cueing on evaluation could be driven by attention.

To test this claim, a number of studies tested gaze cues against arrow cues. Their results show that overt behavioral tendencies including automatic saccadic tendencies towards- and faster response to the cued location have been shown to be virtually similar for gaze and arrow cues (Bayliss, di Pellegrino, & Tipper, 2005; Kuhn & Benson, 2007; Kuhn, Benson, Fletcher-Watson, Kovshoff, McCormick, Kirkby, & Leekam, 2010; Tipples, 2002; Tipples, 2008). Event-related potentials are also very similar when reacting to gaze and arrow cues (Brignani, Guzzon, Marzi, & Miniussi, 2008).

Nevertheless, multiple studies found functional differences in the cueing of gazes and arrows suggesting that reaction to gaze cues is more reflexive, meaning that it is not under volitional control (Friesen, Ristic & Kingstone, 2004; Riccardelli, Bricolo, Salvatore, & Leonardo, 2002; Ristic, Wright, & Kingstone, 2007), and processed in different brain areas than arrow cues (Akiyama, Kato, Muramatsu, Saito, Umeda, & Kashime, 2006; Ristic, Friesen & Kingstone, 2002).

While most overt behavior does not reflect these functional differences, effects of cueing on evaluation do: Preference of cued objects is only observed with gaze cues and not with arrow cues (Bayliss et al., 2006).

The effect of gaze cueing on evaluation: Two models

Two explanatory models can be derived from the findings reported here. The aim of this study is to discern which of these two models is better suited to describe the functional mechanism underlying the effect of gaze cueing on evaluation.

Model 1: Attention. The first model proposes attention as the driving factor of the effect of gaze cueing on evaluation.

The first step of the attention model is that gaze cues are assumed to increase detection speed of a stimulus. This mechanism is assumed to account for the classic gaze cueing effect: Participants are faster at reacting to a stimulus because they are faster in detecting it if it is cued by a person's gaze. The second step of the attention model is that detection speed should be related to the time participants spend examining the stimulus. Since those eye tracking studies investigating gaze cueing have not reported data on the relationship between detection speed and examination time, it could be that the attention model actually starts at the third step: gaze cues might directly increase the time participants examine a stimulus. This has been shown in a recent eye tracking study (Hutton & Nolte, 2011). The fourth step of the attention model is that longer examination times are assumed to lead to better evaluation of the stimulus, which a number of studies have shown (e.g. Armel et al., 2008; Krajbich & Rangel, 2011; Shimojo et al., 2003; Glaholt & Reingold, 2009a; Glaholt & Reingold, 2009b; Pieters & Warlop, 1999). Figure 1 gives a schematic overview of this model.

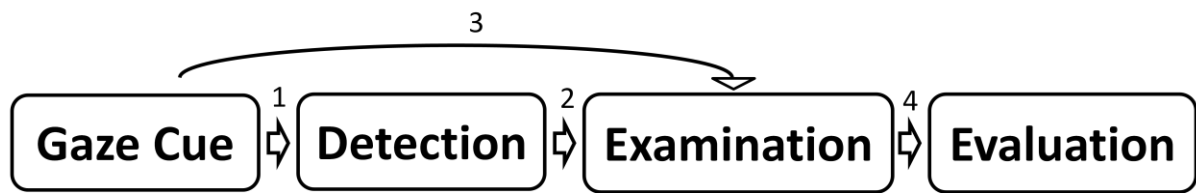


Figure 1. Schematic overview of the process underlying the effect of gaze cueing on evaluation as predicted by the attention model.

The eye tracking methodology employed in this study is ideal for testing this model, because it allows for accurate measurement of detection speed and examination time. To establish attention as a requisite factor for the effect of gaze cueing on evaluation, at least two steps of the attention model have to be confirmed: the gaze cue has to lead to longer examination times of the cued object, and longer examination times have to correlate with better evaluation of the cued object.

Model 2: Social information. The second model proposes social information as the driving factor underlying the effect of gaze cueing on evaluation. Here, the social nature of the gaze cue becomes especially relevant.

A number of incongruent findings concerning the attention effects of gaze cueing led to the development of this alternate explanatory model. First, as described above, the nature of gaze cues seems to differ from that of non-social cues like arrows. Different brain areas are involved and gaze cues elicit more reflexive reactions than arrow cues (Akiyama et al., 2006; Friesen, Ristic & Kingstone, 2004; Riccardelli et al., 2002; Ristic, Friesen & Kingstone, 2002; Ristic, Wright, & Kingstone, 2007). A model basing the effect of gaze cueing on evaluation solely on attention does not account for these differences and should work with nonsocial cues as well. But this is not the case: The effect of cueing on evaluation has never been observed with arrow cues (Bayliss et al., 2006).

Nevertheless, it is still unclear how to account for this difference. It could be that the more automatic nature of the gaze cue leads to longer dwell times on the cued object, so that it would again be attention effects causing the increased liking of cued objects. However, it is also conceivable that it is indeed the social nature of the cue that carries implications of desirability of the cued object. Bayliss et al. (2006) argue that we implicitly assume that people look at objects they like and look away from objects they dislike. Observing a person looking at an object, we infer that this person likes this object and base our evaluation in part on that assumption. The fact that some studies found gaze cueing effects only when participants were aware of the congruency of the gaze cue (Bry et al., 2011; Corneille et al., 2009) could hint at this: if we notice that someone looks at an object, an automatic assumption of intentionality is triggered, leading to the conjecture that the looked-at object must be of relevance to the looking agent. If we don't notice this congruency, that is, if we notice the gaze and the object but don't draw a connection between the two, we might still follow the direction of the gaze, leading to increased reaction speed and the classic gaze cueing effect, but the effect on evaluation would vanish. This would explain why the effect of gaze cues on evaluation is stronger if participants are made aware of the congruent gaze cue.

Another find emphasizing the social rather than the attention effects of gaze cues is that of Strick, Holland and van Knippenberg (2008). They found that direct gaze at the participant leads to better liking of objects and found no difference between congruent and incongruent gaze cues. This effect was shown for attractive, friendly looking cueing faces. When the cueing faces were rated unattractive, a non-significant tendency towards the inverse effect was found, i.e. direct gaze at the participant by unattractive faces was related to slightly worse evaluation of objects. The authors argue that this effect is due to the rewarding

properties of the direct gaze of friendly, attractive people. The association of this rewarding stimulus with the evaluated object would lead to increased liking of that object.

The functional mechanism in this model would therefore consist of positive values of the social stimulus, i.e. the cueing face, that are transferred to the cued object, or inferences made from the gaze cue that is seen as diagnostic of the desirability of the object. In both cases, the type of gaze cue associated with an object would directly lead to a different evaluation of that object, without the need for attention mediation. Figure 2 gives a schematic overview of this model.

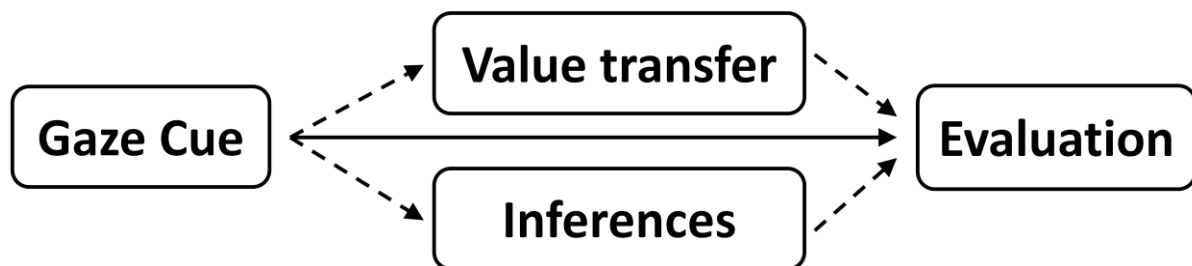


Figure 2. Schematic overview of the process underlying the effect of gaze cueing on evaluation as predicted by the social information model.

Testing this model involves establishing a direct effect of the gaze cue on evaluation. The direction of the effect would permit inferences about the underlying mechanism. If products associated with direct gaze at the participants are preferred, this would point to a process of value transfer. If products associated with a model's gaze at the product are preferred, this would indicate inferences as the underlying process.

Method

The study

The aim of this study was to investigate the effect of gaze cueing in print advertisements. First, I tested how a model's gaze influences a viewer's gazing behavior, and second I tested whether and how this affects the evaluation of advertisements and of products

featured in advertisements. This was tested using genuine Asian cosmetic advertisements. Participants saw advertisements that either featured a model looking at a product, a model looking straight at the participant or a model looking away from the product. Participants' gazing behavior was recorded with an eye tracker. Participants rated products directly after having seen each advertisement and again after having seen all advertisements. This allowed for an investigation of how a model's gaze influences participants' viewing behavior, and how participants' viewing behavior is connected to their evaluation of the advertisement and the product.

Participants

Sixty-five women participated in this study. Five participants had to be excluded from the analysis: Two because they did not follow the experimental instructions correctly and three because of technical problems involving the calibration of the eye tracker, resulting in a final sample of sixty women. The final sample included women aged 19 to 58 ($M = 31.63$, $SD = 10.97$). Twenty-nine were psychology students who received partial course credit as compensation for their participation. Of the other participants, sixteen were students of other disciplines, and the rest mostly full-time working women who volunteered to participate in the study without any compensation. Only women with normal or corrected-to normal vision were included in the sample. Only women were tested for this study because the gaze cueing effect has been shown to be stronger for women than for men (Alwall et al., 2010).

Design

This study employed a between-participants design to test the effect of congruent, straight or incongruent gaze cues on product evaluation. Participants were randomly assigned to one of three experimental conditions:

1. *Congruent*: All advertisements presented in this condition featured congruent gaze cues, i.e. the models were always looking at the product.
2. *Straight*: All advertisements presented in this condition featured models who gazed directly at the participant.
3. *Incongruent*: All advertisements presented in this condition featured incongruent gaze cues, i.e. the models always looked away from the product.

To manipulate gaze cue, I retouched the models' eyes to make them appear to look at the product, straight ahead or away from the product. Figure 3 shows examples of an advertisement as seen by participants in each condition.



Figure 3. Three versions of an ad as seen by participants in the congruent, straight and incongruent condition.

Participants were evenly distributed among the three experimental conditions, resulting in a sample of 20 women per experimental condition.

Material

In total, participants saw eleven advertisements; one practice advertisement and ten further advertisements. The practice advertisement was excluded from the analysis. Each advertisement showed a full frontal shot of a female Asian model and a cosmetic product. In five of the ten advertisements, the model was placed on the right-hand side of the advertisement, in the other five advertisements the model was placed on the left-hand side. In one of the advertisements, the model was on the right-hand side of the advertisement but the

model held the product on her right shoulder, so that the product was situated even further to the right-hand side of the advertisement. In all other advertisements, the product was placed on the opposite side of the model.

Seven of the advertisements featured one product or two versions of one product, three advertisements featured a range of three or more products. Products were mostly skin whitening products, moisturizing crèmes or masks and one hair product. Writing on the products was mostly in Chinese, excepting the brand name, which was unknown to the participants. All writing in English that gave hints as to what the product was, was removed beforehand so as to leave participants with as little information as possible to the actual type or quality of the product.

I chose Asian cosmetic advertisements because the models and products featured in those advertisements are unlikely to be known to the tested sample of Austrian citizens. A pretest ($n = 72$) established that the models featured in the advertisements used in this study were perceived as above average in attractiveness ($M = 4.61$, $SD = 1.04$ on a scale of 1 to 7, $T(67) = 4.82$, $p < .001$) and friendly in their expression ($M = 4.64$, $SD = 1.05$ on a scale of 1 to 7, $T(67) = 5.02$, $p < .001$). Products were rated average in their attractiveness ($M = 4.01$, $SD = 0.87$ on a scale of 1 to 7, $T(50) = .58$, $p = .954$).

Procedure

Participants were all tested individually by the same experimenter. They were told that they would participate in a marketing study investigating the attractiveness of Asian cosmetic products, allegedly preceding an introduction of those products to the European market.

Data were collected using an SMI RED 500 eye tracker connected to a 22 inch computer screen with a resolution of 1680 x 1015px and a sampling rate of 120Hz. All participants were at an approximate viewing distance of 70 cm to the computer screen.

Participants were greeted and given a brief explanation of the eye tracking procedure. After calibration and instruction, participants were presented with full-screen color Asian cosmetic advertisements. Participants all saw the same advertisement in a practice trial, followed by ten experimental trials in which the order of the advertisements was randomized. Each advertisement was presented for five seconds. Directly following the presentation of each advertisement, participants were asked to rate the attractiveness of the advertisement as a whole (“How much did you like the advertisement?”) and the attractiveness of the product (“How attractive did you find the product?”). Participants reported their ratings verbally while presented with the questions on the eye tracking monitor, to avoid loss of eye tracking data due to the necessity of handling a mouse or a keyboard. Ratings were noted by the experimenter.

After the eye tracking procedure, participants completed a second, more extensive evaluation of the products on a separate laptop. They saw each advertisement once more and answered twelve questions about each product. This twelve-item questionnaire was subjected to a factor analysis to extract underlying latent variables. A principal component analysis (PCA) with orthogonal rotation (varimax) extracted three factors with eigenvalues larger than 1 that in sum explained 78.53% of the variance. Sample size was adequate for the analysis (KMO = .783) and item correlations were sufficiently large for PCA (Bartlett’s test of sphericity: $\chi^2(66) = 658.52, p < .001$). The three extracted factors were the following:

1. *Product evaluation/ self (PEs)* accounted for 31.12% of the variance (*eigenvalue* = 3.734, *Cronbach’s* α = .946). It included the following four items, which were all answered on a 7-point scale. Endpoints are indicated in brackets:
 - How likely is it that you would buy this product if it was available in the domestic market? (very unlikely – very likely)

- How appealing do you find the product? (very unappealing – very appealing)
- How attractive do you find the product? (very unattractive – very attractive)
- How much do you like the product? (not at all – very much)

2. *Product evaluation/ other (PEo)* accounted for 30.42% of the variance (*eigenvalue* = 3.65, *Cronbach's* α = .855). It included the following six items, which were all answered on a 7-point scale. Endpoints are indicated in brackets:

- How would you estimate the market success of this product in Austria? (not successful – very successful)
- How likely do you think it is that women would buy this product if it was available in the domestic market? (very unlikely – very likely)
- Compared to other products of its kind, what price would you be prepared to pay for this product? (a lot less – a lot more)
- Compared to other products of its kind, what price could be asked for this product? (a lot less – a lot more)
- How effective do you think is the product? (not effective – very effective)
- Compared to other products of its kind, how effective do you think is the product? (much less effective – much more effective)

3. *Willingness to pay (WP)* accounted for 16.99% of the variance (*eigenvalue* = 2.04, *Cronbach's* α = .81). It included the following two items, which were answered on a scroll bar ranging from €0-50:

- What price would you be willing to pay for this product?
- What price do you think could be asked for this product in the domestic market?

Afterwards, participants completed a demographics questionnaire with questions about their age, profession or study subject, purchase frequency of cosmetic products and average amount of money spent in a month on cosmetic products. After completing the surveys, participants were debriefed and thanked for their participation. On average, participants needed 27.3 minutes ($SD = 6.57$) to complete the study.

Results

Data Analyses

Eye tracking data. Preparation of eye tracking data for analysis included the definition of so-called areas of interest (AOIs) for each stimulus picture presented to the participants. For each advertisement, three major AOIs were defined: one covering the face of the model, one covering the product and the residual picture space that was summarized as a background AOI. For additional analyses, two further AOIs were defined; one for the left eye and one for the right eye of the model.

The definition of AOIs allows the extraction of characteristic variables for each AOI. Dwell time denotes the total time participants spend looking at a certain AOI, specifically the time from the first to the last fixation inside an AOI. It is therefore a measure for the time participants spend examining an object, e.g. the model or the product. Entry Time denotes the time from stimulus onset to the first eye movement into the AOI. This entry time is used as a measure for the speed with which participants detect a specific object, e.g. the product. All analyses concerning attention use these two variables.

Effect sizes. All results are presented with Pearson's r as a measure of the effect size. As suggested by Cohen (1992), an r of .1 constitutes a small effect, an r of .3 a medium effect and an r of .5 a large effect.

Material. The use of genuine advertisements resulted in a number of interfering variables. Repeated-measures ANOVAs

showed that the different design of each advertisement led to different ratings of advertisements ($F(9, 51) = 9.28, p < .001, r = .43$) and products ($F(9, 51) = 7.3, p < .001, r = .39$) (see table 1 for average ratings of each advertisement).

The singular design of each advertisement also resulted in different AOI sizes for models' faces and products which had an effect on dwell time. The larger the model's face, the longer participants tended to look at it ($\beta = .6, t(9) = 2.26, p = .05, r = .6$), the larger a product, the longer participants looked at it ($\beta = .73, t(9) = 3.2, p = .01, r = .73$) and the larger

the background, the longer participants looked at it ($\beta = .821, t(9) = 4.31, p = .02, r = .82$).

These effects are implied in the use of genuine advertising material that was not designed for the laboratory. Given that each participant in each experimental group saw all advertisements and that the presentation order was randomized, the effect of interfering variables should be the same in all experimental conditions and should therefore not impair the validity of between-group comparisons. Therefore, if not otherwise specified, the following analyses were calculated with means per person averaged over all ten advertisements.

Table 1

Means and standard deviations for product and advertisement ratings. Rating scale range: 1 (not attractive) - 7 (very attractive).

	Product ratings		Ad ratings	
	Mean	SD	Mean	SD
1	4.60	2.06	4,85	1,89
2	5.68	2.12	4,60	2,06
3	4.62	2.03	5,68	2,12
4	5.08	1.93	4,62	2,03
5	4.98	2.28	5,08	1,93
6	4.80	1.81	4,98	2,28
7	4.08	1.93	4,80	1,81
8	4.12	1.96	4,08	1,93
9	3.65	1.76	4,12	1,96
10	4.38	2.04	3,65	1,76
Overall	4.35	1.46	4.7	1.24

Attention Measures

A repeated-measures ANOVA comparing participants' average dwell time on the model, the product and the background showed that participants did not spend equal amounts of time examining each AOI ($F(2, 118) = 102.69, p < .001, r = .92$). Tukey post-hoc tests revealed that participants spent most of their time looking at either the model ($M = 1,420.4\text{ms}, SD = 391.65$) or the product ($M = 1,506.8\text{ms}, SD = 401.24$), with much shorter dwell times on the background of the advertisement ($M = 565.1\text{ms}, SD = 226.65$).

Concerning the sequence of their gazes, participants looked first at the model ($M_{\text{entry time}} = 595.96\text{ms}, SD = 358.44$), second at the product ($M_{\text{entry time}} = 992.35\text{ms}, SD = 455.46$) and, if at all, third at the background of the advertisement ($M_{\text{entry time}} = 1,512.55\text{ms}, SD = 532.22$) in 78.83% of the cases. This primary detection of the cueing face constitutes the prerequisite for gaze cueing. Surprisingly, this did not carry through to effective gaze cueing. A one-way ANOVA comparing average product entry times revealed that participants observing advertisements in the congruent condition were not quicker to look at the product than participants observing advertisements in the straight- or incongruent condition ($F(2, 57) = 1.562, p = .22, r = .23$). To ascertain whether this was due to certain characteristics of specific advertisements individual analyses for each advertisement were calculated. Results are presented in table 2.

As can be seen from the table, the gazing behavior of the participants shows no clear tendencies, let alone gaze cueing effects. Entry times differ between conditions significantly in only three of ten advertisements. Post-hoc analyses of those three advertisements each point in a different direction. In advertisement number six, participants observing advertisements in the incongruent condition were almost twice as fast to find their way to the product ($M = 1,076.75\text{ms}, SD = 569.1$) than those observing advertisements in the congruent

condition ($M = 2,115.55\text{ms}$, $SD = 1505.69$). In advertisement number eight, participants observing advertisements in the incongruent condition were faster to look at the product ($M = 539.95\text{ms}$, $SD = 299.62$) than participants observing advertisements in the straight condition ($M = 982.85\text{ms}$, $SD = 690.51$). Finally, in advertisement number nine, participants in the congruent condition looked at the product significantly faster ($M = 1,177.88\text{ms}$, $SD = 768.44$) than participants observing advertisements in the straight condition ($M = 1,899.17\text{ms}$, $SD = 922.44$). We can therefore assume that not finding a gaze cueing effect is not due to certain characteristics of one particular advertisement, though it can be speculated that certain characteristics of every single advertisement are responsible for attenuating the gaze cueing effect.

Table 2

Mean product AOI entry times in milliseconds for each advertisement for the congruent, straight and incongruent experimental condition. Lower values indicate faster detection speed.

Advertisement number	Condition			F(2, 57)	p	r
	Congruent	Straight	incongruent			
1	1,157.05	1,068.35	857.25	< 1	.532	.15
2	932.90	1,173.55	883.05	< 1	.495	.16
3	736.25	1,094.15	955.05	1.08	.347	.19
4	847.50	900.85	637.70	< 1	.410	.18
5	903.50	632.25	717.17	1.26	.290	.21
6	2,115.55*	1,483.35	1,076.75*	4.50	.015	.37
7	1,013.00	999.05	843.30	< 1	.680	.12
8	729.70	982.85*	539.95*	3.77	.029	.34
9	1,177.88*	1,899.17*	1,472.47	3.38	.042	.35
10	646.55	759.70	684.55	< 1	.872	.07
Overall	1,031.90	1,093.91	851.24	1.56	.22	.23

* Asterisks mark significant Tukey post-hoc contrasts ($p < .05$)

Even though the gaze of the model did not influence the speed with which participants looked at the product, it did have an effect on the amount of time participants spent looking at the model ($F(2, 57) = 4.194, p = .02, r = .36$). Tukey post-hoc analysis showed that participants spent significantly longer looking at the model in the congruent condition ($M = 1,583.37\text{ms}, SD = 333.53$) than in the incongruent condition ($M = 1,243.485\text{ms}, SD = 340.82$). Participants in the straight condition did not differ significantly from either other group in the amount of time they looked at the model ($M = 1,434.295\text{ms}, SD = 433.37$).

The time participants spent looking at the product ($F < 1, p = .991$) or the background ($F(2, 57) = 2.1, p = .132$) did not differ between experimental conditions.

Independently of experimental conditions, the speed with which participants looked at an AOI had an effect on the time participants spent looking at it. Linear regression showed that shorter entry times are related to longer dwell times. This holds true for models ($\beta = .4, t(58) = 3.29, p = .002, r = .4$) as well as products ($\beta = .34, t(58) = 2.79, p = .007, r = .34$).

Presentation order. Repeated-measures ANOVAs showed that there was no effect of presentation order on product entry time ($F(9,51) < 1, p = .49$) or model entry time ($F(9,51) = 3.78, p = .23$). But there was an effect of presentation order on dwell time ($F(9, 51) = 24.64, p < .001, r = .38$). Post-hoc contrasts revealed that overall dwell time was longer in the first advertisement participants saw (all $p \leq .001$), an effect which was carried by longer product dwell time ($F(9, 51) = 7.1, p < .001, r = .33$) and model dwell time ($F(9, 51) = 7.64, p < .001, r = .32$). Background dwell time was affected by presentation order ($F(9, 51) = 2.21, p = .037, r = .17$) but background dwell time on the first picture did not differ background dwell time on any other advertisements (post-hoc tests all $p = 1$). See table A.1 in appendix A for means, standard deviations and post-hoc pairwise comparisons for all advertisements. Figure 4 shows overall, product, model and background dwell time for each advertisement.

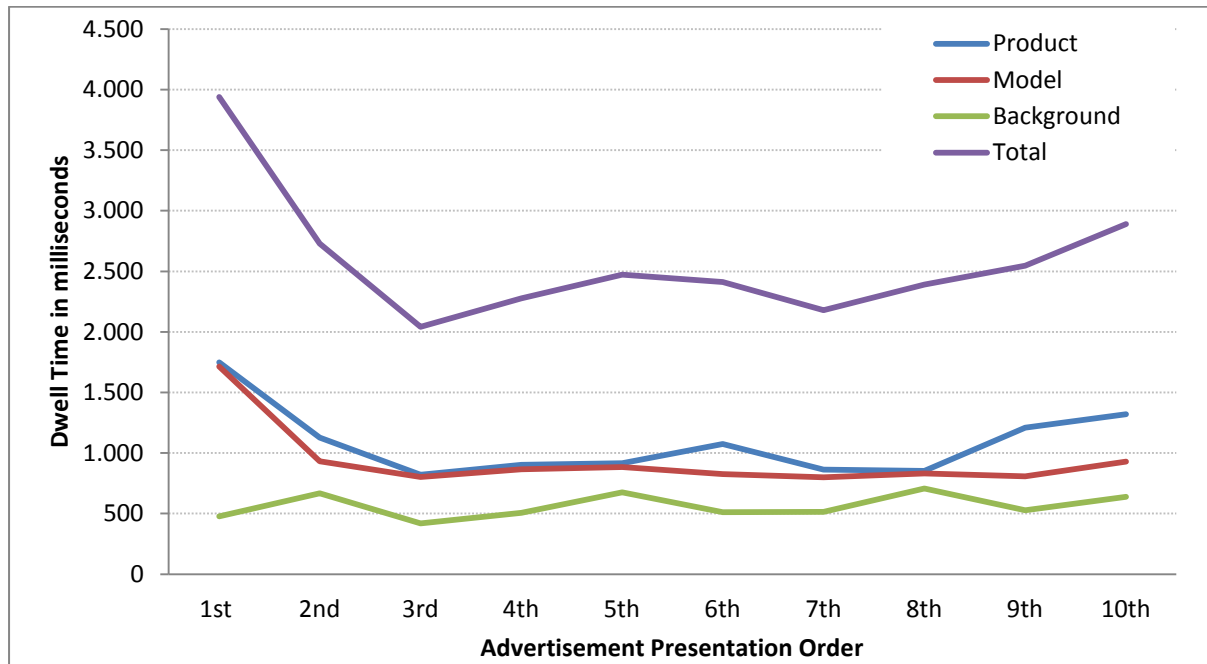


Figure 4. Total, product, model, and background dwell times per advertisement in advertisement presentation order.

Dwell time denotes the total time participant spend fixating within and area of interest.

Lower overall dwell times mean that participants spent more time screening the advertisements without actually fixating on any given point. The presentation order of advertisements was randomized. This means that, independent of which advertisement it was participants saw first, participants displayed significantly different viewing behavior when inspecting the first advertisement. They generally spent more time examining specific points of the advertisement, especially the product and the model.

Evaluation measures

First Evaluation. The first evaluation consisted of attractiveness ratings of the product and the advertisement directly after participants saw each advertisement at the eye tracker.

Repeated-measures ANOVAs showed no effect of presentation order on product evaluation ($F(9, 51) < 1, p = .68$) or advertisement evaluation ($F(9, 51) = 1.05, p = .42$) in the sense that when calculated over all experimental groups, the first advertisement was not rated

differently than the following advertisements. But there was an effect of presentation order when comparing experimental groups. For the first advertisement participants saw, a one-way ANOVA comparing the experimental groups showed that participants observing advertisements in the congruent condition rated products significantly better ($F(2, 57) = 7.56$, $p = .001$, $r = .46$, $M = 5.5$, $SD = 1.47$) than participants observing advertisements in the straight ($M = 4.05$, $SD = 1.67$) or incongruent condition ($M = 3.6$, $SD = 1.79$). Keeping in mind that the presentation order was randomized and each participant saw a different advertisement first, this indicates that it is actually the gaze cue and not specific characteristics of single advertisements that drives this effect. When rating the first advertisement, participants preferred products that were being looked at by a model to products associated with a model looking at them or a model looking away from the product. This effect, however, was not found in advertisements presented to the participants after the first one (all $p > .1$) and does not generalize over all advertisements ($F < 1$, $p = .983$). See table B.1 in appendix B for means, standard deviations and between-group comparisons of product evaluation by presentation order.

Concerning the evaluation of the advertisements as a whole, the results can be seen as paralleling the evaluation of products. There is a tendency to prefer advertisements with congruent gaze cues ($M = 5.7$, $SD = 1.22$) to those with straight ($M = 4.8$, $SD = 2.02$) or incongruent gaze cues ($M = 4.45$, $SD = 1.57$) when analyzing only the first advertisement participants saw ($F(2, 57) = 3.11$, $p = .052$, $r = .31$). Again, this effect does not persist when analyzing the second or any advertisement seen later (all $p < .1$), nor does it generalize over all advertisements ($F < 1$, $p = .713$). See table B.2 in appendix B for means, standard deviations and between-group comparisons of advertisement evaluation by presentation order. Also, ratings of advertisements and products were highly correlated ($r = .77$, $p < .001$).

Relating these evaluations to attention measures, hierarchical linear regression showed little effect of the time participants spent looking at a specific AOI on their evaluations of products and advertisements. Specifically, the time participants spent looking at the product did not influence their rating of the product ($\beta = .13$, $t(58) = 0.996$, $p = .323$), the time participants spent looking at the model did not influence their rating of the advertisement ($\beta = .08$, $t(58) = 0.57$, $p = .57$) and the time participants spent looking at the model did not influence their rating of the product ($\beta = .12$, $t(58) = 0.93$, $p = .358$).

Second evaluation. The second evaluation participants gave after having completed the eye tracking part of the study consisted of a twelve-item questionnaire for each advertisement, resulting in measures of Product evaluation/ self (PEs), Product evaluation/ other (PEo) and Willingness to pay (WP). Comparing the experimental groups, ratings did not differ between groups in any of the three measures (PEs: $F < 1$, $p = .66$, PEo: $F < 1$, $p = .85$, WP: $F = 1.45$, $p = .24$).

Additional Analysis

Age. Participants were aged 19 to 58 ($M = 31.63$, $SD = 10.97$). Age had a significant impact on participant behavior. The older the participant, the longer she spent looking at the background ($r = .46$, $p < .001$), the less time she looked at the model ($r = -.42$, $p = .001$) and the less time she looked the model in the eyes ($r = -.39$, $p = .002$). Also, the older participants the less they liked the advertisements ($r = -.3$, $p = .018$) and the products (at the eye tracker: $r = -.31$, $p = .016$, second evaluation: $r = -.27$ to $-.38$, $p < .038$). With age, participants reported buying cosmetics less frequently ($r = -.29$, $p = .026$), though the amount of money spent on cosmetics did not change with age ($r = .16$, $p = .225$).

Few/ many. Since not all advertisements featured the same number of products, t-tests were conducted to compare ratings of those seven advertisements that featured only one

product or two versions of one product and those three advertisements featuring a range of three or more products. The ratings of those advertisements featuring multiple products surpassed the ratings of advertisements with fewer products over all experimental conditions in the first and second evaluation on all scales. See table 3 for means and t-values.

Table 3

Comparison of ratings of advertisements with few (≤ 2) or many (> 2) products.

	Few	Many			
	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>t(59)</i>	<i>p</i>	<i>r</i>
Advertisement rating eye tracker	4.57 (1.25)	5.24 (1.64)	3.88	< .001	.45
Product rating eye tracker	4.12 (1.4)	4.89 (1.9)	4.83	< .001	.53
Product evaluation self	3.14 (0.9)	3.72 (1.05)	4.88	< .001	.54
Product evaluation other	3.63 (0.64)	4.19 (0.61)	7.34	< .001	.69
Willingness to pay	6.55€ (2.56)	8.42€ (3.32)	7.01	< .001	.67

Left/ right. In six of the advertisements, the product was placed on the right hand side of the model, in four advertisements the product was on the model's left. Model placement had an effect on ratings: Advertisements with products on the right-hand side were rated better, and products on the right-hand side themselves were rated better as well. See table 4 for means and t-values.

Table 4

Comparison of advertisements with products on the left- or right hand side of the model.

	Left	Right			
	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>t(59)</i>	<i>p</i>	<i>r</i>
Advertisement rating eye tracker	4.60 (1.35)	4.89 (1.32)	2.20	.032	.28
Product rating eye tracker	4.03 (1.41)	4.56 (1.63)	3.80	< .001	.44
Product evaluation self	3.01 (0.95)	3.49 (0.94)	3.96	< .001	.46
Product evaluation other	3.53 (0.74)	3.97 (0.57)	5.63	< .001	.59
Willingness to pay	6.16€ (2.45)	7.74€ (2.99)	6.87	< .001	.67

The position of model and product in the advertisement also had an effect on attention measures. In advertisements where the product was placed on the right-hand side of the model, participants were faster to look at the model (product right: $M_{\text{entry timeI}} = 546.03\text{ms}$, $SD = 332.18$, product left: $M_{\text{entry timeI}} = 666.44\text{ms}$, $SD = 484.71$, $t(59) = 2.37$, $p = .021$, $r = .3$) and spent less time looking at the background (product right: $M_{\text{dwell timeI}} = 507.73\text{ms}$, $SD = 259.12$, product left: $M_{\text{dwell timeI}} = 651.19\text{ms}$, $SD = 273.57$, $t(59) = 3.97$, $p < .001$, $r = .46$). Also, participants looked significantly longer at the eye that was closer to the product than at the eye farther away from it, i.e. dwell time on the right eye was longer when the product was placed on the right-hand side of the model (right eye: $M_{\text{dwell timeI}} = 337.23\text{ms}$, $SD = 254.09$, left eye: $M_{\text{dwell timeI}} = 174.75\text{ms}$, $SD = 174.37$, $t(59) = 4.52$, $p < .001$, $r = .51$) and longer on the left eye if the product was placed on the left-hand side of the model (right eye: $M_{\text{dwell timeI}} = 359.17\text{ms}$, $SD = 229.82$, left eye: $M_{\text{dwell timeI}} = 220.83\text{ms}$, $SD = 180.87$, $t(59) = 4.48$, $p < .001$, $r = .5$).

Discussion

Summary of results

This study employed a between-subjects design to investigate the effect a model's gaze in print advertisements has on a viewer's gaze and on product evaluation. Participants were presented with cosmetic advertisements that featured a model looking either at the product (congruent condition), looking straight at the participant (straight condition) or looking away from the product (incongruent condition). Two models are proposed to explain the effects this had. An attention model predicts that the model's gaze at the product should lead to faster detection and longer examination of the product, which should lead to increased liking of the product. A social information model predicts that either the model's gaze at the participant should directly lead to increased liking of the product due to the rewarding value of direct

gaze of an attractive model that is associated with the product (value transfer), or the model's gaze at the product should directly lead to increased liking of the product due to the interpretation of the model's gaze as a sign of her liking the product (inferences).

Model 1: Attention

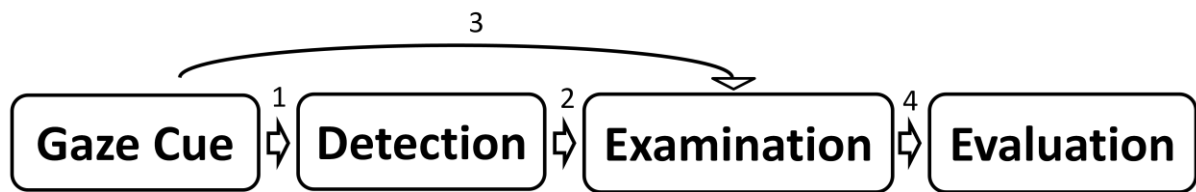


Figure 1. Schematic overview of the process underlying the effect of gaze cueing on evaluation as predicted by the attention model.

The first prediction of the attention model is the classic gaze cueing effect. Participants were expected to look faster at the product if the model was looking at it. This effect could not be reproduced in this study. There are a number of possible reasons why this was the case.

First, most previous gaze cueing studies employed a gaze sequence, that is, the cueing face looked first at the participant and then at the product or the location where the product was about to appear (Bayliss et al., 2006; Bayliss et al., 2007; Bayliss et al., 2009; Bayliss & Tipper, 2006; King et al., 2011). Sometimes the cueing face then turned back to look at the participant once more (Bry et al., 2011). There were two studies, however, that employed static gaze cues. Of those, one used dogs' heads as cues (Corneille et al., 2009) and asked participants to indicate whether the dog had looked at the product or away from it, two factors that make its comparability to the present study questionable. The other study found an effect of straight gaze at the participant on evaluation, but no effect of congruent gaze cues (Strick et al., 2008). Van der Weiden et al. (2010) explicitly compared different gazing sequences and found that a participant-product-participant sequence had the strongest effect

on object evaluation. Static gaze at the participant did not have an effect on object ratings in this study; neither did a gaze sequence of product-participant. Also, research in developmental psychology has shown that infants are cued by gaze sequences, but not by static gaze cues (Mansfield, Farroni, & Jonson, 2012). Taken together, this indicates that different processes might be at work when observing static or dynamic gaze cues. It could therefore be that the gaze cueing effect was not found in this study because static gaze cues were used. Since print advertisements only can use static gaze cues, further research exploring static gaze cues could be of value.

Second, participants were asked to rate each product directly after having seen each advertisement and before seeing the next one. This could have disturbed the participants' natural gazing behavior by priming them to look for the product right away in order to be able to rate its attractiveness.

Third, previous studies investigating gaze cueing effects on reaction times presented the gaze cue before the cued object appeared. In this study, participants' gaze was cued to start at the center via a fixation cross after which model and product appeared simultaneously. It could be that participants registered the product with their first fixation, at the same time they registered the model. If this was the case, facilitating effects of the gaze cue would be without effect, since participants in all conditions would have noticed the product at the same time, right after stimulus onset.

Fourth, a gaze cueing study concerned with the gazing behavior elicited by gaze cues ruled out cue-driven saccades as the relevant mechanism accounting for gaze cueing effects (Mansfield et al., 2003). It is therefore not clear whether overt or covert attention shifts account for gaze cueing effects. Covert attention shifts cannot be measured with an eye tracker, and even cue-driven saccades need not result in actual fixation on the target

(Mansfield et al., 2003). Rather, there might have been cue-driven saccades to the product which allowed participants to register the product in their peripheral vision. This would suffice for faster reaction to a stimulus, but would not constitute a fixation on the stimulus itself and would therefore not influence the entry time on the product AOI. Not finding shorter entry times on the product AOI does therefore not necessarily mean that there was no gaze cueing.

The second prediction of the attention model is the effect of entry time on dwell time. This was found in this study. The faster participants looked at an AOI, the longer they spent looking at it. This shows that we tend to look first and longest at those parts of a picture that seem the most interesting or important.

The third prediction of the attention model is that the gaze cue should have an effect on dwell times in the way that participants should spend longer looking at the product if the model was looking at the product. This effect was not found in this study, though there was an effect of gaze cue on model dwell time. Participants looked longer at the model in the congruent condition than in the incongruent condition. Previous studies found that congruently cueing faces are perceived as more trustworthy than incongruently cueing faces. This could have resulted in participants looking longer at trustworthy, congruently cueing faces whose gazes were perceived as meaningful, while the incongruent gaze cue was categorized as not meaningful and the untrustworthy incongruently cueing face was not observed any further.

The fourth prediction of the attention model is that there should be a relationship between dwell time and evaluation. Preference of objects should increase with the time participants look at them. Again, this effect was not found in this study.

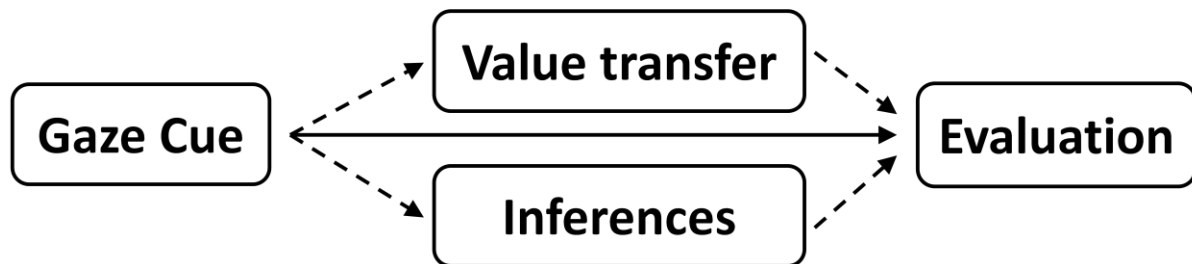
Model 2: Social information

Figure 2. Schematic overview of the process underlying the effect of gaze cueing on evaluation as predicted by the social information model.

The basic prediction of the social information model is that there should be a direct effect of the gaze cue on product evaluation. This was the case for the first advertisement participants saw. Participants in the congruent condition rated advertisements and products better than participants in the straight or incongruent condition. Since the order of the advertisements was randomized, each participant saw a different advertisement first. That the effect persists over all advertisements is a strong indication for the assumption that the gaze cue itself led to different ratings of advertisements and products. But this effect did not persist beyond the first advertisement participants saw and participants generally displayed different gazing behavior when studying the first advertisement than when studying the following advertisements. When seeing the first advertisement, participants fixated longer on the advertisement, in later advertisement they fixated less, indicating that they screened the advertisement more dynamically and spent less time examining single points. This could indicate that the exposure time to the advertisements was too long. Other gaze cueing studies presented the gaze-object association for as short as 1.5 seconds (Corneille et al., 2009, Strick et al., 2010), mostly around 2.5-3 seconds (Bayliss et al., 2006; Bayliss et al., 2007; Bayliss et al., 2009; Bry et al., 2011; King et al., 2011) to a maximum of 4.5 seconds which included a three-step gazing sequence and not just a static gaze cue (Van der Weiden et al., 2010). In this study, participants saw each advertisement for five seconds. The length of exposure time

was chosen because participants were presented with full-screen advertisements, which are more complex and bigger than the stimulus material used in previous studies. Five seconds, however, might have been too long. When seeing the first advertisement, the task was still new to the participants and they thoroughly studied the advertisement. The following advertisements were very similar in their general structure, so participants already knew what to expect. They might not have needed more than a few glances to take in the differences and might simply not have processed the connection between the model's gaze and the product. Previous studies showed that the effect of gaze cues on evaluation relies on or is stronger if the participants are aware of the congruency between the gaze and the object of evaluation (Bry et al., 2011; Corneille et al., 2009). Participants might not have established this connection in the later advertisements, thus disturbing the effect of the gaze cue. For further studies I would therefore recommend shorter exposure times.

The direction of the effect allows conjecture of the underlying mechanism. A process of value transfer would take place if participants experienced the direct gaze of an attractive, friendly model as rewarding and if they transferred this reward value onto the product. A process of inferences would take place if participants interpreted the model's gaze at the product as a sign of desire, i.e. the model wanting the product, which would lead to an inference of the product as desirable.

Results from this study point to a process of inferences, since participants preferred objects that were looked at and not those that were associated with direct gaze at the participants. This would fit the explanation that participants interpreted the model's gaze as a sign of desire for the looked-at object. Clear conclusions cannot be drawn from this finding, though, because participants' inferences were not tested. Also, this finding stands in contrast to the findings of Strick et al. (2008), whose data point to a model of value transfer. Studies

concerned with investigating these mediating processes would be valuable contributions, if they establish clear evidence for either process.

Conclusion

The two major assumptions constituting the attention model of gaze cueing are that congruent gaze cues lead to longer dwell time on the cued object and that longer dwell time on the cued object leads to increased liking of that object. Neither effect could be found in this study. The basic assumption of the social information model is that there should be a direct effect of gaze cueing on evaluation. This was found for the first advertisement participants saw. Participants rated product and advertisement better in the congruent condition than in the straight or incongruent condition, which hints at inferences of desirability as the underlying mechanism driving this effect. I therefore assume that the social information model is better suited to explain the effect of gaze cueing on evaluation than the attention model, and that the effect of gaze cueing on evaluation found in this study is most likely based on a process of inferences.

Results outside the gaze cueing paradigm

This study produced a number of findings that may hint at fruitful avenues for further research. First, participants preferred a range of products to only one or two versions of one product. Not only were they prepared to pay more for more products, but they also attributed higher effectiveness and greater market success to those products. It could be interesting to investigate this effect in more detail and to find out why consumers prefer a range of advertised products to individual ones.

Second, there was a pronounced positioning effect. If the model was placed on the left hand side of the advertisement and the product on the right hand side, participants rated advertisements and products more favorably than when model and product were positioned

the other way around. An explanation for this could be that participants are used to reading from left to right. Participants might implicitly expect to begin exploration of an advertisement on the left hand side, which could lead to a fluency effect if the composition of the advertisement fits this automatic left-to-right tendency. Since participants always looked at the model first, this would be the case if the model was placed on the left hand side. Exploring this effect further could be a very interesting area of research with a number of practical implications for advertisers. The advertisements used in this study were not counterbalanced in their design, though, that is, different models and different product embedded in different background designs were placed either left or right. It could therefore be that the positioning effects found in this study are artifacts of other design characteristics of the advertisements.

Third, there was a pronounced age effect in relation to advertisement and product rating, but also in the gazing behavior of participants. It is not clear whether this effect is due to specific characteristics of the sample used in this study. Almost half of the participants were psychology students aged less than thirty. These age effects could therefore simply reflect differences between psychology students and other people. In-depth studies of differences between psychology students and members of the general public might actually be of great service to the field of psychology in general, since a great number of psychological studies rely on their student population as test subjects.

The fact that older participants generally rated advertisements and products less favorably than younger ones might reflect the possibility that participants aged thirty or older have more established preferences than younger people, thus they might simply be less susceptible to advertisements of products unknown to them. It might be that older women have already established brand loyalties and are less willing to try new products, thus rating

them less favorably than younger participants. Studying these generational differences would be of particular interest in areas this closely related to marketing and advertising realities.

General Limitations

The quality of the experimental material used in this study has to be addressed here. Using real advertisements of course has the advantage of higher ecological validity of results, so that the findings reported in this paper should be directly applicable to real-world advertising contexts. On the other hand, there is the disadvantage of confounding factors, which might lead to general underestimation of effects due to attenuation by uncontrolled factors or even to misinterpretation of findings which could have been caused by other factors than those hypothesized here. Problematic differences between the advertisements used here include the different type and number of products, different color schemes used in the advertisements, different sizes of AOIs caused by different sizes of model pictures and products, and of course a generally more complex design of advertisements which contained more distracting stimuli than experimental material designed for laboratory use would have. Since the same advertisements were used in all experimental conditions, these confounding factors should have been approximately counterbalanced between conditions. But the basic assumption of this study was that different mechanisms should drive evaluation in the different experimental groups, i.e. that the social stimulus should have a stronger impact in the congruent and straight condition than in the incongruent condition. In this case, however, there were other factors in the design of the advertisements on which participants might have based their evaluation. Those factors might have had different impact in the different conditions, depending on the strength of the social stimulus.

Another limitation concerning the stimulus material is the retouching of models' eyes to convey gaze cues. This is problematic because the models' retouched gaze simply did not

seem natural in some cases. In all original advertisements the models were looking straight at the viewer. The eye is naturally open wider when looking straight ahead than when looking to one side. Since manipulation of the eyelids was not possible, some of the retouched models appeared scared or surprised, simply because their eyes were marginally too wide open. Also, retouching of the eyes did not always succeed in conveying the impression that the model was actually looking at the product, but just looking in the general direction of the product. This might make no difference for peripheral detection speed as was tested in previous studies, but it might influence factors such as desirability inferences, which would only make sense if the model is actually perceived as looking at the product.

The impact of uncontrolled factors becomes especially problematic in light of the above mentioned suspicion that the exposure time was too long. Participants had five seconds to explore the whole advertisement. Comparable studies used shorter exposure times of 1.5 to 4.5 seconds (Bayliss et al., 2006; Bayliss et al., 2007; Bayliss et al., 2009; Bry et al., 2011; Corneille et al., 2009; King et al., 2011; Strick et al., 2008; Van der Weiden et al., 2010). A recent eye tracking study showed that participants under time pressure display different gazing behavior and are more susceptible to contextual influences than participants without time pressure (Reutskaja, Nagel, Camerer, & Rangel, 2011). Participants in this study might simply have had too much time to explore the advertisement, which could have led to decreased influence of the social cue. Future studies should therefore employ shorter exposure times.

Also, previous studies mostly applied a design in which participants actively had to respond to the cued objects, mostly in a classification task (Bayliss et al., 2006; Bayliss et al., 2007; Bayliss et al., 2009; King et al., 2011). Maybe this leads to a different mode or level of processing than just looking at an object and evaluating it. Another difference between this

study and previous research is that in this study participants saw each advertisement only once, and therefore only one gaze-object association. This might simply not have sufficed to establish an effect of gaze cueing on evaluation, which might rely on multiple exposures to objects and gaze-object associations.

As noted before, it could also be problematic that participants were explicitly asked to rate products before seeing the next advertisement, since this could have led to different gazing behavior and/ or evaluation strategies. Implicit rating via implicit association tests might be more effective. This would also address the issue that relying on a one-item measure for advertisement rating is problematic.

Practical implications

This study showed that, when first presented with an advertisement, participants prefer products and advertisements that include a model looking at the product. Preference is further increased if the model is placed on the left-hand side of the product and if the advertisement includes an array of products and not just one product.

The ideal design of an advertisement as can be concluded from this study is therefore as follows: there should be an attractive model at the left-hand side of the advertisement who is looking at an array of products located to her right.

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Appendix A

Table A.1

Mean dwell time per advertisement in presentation order and pairwise comparisons of the first advertisement with each other advertisement.

Advertisement sequence	Total Dwell Time in ms		Post hoc first ad <i>p</i>	Product Dwell Time in ms		Post hoc first ad <i>p</i>
	Mean	SD		Mean	SD	
1 st	3,938.60	746.76	-	1,747.54	804.83	-
2 nd	2,727.87	1,782.13	< .001	1,128.02	1,052.38	.025
3 rd	2,042.93	1,382.51	< .001	821.58	838.82	< .001
4 th	2,277.43	1,525.35	< .001	904.08	861.18	< .001
5 th	2,472.80	1,396.73	< .001	914.95	771.23	< .001
6 th	2,412.73	1,333.33	< .001	1073.63	904.80	.008
7 th	2,177.78	1,314.37	< .001	863.47	793.65	< .001
8 th	2,390.85	1,535.31	< .001	853.77	743.18	< .001
9 th	2,545.30	1,450.29	< .001	1,209.18	973.26	.079
10 th	2,889.50	1,627.54	.001	1,321.37	1,088.03	.903

Advertisement sequence	Model Dwell Time in ms		Post hoc first ad <i>p</i>	Background Dwell Time in ms		Post hoc first ad <i>p</i>
	Mean	SD		Mean	SD	
1 st	1,713.71	753.11	-	477.35	465.95	-
2 nd	931.97	1,001.88	< .001	667.88	737.40	1.000
3 rd	801.72	844.34	< .001	419.63	369.45	1.000
4 th	866.32	972.52	< .001	507.03	469.00	1.000
5 th	883.23	884.83	< .001	674.62	673.46	1.000
6 th	826.38	809.11	< .001	512.72	629.83	1.000
7 th	800.50	844.84	< .001	513.82	553.15	1.000
8 th	830.50	858.84	< .001	706.58	688.57	1.000
9 th	808.67	761.08	< .001	527.45	530.89	1.000
10 th	929.07	904.72	< .001	639.07	679.10	1.000

Appendix B

Table B.1

Means and standard deviations for product ratings per presentation order and experimental condition.

Product evaluation											
Advertisement sequence	Condition								<i>F</i> (2, 57)	<i>p</i>	<i>r</i>
	Overall		Congruent		Straight		incongruent				
	Mean	SD	Mean	SD	Mean	SD	Mean	SD			
1 st	4.38	1.79	5.50	1.47	4.05	1.67	3.60	1.70	7.56	.001	.46
2 nd	4.47	2.04	4.25	1.86	4.60	2.23	4.55	2.09	< 1	.846	.08
3 rd	4.38	2.30	4.50	2.04	4.35	2.68	4.30	2.25	< 1	.961	.04
4 th	4.30	2.09	4.20	1.82	3.70	2.00	5.00	2.32	2.03	.141	.26
5 th	4.57	2.04	4.95	1.43	4.65	2.54	4.10	2.00	< 1	.415	.17
6 th	4.55	2.00	4.20	1.82	4.95	1.99	4.50	2.19	< 1	.496	.16
7 th	4.28	2.15	4.75	1.92	3.80	2.14	4.30	2.36	< 1	.382	.18
8 th	4.42	2.29	3.75	1.83	4.40	2.60	5.10	2.27	1.79	.176	.24
9 th	3.95	2.08	3.95	1.73	4.05	2.50	3.85	2.03	< 1	.956	.04
10 th	4.20	2.07	4.55	1.96	4.25	2.38	3.80	1.85	< 1	.520	.15
Overall	4.35	1.46	4.37	1.28	4.30	1.64	4.38	1.50	< 1	.983	.08

Table B.2

Means and standard deviations advertisement ratings per presentation and experimental condition.

Advertisement evaluation												
Advertisement sequence	Overall		Condition						<i>F</i> (2, 57)	<i>p</i>	<i>r</i>	
			Congruent		Straight		incongruent					
	Mean	SD	Mean	SD	Mean	SD	Mean	SD				
1 st	4.98	1.69	5.70	1.23	4.80	2.02	4.45	1.57	3.11	.052	.32	
2 nd	4.67	1.81	4.20	1.94	5.00	1.92	4.80	1.54	1.06	.353	.19	
3 rd	4.78	2.19	4.75	1.77	5.10	2.49	4.50	2.31	< 1	.691	.11	
4 th	4.93	2.12	4.65	2.13	4.45	1.93	5.70	2.18	2.08	.135	.26	
5 th	4.70	1.99	4.80	2.24	5.00	2.08	4.30	1.63	< 1	.525	.15	
6 th	5.15	1.92	4.85	1.95	5.40	2.09	5.20	1.77	< 1	.664	.12	
7 th	4.43	2.19	4.40	2.26	4.70	2.39	4.20	1.99	< 1	.774	.09	
8 th	4.83	2.25	4.15	1.98	5.10	2.40	5.25	2.29	1.43	.248	.22	
9 th	4.50	2.17	3.95	1.88	4.55	2.39	5.00	2.18	1.19	.312	.20	
10 th	4.67	2.15	4.80	1.85	4.55	2.48	4.65	2.18	< 1	.963	.05	
Overall	4.77	1.24	4.59	1.29	4.88	1.42	4.86	1.02	< 1	.713	.11	

Appendix C

C. Abstract

Recent studies have shown that gaze cueing can influence object evaluation, but it is not clear what functional mechanisms drive this effect. Based on extant literature, two explanatory models are proposed: an attention model and a social information model. Both models are explored using eye tracking methodology. Participants saw and rated genuine Asian cosmetics advertisements featuring a model's face and a product. The models' eyes were manipulated to gaze at the product, at the participant or away from the product. Eye tracking data did not support the attention model. The social information model is discussed as more likely to explain the effects found in this study.

Keywords: gaze cueing, visual attention, product evaluation, advertising, eye tracking

Appendix D

D. Zusammenfassung

Aktuelle Studien haben gezeigt, dass Blicke anderer Personen die Bewertung von Objekten, die angesehen werden, beeinflussen. Es ist nicht klar, welche Mechanismen diesem Effekt zugrunde liegen. Aus der bestehenden Literatur lassen sich zwei Erklärungsansätze ableiten: ein Aufmerksamkeitsmodell und ein Modell sozialen Einflusses. In dieser Studie werden diese beiden Erklärungsansätze mittels Eyetracking untersucht. Dazu wurden Versuchsteilnehmerinnen echte Werbungen für asiatische Kosmetikprodukte gezeigt, welche sie bewerteten. Auf den Werbungen waren jeweils das Gesicht eines asiatischen Modells und ein Produkt zu sehen. Die Augen der Modelle wurden bearbeitet, um den Eindruck zu erwecken, das Modell würde entweder auf das Produkt, direkt auf die Versuchsteilnehmerin oder vom Produkt weg blicken. Die Ergebnisse der Eyetrackinguntersuchung weisen darauf hin, dass das Aufmerksamkeitsmodell den Prozess nicht angemessen beschreibt. Daher wird angenommen, dass das Modell des sozialen Einflusses die Effekte, die in dieser Studie beobachtet wurden, besser beschreibt.

Schlagworte: Blicke als Hinweisreize, visuelle Aufmerksamkeit, Produktbewertung, Werbung, Eyetracking

Appendix E

E. Material

E.1 Instructions eye tracking

E.1.1 Welcome Page

Herzlich Willkommen zur Marketingstudie "Asia Kosmetik"!

In dieser Studie geht es um Werbungen für Asiatische Kosmetikprodukte.
Ihre Meinung ist gefragt, wie attraktiv Sie die Werbungen und Produkte finden.
Es geht dabei um Ihre **persönliche Einschätzung**. Versuchen Sie bitte, sich spontan zu entscheiden
und dabei alle Abstufungen der vorgegebenen Skalen für Ihre Einschätzung zu nutzen.

Wenn Sie bereit sind, sehen Sie [hier](#) hin, um mit der Studie zu beginnen.

E.1.2 Instruction 1

Damit Sie sich mit der Aufgabe vertraut machen können, folgt nun ein Probedurchgang.
Zu Beginn jedes Durchganges sehen Sie ein Kreuz in der Mitte des Bildschirms. Wenn Sie dieses ansehen, erscheint eine Werbung. Nach 5 Sekunden wird die Werbung automatisch ausgeblendet und Sie werden gefragt, wie attraktiv Sie die Werbung und das Produkt fanden.
Dazu sagen Sie laut, wie attraktiv Sie die Werbung
auf einer Skala von 1 (gar nicht attraktiv) bis 9 (sehr attraktiv) fanden.

Wenn Sie bereit sind, sehen Sie [hier](#) hin, um den Probedurchgang zu starten.

E.1.3 Ratingquestion

Wie attraktiv fanden Sie die Werbung?
Bitte sagen Sie laut eine Zahl von 1 (gar nicht attraktiv) bis 9 (sehr attraktiv).
Die Versuchsleiterin schreibt Ihre Angabe mit.

Wie attraktiv fanden Sie das Produkt?
Bitte sagen Sie laut eine Zahl von 1 (gar nicht attraktiv) bis 9 (sehr attraktiv).
Die Versuchsleiterin schreibt Ihre Angabe mit.

Wenn Sie mit beiden Einschätzungen fertig sind, sehen Sie [hier](#) hin, um mit der nächsten Werbung fortzufahren.

E.1.4 Instruction 2

Das war der Probedurchgang, es folgt nun die tatsächliche Studie.
Wenn Sie noch Fragen haben, stellen Sie diese bitte jetzt, bevor Sie beginnen.

Wenn Sie bereit sind, sehen Sie [hier](#) hin, um mit der Studie zu beginnen.

E.1.5 Instruction 3

Hier endet der erste Teil der Studie.
Wir würden Sie bitten, nun noch ein paar Fragen zu den Produkten zu beantworten.
Vielen Dank!

E.2 Stimulus Pictures

E.2.1 Advertisement 1 congruent



E.2.2 Advertisement 1 straight



E.2.3 Advertisement 1 incongruent



E.2.4 Advertisement 2 congruent



E.2.5 Advertisement 2 straight



E.2.6 Advertisement 2 incongruent



E.2.7 Advertisement 3 congruent



E.2.8 Advertisement 3 straight



E.2.9 Advertisement 3 incongruent



E.2.10 Advertisement 4 congruent



E.2.11 Advertisement 4 straight



E.2.12 Advertisement 4 incongruent



E.2.13 Advertisement 5 congruent



E.2.14 Advertisement 5 straight



E.2.15 Advertisement 5 incongruent



E.2.16 Advertisement 6 congruent



E.2.17 Advertisement 6 straight



E.2.18 Advertisement 6 incongruent



E.2.19 Advertisement 7 congruent



E.2.20 Advertisement 7 straight*E.2.21 Advertisement 7 incongruent*

E.2.22 Advertisement 8 congruent



E.2.23 Advertisement 8 straight



E.2.24 Advertisement 8 incongruent



E.2.25 Advertisement 9 congruent



E.2.26 Advertisement 9 straight



E.2.27 Advertisement 9 incongruent



E.2.28 Advertisement 10 congruent



E.2.29 Advertisement 10 straight



E.2.30 Advertisement 10 incongruent



E.2.31 Practice advertisement congruent



E.2.32 Practice advertisement straight



E.2.33 Practice advertisement incongruent



Each rating page was presented ten times, once for each advertisement. Advertisements were presented above the rating questions, so that participants could see them while rating the product. The order of the advertisements was randomized.

Herzlich Willkommen zum zweiten Teil der Studie!

E.3.2 Rating page 1

Gar nicht ansprechend Sehr ansprechend

[illegible]

Gar nicht gut Sehr gut

Gar nicht
wahrscheinli
ch

Sehr
wahrscheinli
ch

Wie schätzen Sie den Markterfolg des Produktes hierzulande ein?

Gar nicht
erfolgreich

☐☐☐☐☐☐☐

Sehr
erfolgreich

Für welchen Preis, glauben Sie, könnte man das Produkt auf dem hiesigen Markt verkaufen?

0
Euro

10
Euro

20
Euro

30
Euro

40
Euro

50
Euro

E.3.4 Rating page 3

Im Vergleich zu anderen Produkten seiner Kategorie, wie viel glauben Sie könnte man für das Produkt verlangen?

Viel
weniger

☐☐☐☐☐☐☐

Viel mehr

Wie wahrscheinlich würden Sie das Produkt kaufen, wenn es auf den hiesigen Markt käme?

Gar nicht
wahrscheinli
ch

☐☐☐☐☐☐☐

Sehr
wahrscheinli
ch

Wie viel wären Sie bereit, für das Produkt zu zahlen?

0
Euro

10
Euro

20
Euro

30
Euro

40
Euro

50
Euro

E.3.5 Rating page 4

Im Vergleich zu anderen Produkten seiner Kategorie, wie viel wären Sie bereit, für das Produkt zu zahlen?

Viel
weniger

Viel mehr

☐ ☐ ☐ ☐ ☐ ☐ ☐

Für wie wirksam halten Sie das Produkt?

Gar nicht
wirksam

Sehr
wirksam

☐ ☐ ☐ ☐ ☐ ☐ ☐

Für wie wirksam schätzen Sie das Produkt im Vergleich zu anderen Produkten seiner Kategorie ein?

Viel
weniger
wirksam

Viel
wirksamer

☐ ☐ ☐ ☐ ☐ ☐ ☐

E.3.6 Demographics questionnaire

Alter

Geschlecht

☐ Weiblich ☐ Männlich

Wie häufig kaufen Sie ungefähr pro Monat Kosmetikprodukte?

Wie viel Geld geben Sie ungefähr pro Monat für Kosmetikprodukte aus?

Was war Ihrer Meinung nach das Ziel der Studie?

Hier ist Platz für Anregungen und Anmerkungen zum Fragebogen



E.3.7 End page

Vielen Dank für Ihre Teilnahme!

Wenn Sie Fragen zu der Studie haben, wenden Sie sich an die Versuchsleiterin oder per Mail
an margot.mueckstein@univie.ae.at

Appendix F

F. Curriculum Vitae

Name: Margot Mückstein, Bakk. phil.

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Professional experience

10/2012-6/2013	Research assistant at the department of social psychology and consumer research, Faculty of Psychology, University of Vienna
8/2011-10/2011	6-week internship at the department of research methods, Faculty of Psychology, University of Vienna
7/2008 – 6/2012	Accounting for SOPY and SOPY Networld
Since 9/2007	Yearly organization of a summer camp
8/2007-9/2007	Art dealer for Christoph Appel
9/2006-2/2007	Financial consulting at Financial Live
7/2006-10/2007	Compilation and operation of a book vending website

Education

Universities

University of Vienna

Since 10/2008	Diploma course Psychology (Completion of the first level: 1.6.2010)
10/2007-9/2011	Bachelor course Journalism and Communication Science Completion of the course with Bachelor of Arts: 14.9.2011
10/2008-10/2010	Bachelor course Biology

Technical University Vienna

10/2011-2/2012 Bachelor course Electrical Engineering

University of Natural resources and Life Sciences Vienna

10/2007-6/2008 Bachelor course Food Science and Biotechnology

Schools

6/2007	Matura at the Sir Karl Popper School Vienna
2005-2006	Colegio Miraflores, Oleiros, Spain (1 year student exchange)
2003-2007	Sir Karl Popper School for the intellectually gifted
1999-2003	Sacre Coeur Pressbaum

Further skills and qualificationsLanguages

German	Mother tongue
English, Spanish	Fluent
Italian, Russian, French, Dutch, Galego	Basic knowledge

IT Skills

Operating systems	Linux, Windows, MacOS
Office software	MS Office, Open Office, Libre Office
Special software skills	SPSS, CMA, Matlab, Inquisit, Unipark, iViewX, WordPress, Gimp, Photoshop
Programming skills	JavaScript, php, html, Assembler
Keystrokes per minute	487