Eye-Catcher or Blind Spot?

The Effect of Photographs of Faces on E-Commerce Sites

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Abstract: E-commerce still suffers from consumers' lack of trust. Most e-commerce researchers focus on building trust through cues that appeal to rational decision-making. These cues are usually implemented as text (e.g. privacy policies). In print advertising, affective attitudes and trust are commonly built by using photographs of people. On the web, however, users as well as interface design experts believe that photos impair task performance by attracting visual attention. In this study we compared online-shoppers' gaze patterns on pages with a photo of a person to pages with a text box of the same size. Our data does not support the claim that photographs decrease task performance. In fact, users spend more time looking at the text box. We found that the photograph attracts more attention than the text box on a first time view of a particular page. However, participants quickly learn the structure of a page and ignore the photo on subsequent pages. We outline further research, incorporating physiological measurements to infer user cost and affective responses.

Key words: E-commerce, Eye-tracking, Trust, Photographs, Facial Cues, Re-embedding

1. INTRODUCTION

In e-commerce, unlike in classic media, photographs have only been used sparingly. Human Computer Interaction (HCI) experts have argued for several years that photos and graphics should be minimised as they increase download times and act as distracters when user complete their tasks. They are said to decrease the usability of on-line services [19, 13]. However, bandwidth to potential clients is increasing, while 'lack of consumer trust' is still seen as an obstacle in the development of e-commerce [17]. Many

studies have identified elements that can help to build trust in e-commerce. They are mainly cognitive cues for trustworthiness and professionalism that appeal to rational decision-making. Examples include privacy statements, third-party certification and order tracking systems [4, 6]. However, trust comprises cognitive and affective dimensions [5]. Thus, we should examine how the affective impact of photographs, which advertising has relied on for many years, can be used to signal trustworthiness on-line.

In this paper, we first introduce a conceptual basis for the use of photographs as trust-builders, drawing on expertise from advertising and sociology, and discuss results from studies on the effect of photos on perceived trustworthiness (section 2). We then present an eye-tracking study where we examined the impact of photographs of people on users' gaze behaviour and task performance (sections 3, 4, 5). We will conclude with practical recommendations for designers of e-commerce sites and with suggestions for directions of further research on this topic (section 6).

2. BACKGROUND

2.1 Photos in Advertising

When comparing print and poster adverts from the early days of consumerism to today's advertising, it is easy to see that the focus shifted from explaining product attributes to showing attractive people using the products. Why? The advertising industry has learned to make use of our impressive capabilities to process and store images, particularly images of people [12]. This capability is paired with a great weakness: we tend to interpret images, particularly photographs, in the same way we interpret the real thing. Whereas we critically ponder text we read, images we look at directly stimulate affective responses [18, 12].

What is true for pictorial information in general is even more the case for the processing of faces - be they real or on paper or on a screen. The neural area that deals with the processing of faces is distinct from the brain region that processes other information [24]. These human capabilities and weaknesses have, often intuitively, been widely used in the advertising industry for many years.

2.2 Re-embedding: Trust in Distant Interaction

It is well established that interactions with organisations that are stretched over time and space and mediated through technical systems require more

trust than face-to-face interaction [8, 16]. E-Commerce is no exception, as the persistent 'lack of consumer trust' shows [17]. This type of interaction has been described as *dis-embedded interaction* [8]. Trust in dis-embedded interaction can be built through personal trust in representatives, which is usually based on periods of face-to-face interaction. This process is called *re-embedding* [8]. Ordering books on-line and collecting them in the local bookshop, a service offered by many booksellers with physical outlets, is an example of re-embedding in e-commerce. Based on concepts of mediated interaction such as social presence [26], parasocial interaction [11] and telepresence [15], we have introduced the notion of *virtual re-embedding* [22]. We argue that even mediated socio-emotional cues that are normally present in face-to-face interaction signal trustworthiness. An example of a rich implementation of virtual re-embedding would be a personal customer service agent that can be contacted via chat or video-link from an e-commerce site.

2.3 Photos on the Web

As a first step to investigate the idea of virtual re-embedding, Riegelsberger & Sasse [23] and Steinbrück, Schaumburg, Duda & Krüger [27] conducted studies on the effect of photographs of people on an e-commerce site. Steinbrück et al. found that a photograph significantly increased the perceived trustworthiness of an on-line banking site. This result corresponds with findings from Fogg et al. [7], who demonstrated that photos of authors can increase the credibility of articles in on-line magazines.

The findings of the qualitative study by Riegelsberger & Sasse [23], which looked at the effect of photos of people on the on-line shopping site Amazon.de, are more controversial. Reactions of participants ranged from welcoming their presence to expressions of increased mistrust, as they perceived the photographs as an attempt at trust manipulation. We categorised the participants based on their reactions in four distinct groups: *relationship seeking*, *function seeking*, *lack of benefits*, *lack of trust*. Relationship-seeking shoppers and non-shoppers that lack benefits displayed overall positive reactions to the photographs. In the eye-tracking study reported in this paper, we concentrate on the disapproval of the group we termed *function seekers*. Member of this group called the photographs a 'nuisance', as they 'cluttered the screen without serving any purpose'. Their reactions support the previously mentioned notion, expressed by many HCI experts, that photographs decrease the usability of an on-line service. *Function seekers* claimed that finding links and selecting products on an e-commerce web page is more difficult in the presence of photographs. Thus,

we assume that an increased difficulty in completing a product selection or search task will result in an increased task completion time. Hence, our first hypothesis is:

H1: Task performance will be lower in the presence of a non task-related photograph than in the presence of non task-related text of the same size.

The participants' claims are plausible, as many eye-tracking studies on print advertising have shown that photos, particularly faces (and here particularly eyes) get the first fixations when a page is viewed [12]. However, the Stanford Poynter project that researched on-line news reading does not confirm these results for on-line environments. On the contrary, their results show that users first focus on text, headlines in particular, and tend to ignore graphics and photographs [14]. The notion of *banner blindness,* introduced by Benway [2], further advocates caution when applying knowledge on eye movement from off-line reading to an on-line context. Benway found that users of web sites largely ignore banner ads that are designed to attract visual attention through imagery and animation [2]. However, these on-line studies have not specifically looked at photographs of people and faces, as they are being used in print advertising. Thus, based on the results of studies on print media and based on the claims of participants in our earlier qualitative study, we assume that photos of faces attract more visual attention than text.

H2: Users spend more time looking at a non task-related photograph of a face on an e-commerce page than on non task-related text of the same size.

Variance in the effects of pictorial stimuli across different media might be due to differences in tasks that are performed. Pagendarm & Schaumburg demonstrated that the type of task that is performed by the user has a significant influence on recall and recognition of peripheral elements, such as banner ads [20]. They compared a goal-directed search task to aimless browsing, where participants were asked to just have a look at the web page to get a general impression. Based on studies by Benway [2] and Bachofer [1] they assume that goal-directed search relies on schemata that involve top-down information processing. Top-down information processing modes will result in less attention given to non task-related elements. Schaumburg & Pagendarm assume that 'aimless browsing' is governed by bottom-up information processing, where visual attention is not guided by schemata but by external cues. Indeed, recall and recognition of peripheral banner ads were significantly higher in the 'aimless browsing' condition. Based on these results, we assume that the differences in information processing will also result in differences in gaze behaviour. Thus, we hypothesize:

H3: When users engage in a non goal-directed task, they will spend more time looking at photographs of faces than on text of the same size.

3. METHOD

3.1 Participants

The study was conducted with 40 students at the Department of Computer Science at University College London. They were paid £5 for their participation. The mean age of the participants was 22 years, 13 participants were female. The participants were very experienced Internet users; 38 of them stated that they used the Internet for at least one hour per day.

3.2 Materials

We used pages from the on-line shop of a well-known British supermarket chain. The pages chosen were 'aisle-pages' containing product listing from different categories. Figure 1 shows examples of the pages used. Their structure was identical, but the products listed differed.

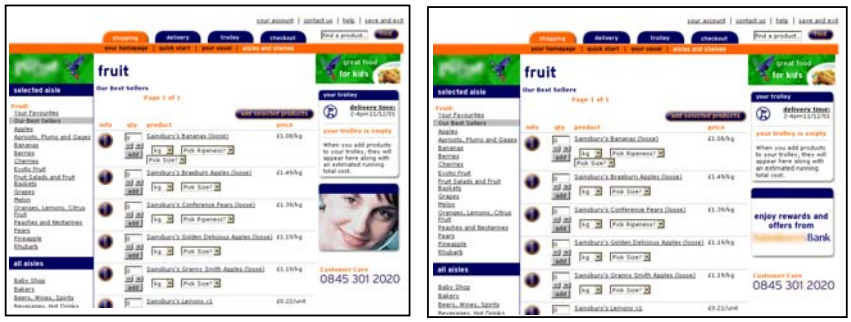

Figure 1. Examples of stimulus pages.

For each page, we created a version with a photograph of a customer service agent (photo) and one with a box containing a text that detailed the services of the supermarket's bank (text). Both photo and text were of the same size (160 x 135 pixels); subsequently we refer to this area on the screen as *region of interest*.

3.3 Procedure

We calibrated the eye-tracker with several test-screens. Instructions were presented to the participants on the screen. Once they had read and

understood the instructions, we displayed the web page. On completion of their task they clicked the mouse. The web pages were incorporated as static screenshots, due to technological constraints of the eye-tracking software.

In order to compare the effects of different tasks we asked participants to perform 8 different tasks on the on-line shopping pages. Table 1 gives an overview on the tasks:

Table 1. Participants' tasks.

1.	Select favourite product
2.	Select favourite product
3.	Find 'product search' function
4.	Find 'change delivery time' function
5.	Find 'help' section
6.	Find customer service telephone number
7.	Find recipe ideas
8.	'Just look at the page and get an impression'

Tasks and conditions (photo / text) were counterbalanced. For every subject the conditions altered with every task. We duplicated the first task in order to allow us to make a meaningful comparison between first time view and subsequent views of the same page structure. Hence for task 1 and 2, we had 4 stimulus pages, allowing us to counterbalance the products they listed (fruit and deli products) and the photo / text conditions.

After completing the experiments we conducted brief qualitative interviews with the participants to find out, whether they had experienced any difficulties in completing their tasks and whether they could recall or recognise specific interface elements.

3.4 Measurements

The core dimensions that are evaluated in the field of Human Computer Interaction (HCI) are task performance, user cost (comprising physiological and mental cost) and user satisfaction [25]. Task performance has received most attention in the past. However, when we evaluate e-commerce systems that are targeted at consumers, user satisfaction as well as user cost are equally important, as they will influence their decision as to where to shop online.

The trust users hold in an e-commerce site will impact user satisfaction, and can also minimise user cost. In the study we report here, we explored potentially adverse effects of elements that aim to build trust, i.e. photographs of people. One of the dependent variables measured is thus the time taken to complete the task.

We used eye-tracking to explore the effects of photographs on the atomic level of users' visual attention. The aim was to gain a better understanding of potential effects on task performance and user cost. Thus we used the eye-tracker to measure whether the photos had been looked at and how much time was spent looking at them. We used the LC Eye Gaze system (www.eyegaze.com), an infrared based remote tracking system that allowed us to sample the position of the participants' gaze with a frequency of 50 Hz. We report this measure as sample count, where each sample count equates 0.02 seconds of visual attention given to a region of interest. We further analysed fixations. Fixations where detected by looking for sequences of gazepoint measurements that remain relatively constant. If a new gazepoint lies within a circular region around the running average of an on-going fixation, the fixation is extended to include the new gazepoint. The radius of the acceptance circle was set to 6.35mm.

4. RESULTS

4.1 H1: Task Performance

As figure 2 shows, there is no significant difference in the total time taken to complete a task between the photo and the text condition. There is thus no evidence that the presence of a photo compared to the presence of non task-related text has an influence on the time taken to complete a task. We cannot reject the null hypothesis, thus there is no evidence that photographs decrease task performance.

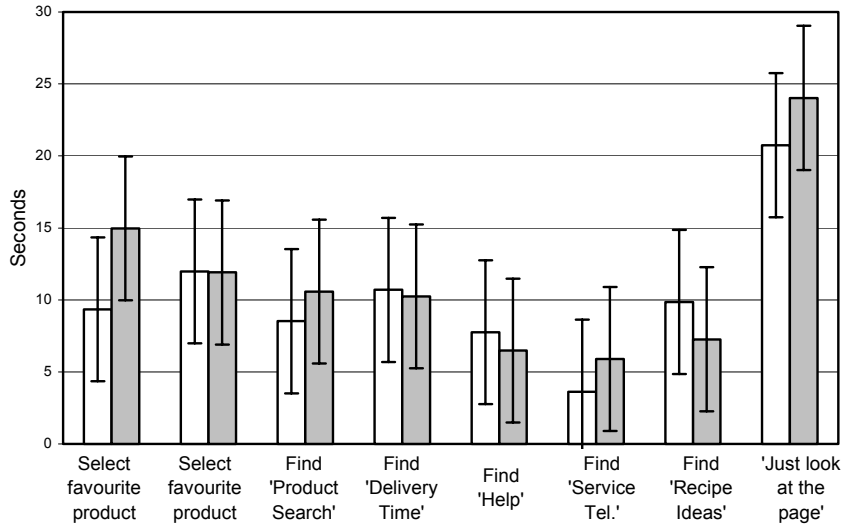

Figure 2: Total time taken (white: text / grey: photo).

4.2 H2: Time spent in Region

Again, over most tasks, there are no significant differences between the photo and the text condition. Participants do not significantly spend more time on photographs than on text. To the contrary, for most tasks, participants spend more time looking at the text than at the photograph. Exceptions are task one and two, which both contain first time views of the pages (see section 4.4).

4.3 H3: Task Type

Only for task 8 ('Just look at the page'), the time spent looking at the region of interest differed significantly: Participants spent more time looking at the region in the text condition than in the photo condition. After excluding participants with a tracking accuracy[1] of below 95% and removing outliers, we had 16 valid measurements for task 8. Table 2 gives an overview on the results for this task.

Table 2. Results for task 8: 'Just have a look at the page'.

	Text	Photo	p	N
Absolute Time	.76	.17	.015	16 (1 outlier)
Fixation Count	2.75	.75	.048	16 (1 outlier)
Relative Time	3.6 %	.5 %	.002	16 (1 outlier)

In the text condition, participants spent on average .76 sec on the region, whereas in the photo condition the average was .17 sec. The differences become more evident when comparing relative times, i.e. the time spent looking at the region of interest relative to the time taken to complete the whole task. Thus, the data falsifies H3: For a non goal-directed task, participants spend more time looking at text rather than at photos.

4.4 Attraction of Region

One concern with above results is the extent to which time in a region is biased by the content of the region. As previously mentioned, it is known that face processing is fast and dealt with by specialised brain structures [20]. Thus, using time in region might be an unfair comparison between the two conditions as it is biased against H2 and H3. Thus, as a secondary

[1] Tracking accuracy is the number of registered samples divided by the total number of samples that could have been taken during task completion. Tracking accuracy is decreased by participants' head movements or gazes away from the screen.

measure we compared the conditions on the grounds of whether the region had been looked at or not. This measures the *attraction* of the region alone and is unbiased by differences in processing time.

This analysis revealed a significant difference between the first and second page view. When they look at the page the first time, significantly more participants look at the region when the photo is present compared to when text is displayed (Pearson Chi-Square, p=.027). Looking at the second view of the pages, where participants again selected a favourite product, there are no significant differences, between conditions – the majority of participants ignore the region, be it text or photo (see table 3).

Table 3. Number of participants who viewed the region of interest.

1st view	TEXT	PHOTO	TOTAL
Region NOT viewed	14	7	21
Region viewed	6	13	19
2nd view	**TEXT**	**PHOTO**	**TOTAL**
Region NOT viewed	15	16	31
Region viewed	5	4	9

4.5 Qualitative Interviews

Most of the participants who reported problems finding items because of the pages being too 'cluttered' referred to text as the reason for this. They said that there was either too much text they had to skim through, or that it was too small. When asked about interface elements they could recall or recognise, most participants mentioned a banner ad for a product range that was covered by TV advertising during the period of the experiments. Both the photo and the text we tested were recognised by only half the participants in the post-experimental interviews. Comments on the photographs made by participants who recognised the photo in the post-experimental interviews were generally positive.

5. DISCUSSION

5.1 Task Performance

The data does not allow us to conclude that the variance in time taken to complete a task is related to the presence of text or photos. Thus, the claims of participants in the previous qualitative study [23] are not corroborated.

Our results confirm those by Burke & Hornof, who found that animated banners do not decrease task performance in a visual search task [3]. However, they report that subjective workload, measured with the NASA *Task Load Index* (TLX), was increased. They conclude that in the presence of animations, task performance is held constant by users, albeit at the premium of increased mental cost. Based on our results and the claims of participants in our earlier study, we hypothesize that non task-related photographs have a similar effect.

The photos do not affect task performance, but they might affect user cost, as users have to counteract this stimulus (bottom-up) driven guidance of attention to keep task performance high.

5.2 Time in Regions & Visual Attraction

5.2.1 Effect of Photos

When carrying out a product selection or search task, users do not spend significantly more time looking at non-related photos than at non-related text. As said before, this measure of time spent in a region is biased towards text, as it takes longer to process. Thus, we have used the measure of *attraction* – whether a region had been viewed all. Again, across tasks, there were no significant differences between the attraction of photo and text. Thus, our findings should raise concerns about directly transferring results from classic media (e.g. print) to on-line environments.

However, the first time the participants viewed a product selection page, the majority of them looked at region in the photo condition, whereas the majority did not look at the region in the text condition. Thus, for first-time viewing, results from off-line magazine reading translate to on-line shopping. Photos of faces do attract visual attention. They can thus be used as a modest means of virtual re-embedding.

5.2.2 Effect of Task

We expected to activate schemata that are similar to off-line magazine reading by asking participants to 'just look at the site' without asking them to perform a search or product selection task (task 8).

Comparing the attraction of the regions did not yield any significant results for this task. However, participants spent significantly less time on the region in the photo condition than in the text condition. We explain this effect by the fact that this task did not put time pressure on the participants;

hence they could take the time to read the text, which they previously might just have skimmed when they were engaged in their search tasks.

On a methodological level, this result supports Pagendarm & Schaumburg's [20] claim that we must distinguish between different task types and processing modes when researching web site usage on such an atomic level. The task effects which mode of information processing is dominant: stimulus-driven or top-down.

5.2.3 Effect of Repetition

Another interesting finding from the measure of attraction is that for subsequent views of the same page structure the region was largely ignored, independent of whether photo or text was displayed. We explain this effect through the participants' quick learning of the structure of the page. They learned where to expect task-related information. Unlike magazine-reading, where readers also look at photographs and adverts that are clearly identifiable by their position and are clearly not related to content they are reading, on-line shopping is more goal-focused.

6. CONCLUSIONS

6.1 Substantive Findings

This study is the first to look into the effect of photographs of people on visual attention on an on-line shopping site. Evidence from related studies on the effect of photos on visual attention in other media is mixed (section 2.1 and 2.3): Studies conducted in classic media clearly state that photographs, particularly of faces, attract visual attention. The best-known study for on-line media, the Poynter project, does not support these findings for on-line news reading.

Our most important result is that photos do attract more visual attention than text on a first time view of a page, when users perform a product-selection task. Steinbrück et al. [27] found that one-time exposure can already have a positive effect on attributed trustworthiness. Thus, experience from advertising can be used to give e-commerce sites affective attributes and signal trustworthiness.

However, our results suggest caution if a photo is used repeatedly on several pages of the shopping process. Firstly, it will largely be ignored and, secondly, ignoring it might come at a cost to the user. They might perceive the pages as 'cluttered', as participants in our previous study stated.

Furthermore, we found that on average, users spend more time looking at non-task related text than on non task-related photos (significant for task 8). Also, based on our post-experimental interviews, they suffer more from non task-related text than from photos, when performing search tasks. This finding should advocate caution when trying to communicate trustworthiness through more traditional, cognitive approaches such as privacy statements and third party assurances, as they all rely on text. When trying to make it easier for users to perform their tasks on an e-commerce site, text should be as carefully placed as photos or graphics.

Finally, our study showed that users are able to learn the structure of a particular page surprisingly fast. This finding further emphasises the need for a consistent structure of pages across a site, as it has been advocated by many HCI experts [19, 13].

6.2 Methodological Findings

We found that the time spent looking at an interface element, or the number of fixations on this element, is a problematic measure when inferring on its impact on the user's information processing and – ultimately – task performance, user cost and user satisfaction. We compared photos and text, elements that are known to be processed in very different ways. Thus, we advocate the use of the percentage of users who looked at a particular region of interest, or *location of first and subsequent fixations,* to measure the initial attraction of an interface element.

We have shown that results from on-line news-reading are not directly applicable to on-line shopping. Thus, results from eye-tracking studies from one domain of on-line services should not be generalised to other domains. Furthermore, even within the domain of e-commerce, our study showed that the task that is performed by the user on a particular page has an impact on gaze behaviour. Thus, for further studies it is advisable to differentiate the sub-tasks users perform on an e-commerce site and to evaluate them separately.

6.3 Limitations

Before we introduce thoughts for further research, we want to point out the limitations of this study. Even though we used a remote eye-tracking system that is non-invasive and that allows participants to sit and move rather comfortably, the strictly controlled nature of the experimental study lead to a rather low ecological validity of the participants' tasks. They only interacted with static pages in a repetitive fashion, rather than exploring a whole site by following links. Nonetheless, we believe that the results give

some valuable indications both for researchers and practitioners at this early stage.

6.4 Future Work

Studies beyond this initial one should aim to increase ecological validity by using real pages as stimulus material and by allowing users to navigate an e-commerce site.

In a next step we will combine eye-tracking measures with synchronous recording of physiological measurements such as *electrodermal activity* (EDA) and *blood volume pulse* (BPV). These measures have been shown to be indicative of perceptual strain and user cost [29]. Initial pilots, however, have shown that these measures are very sensitive to individual differences, habituation and noise, thus complicating the analysis. Research by Vyzas & Picard [28] furthermore suggests that physiological measures can be used to infer on affective responses and emotions. Furthermore, Hess & Polt [10] claim that pupil dilation, which is recorded by standard eye-tracking equipment, is indicative of affect. We expect that concurrent analysis of the position of eye-gaze and physiological measures as well as pupil dilation will allow isolating immediate affective responses to interface elements.

Furthermore, the effect of virtual re-embedding, be it through photographs or richer media, needs to be explored further. Current studies have relied on qualitative methods and questionnaire tools. We will look into methods with higher ecological validity, making use of economic trust games and also drawing in established methods from advertising research such as Implicit Association Tests [21] or Semantic Differentials [9].

ACKNOWLEDGEMENTS

We gratefully acknowledge the help of Gillian Wilson and Daniel Bruneau. Jens Riegelsberger is funded by a British Telecom studentship (WEB164414/CT501045). The research reported here was conducted as part of the HIGHERVIEW project (www.cs.ucl.ac.uk/research/higherview).

7. REFERENCES

[1] Bachofer, M. (1998). Die Stern Bibliothek: Wie wirkt Werbung im Web? Hamburg: Gruner & Jahr.

[2] Benway, J. P. (1998). Banner Blindness: The irony of attention grabbing on the World Wide Web. In Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting, pp. 463-467.

[3] Burke, M. and Hornof, A. J. (2001). The effect of animated banner advertisements on a visual search task. University of Oregon Technical Report. ftp://ftp.cs.uoregon.edu/pub/hornof/CHI2002.pdf .

[4] Cheskin (1999). eCommerce Trust Study. http://www.cheskin.com/think/studies/ecomtrust.html

[5] Corritore,C.L., Kracher,B., & Wiedenbeck,S. (2001). Trust in the online environment. In M. J. Smith, G. Salvendy, D. Harris, & R. J. Koubek (Eds.), Evaluation and Interface Design: Cognitive Engineering, Intelligent Agents and Virtual Reality. Mahwah, NJ: Lawrence Erlbaum, pp.1548-1552.

[6] Egger, F. N. (2001). Affective Design of E-Commerce User Interfaces: How to maximise perceived trustworthiness. In Helander, M, Khalid, H. M., and Tham (Eds.). Proceedings of CAHD: Conference on Affective Human Factors Design. June 27-29, Singapore, pp. 317-324.

[7] Fogg, B., Marshall, J., Kameda, T., Solomon, J., Rangnekar, A., Boyd, J., and Brown, B. (2001). Web Credibility Research: A Method for On-line Experiments and Early Study Results. CHI2001: Extended Abstracts. March, 31 – April, 5. Seattle, WA, US, pp. 295-296.

[8] Giddens, A. (1990). The consequences of modernity Stanford: Stanford University Press.

[9] Heise, D. R. (1970). The Semantic Differential and Attitude Research. In G. F. Summers (Ed.). Attitude Measurement. Chicago: Rand McNally, pp. 235-253.

[10] Hess, E.H., and Polt, J.M. (1960). Pupil size is related to interest value of visual stimuli. Science, 132, 349-350.

[11] Horton,D., & Wohl,R.R. (1956). Mass communication and para-social interaction: Observations on intimacy at a distance. Psychiatry, 19, 215-229.

[12] Kroeber-Riel (1996). W., Bildkommunikation Munich: Vahlen.

[13] Krug, S. (2000). Don't make me think Indianapolis: New Riders.

[14] Lewenstein, M., Edwards, G., Tatar, D., and DeVigal, A. (2000). Stanford Poynter Project. http://www.poynter.org/eyetrack2000/.

[15] Lombard,M., & Ditton,T. (1997). At the Heart of It All: The Concept of Presence. Journal of Computer Mediated Communication, 3(2).

[16] Luhmann, N. (1979). Trust and Power Cichester: Wiley.

[17] Mitra, A. (2002). Trust, Authenticity and Discursive Power in Cyberspace, Communications of the ACM, vol. 45, no. 3, pp. 27-29.

[18] Nass, C. and Reeves, B. (2000). Perceptual Bandwidth, Communications of the ACM, vol. 43, no. 3, pp. 65-70.

[19] Nielsen, J. (2000). Designing Web Usability Indianapolis: New Riders.

[20] Pagendarm, M. and Schaumburg, H. (2001).Why are users banner-blind? The impact of navigation style on the perception of web banners. Journal of Digital Information, vol. 2, no. 1. http://jodi.ecs.soton.ac.uk/Articles/v02/i01/Pagendarm/

[21] Plessner, H. and Barnse, R. (2002). Attitude Measurement Using the Implicit Association Text. Experimental Psychology 50(2).

[22] Riegelsberger, J. and Sasse, M. A. (2001). Trustbuilders and trustbusters: The role of trust cues in interfaces to e-commerce applications. In B. Schmid, K. Stanoevska-Slabeva, and V. Tschammer. Towards the E-Society: E-commerce, E-Business and E-Government. 1st IFIP Conference on e-commerce, e-business, e-gonvernment (i3e). October 3-5, Zurich, pp. 17-30.

[23] Riegelsberger, J. and Sasse, M. A. (2002). Face it: Photographs Don't Make Websites Trustworthy. CHI2002: Extended Abstracts. April 20-25, Minneapolis, MN, US, pp. 742-743.

[24] Rodman, H. R. (2002). Face Recognition. htp://cognet.mit.edu/MITECS/Entry/rodman.
[25] Shackel,B. (1991). Usability - Context, Framework, Definition, Design and Evaluation. In B. Shackel & S. Richardson (Eds.), Human Factors for Informatics Usability. Cambridge: Cambridge University Press, pp. 21-37.
[26] Short, J., Williams, E., and Christie, B. (1976). The Social Psychology of Telecommunications London: John Wiley & Sons.
[27] Steinbrück, U., Schaumburg, H., Duda, S., and Krüger, T. (2002). A Picture Says More Than A Thousand Words - Photographs As Trust Builders In E-Commerce Websites. CHI2002 Extended Abstracts. April 20-25, Minneapolis. MN, US, pp. 748-749.
[28] Vyzas, E. and Picard, R. W. (1999). Offline and Online Recognition of Emotion Expression from Physiological Data. Third International Conference on Autonomious Agents, May 1, Seattle, WA, US.
[29] Wilson, G. and Sasse, M. A. (2000). Do Users Always Know What's Good For Them? Utilising Physiological Responses to Assess Media Quality. Proceedings of HCI 2000: People and Computers XIV. McDonald, S., Waern, Y., and Cockton, G. September 5-8, Sunderland, UK, pp. 327-339.