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ABSTRACT

To gain insight into how Internet users perceive human images, a controlled experiment was conducted using a survey, interviews, and an eye-tracking device. Three experimental conditions of human images were created including (1) human images with facial features; (2) human images but with no facial features; and (3) no human images. It was expected that human images with facial features would induce a user to perceive the website as more appealing, having warmth or social presence, and as more trustworthy. In turn, image appeal and perceived social presence were predicted to result in trust. All expected relationships in the model were supported except no direct relationship was found between the human image conditions and trust. Another goal of the research was to examine user reactions by cultural group, and differing reactions were observed between Canadian, German, and Japanese related to perceptions of use of human images in website design.

Keywords

Image appeal, trust, social presence, website design, culture.

INTRODUCTION

Visual design of the website has the potential to contribute to emotional appeal of a site (Garrett 2003), and may be expressed through images or colors (Rosen and Purinton 2004). In line with marketing studies, some research has uncovered a relationship between aesthetic beauty of a website and e-trust (Karvonen 2000). Further, research has begun to explore the impact of social cues and "warmth" of websites that impart a feeling of social presence related to the user's experience of the website (Gefen and Staub 2003; Hassanein and Head 2006, Yoo and Alavi 2001). These studies seek to create new theoretical perspectives that move beyond the technology acceptance model (TAM) into the realm of emotive reactions. Further, this development is consistent with calls for a break with a "conventional cognition-driven paradigm of studying user reactions to technology" to focus on affect and emotion in the examination of information technology (Zhang and Li 2004).

Specific to the current investigation, representations of humans in graphic images found on web pages are examined for how they might induce user emotive reactions of image appeal or perceived social presence. Further, this investigation examines the role that culture may play in user reactions to human images using a multi-method approach. While much previous research on website design has used surveys as the most popular mode of data collection, in the current investigation we examine use of human images on websites using surveys in conjunction with interview data, as well as fine-grained examinations of user actions using an eye-tracker in an experimental laboratory setting. Through this triangulated methodology, we seek to gain a more comprehensive and richer understanding of imagery across cultural groups.

RESEARCH MODEL AND HYPOTHESES

The model developed to test the impact of different levels of human images on image appeal, trust, and social presence appears in Figure 1. In addition to testing the model relationships for combined cultural groups, we are also interested in exploring whether between-group cultural differences result. A detailed review of the literature that frames the research constructs and hypotheses for testing are not presented here due to space limitations, but may be obtained from the authors upon request.
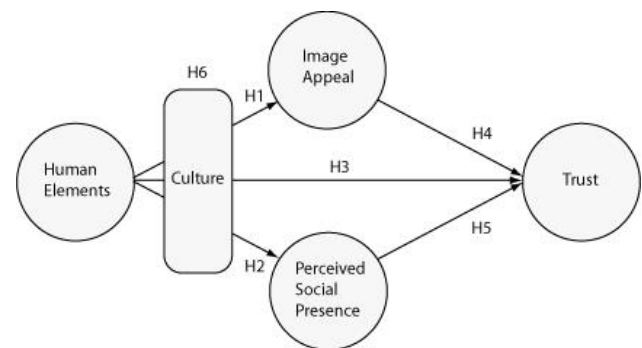

Figure 1. Research Model

In this study "human images" refer to the representation of humans in website images. In particular, the levels of human images identified in this paper are: human images including facial features (High Human), human images but with no facial features (Medium Human), or no human images (No Human).

Images of people can be used to effect emotional responses in an online environment (Riegelsberger et al. 2003), which may in turn lead consumers to have more favorable attitudes towards the website. As such,

Hypothesis 1: For all cultural groups, image appeal will be highest in the High-Human condition, when compared to the Medium-Human and No-Human conditions.

Social presence is defined as "the extent to which a medium allows users to experience others as being psychologically present" (Gefen and Straub, 2003, p. 11). Researchers suggest that pictures and text on a website are able to convey a personal presence and can positively impact user trust and enjoyment (Gefen and Strabu 2003; Hassanein and Head 2004). As such,

Hypothesis 2: For all cultural groups, perceived social presence will be highest in the High-Human condition, when compared to the Medium-Human and No-Human conditions.

Hypothesis 5: For all cultural groups, higher perceived social presence will result in higher levels of trust.

Online trust can be established through virtual re-embedding of content and social cues (Riegelsberger et al. 2003). Based on work linking facial images to trust and attraction (Riegelsberger 2002; Steinbruck et al. 2002), the following is offered:

Hypothesis 3: For all cultural groups, trust will be highest in the High-Human condition, when compared to the Medium-Human and No-Human conditions.

Hypothesis 4: For all cultural groups, higher image appeal will result in higher levels of trust.

Previous research indicates that there are some cross cultural differences relating to preferences in website design and advertising format (for example, Singh et al 2003; Sun 2001). However, we know of no study to date in which different levels of human images in pictures are compared across cultures. Thus, the following exploratory hypothesis is offered:

Hypothesis 6: Between cultural groups Japanese, Germans and Canadians groups will differ in their reactions to the three human image conditions.

RESEARCH METHODOLOGY

Participants

Ninety participants from three countries (30 each from Canada, Germany, and Japan) took part in the experiment. These countries were chosen to represent diverse cultural characteristics as determined by Hofstede (1980). German and Japanese participants were recruited from international language schools located in a metropolitan area in Canada. All international participants had lived in Canada for less than one year.

Experimental Task and Design

The experiment was conducted in a controlled setting where participants browsed an e-commerce website in a university usability laboratory. This study was designed as a repeated group two-factorial experiment, with three levels for each factor. The first factor was culture, where 30 participants were carefully selected to represent each of the three culture levels as represented by nationality (Canadian, German, and Japanese). The second factor was website design, where three versions of an e-Commerce website featuring electronics were created to represent each of the three levels of human images (no-human, medium-human and high-human). Each participant viewed each of the three website conditions. The order in which the website conditions were viewed was randomly assigned to eliminate possible order effects.

The SonyStyle website was the basis for the experimentally manipulated website used in this study. The SonyStyle name was removed from the three versions to avoid any branding effects. Each of the three localized websites (Canadian, German and Japanese) was designed into three versions to represent low, medium and high levels of human images. Therefore, a total of nine experimental website versions were created.

A Multiple Method Approach

In this study, three research and analysis methodologies are employed (quantitative survey analysis, qualitative interview analysis, and eye-tracking analysis) to investigate our hypotheses.

Eye-tracking: Participants wore a headband with a small mounted sensor, allowing the pan/tilt mechanism to track head movements without loss of eye image. Each website used in this study was divided into Areas of Interest (AoI). In this study, the minimum duration time for a fixation is .05 seconds (following Lankford 2000 and Rayner 1998), and is expected to represent interest in the viewed portion of the website.

Survey: A survey was administered after each participant completed the assigned task for each website condition. Our instrument encompassed satisfactory content validity (established through literature reviews and expert judges); satisfactory construct validity (as evidenced from high correlations between items of the same construct and low correlations between items of different constructs); and satisfactory construct validity (as evidenced from acceptable internal consistency and split half measures). Details on the survey instrument and its validation are available upon request from the authors.

Interviews: Interview questions followed the survey. Participant responses were recorded using a digital recorder. Responses were content analyzed and coded using Atlas.ti.

ANALYSIS

Impact of Human Images on Image Appeal, Perceived Social Presence and Trust (H1, H2, H3, H4, H5)

As shown in Table 1, based on survey data analysis, image appeal and perceived social presence were highest for the high-human condition when all cultural groups were pooled. The high-human condition demonstrated greater image appeal than both the medium-human (p<.01) and no-human (p<.001) conditions. There was no significant appeal difference between the no-human and medium-human (p=.373) conditions. For perceived social presence, significant differences were found between all pairings, in the expected direction (i.e. no-human < medium-human < high-human). Therefore, based on the survey data analysis, both H1 and H2 are supported.

The survey analysis revealed that there were no significant differences in trust between the three conditions when all cultural groups were pooled (p>.05). Therefore, H3 is not supported.

Paired Comparison	IA (sig.)	SP (sig.)	T (sig.)
No-Human vs. Medium-Human	.373	.000***	.472
No-Human vs. High-Human	.000***	.000***	.511
Medium-Human vs. High-Human	.003**	.011*	.159

Table 1. Image Appeal, Perceived Social Presence and Trust Paired Comparisons across Conditions

Interesting findings were revealed when analyzing eye-tracking data for the three website conditions for all cultures. While there were significant increases in time and fixations between the no-human condition and the medium-human condition, participants spent less time and had fewer fixations on the high-human images when compared to the medium-human images. In fact, there were no significant differences between the no-human and high-human conditions in terms of image time and fixations. This anomaly can be explained through the analysis of interview data. Participants across all countries had negative opinions of the medium-human website condition. The majority of participants found the partial human images (without faces) to be "weird" and "unnatural" and in many cases, "distracting". This unusual representation could account for the increased draw of visual attention.

From the survey analysis, both image appeal and perceived social presence were found to be significantly correlated with trust (p<.000) across all cultural groups and human element conditions. Therefore, H4 and H5 are supported.

The Influence of Culture on the Reactions to Human Images in Website Design (H6)

Overall, there is support for H6 that between cultural groups there were different reactions to the three human image conditions. Table 2 shows pair-wise comparisons for image appeal, perceived social presence and trust across three human conditions and three countries.

Condition	Country Comparisons	IA (sig.)	SP (sig.)	T (sig.)
No-Human	J. vs. G.	.996	.002**	.296
	J. vs. C.	.005**	.960	.116
	G. vs. C.	.007**	.005**	.868
Medium-Human	J. vs. G.	.431	.994	.341
	J. vs. C.	.031*	.142	.073
	G. vs. C.	.382	.115	.697
High-Human	J. vs. G.	.446	.786	.067
	J. vs. C.	.003**	.958	.467
	G. vs. C.	.076	.923	.531
Legend: J=Japan; G=German; C=Canada; IA=Image Appeal; SP=Perceived Social Presence; T=Trust				

Table 2. Multiple Comparisons across three Human Conditions and three Countries

Survey analysis reveals that there were differences in image appeal across the conditions for the three countries (Table 2). It appears that the Canadians and Japanese were most significantly different in their perceptions of image appeal across the three conditions, whereas the Germans were more similar to the Japanese in their perceptions of image appeal.

In terms of perceived social presence, significant differences between countries were only observed for the no-human condition. There were no differences between Canadian and Japanese perceptions for this treatment. Germans perceived a significantly lower level of social presence in the no-human condition.

As when the country samples were pooled (H3), human element conditions did not generate significant differences in terms of trust across various country sample comparisons.

Analyzing eye-tracking data for the three website conditions revealed a consistent pattern across cultures. Relative time spent viewing the manipulated images (compared to total time), is displayed in Figure 2. As indicated when cultural samples were pooled, the medium-human condition drew the greatest visual attention from participants in each of the three country samples. During interviews, Canadians and Germans were more detailed in their responses concerning the medium-condition images and as mentioned earlier found this condition to be unnatural or odd.

Of interest, and based on the eye-tracking data, Canadians spent much less time (and had fewer fixations) on the manipulated images, regardless of the human image condition. This difference was especially marked when compared to the German sample. In terms of the number of image fixations, Canadians demonstrated significantly lower levels than Germans for the no-human (p<.05),

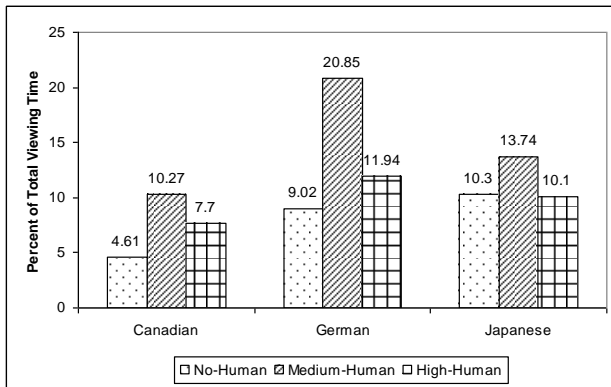medium-human (p<.01) and high-human (p<.05) conditions.

Figure 2. Average Time Spent Viewing Images Across Cultures

Interview data was coded using two methods: (i) in vivo (using the participants exact words as the basis for a code), and (ii) open coding (using arbitrary labels to code the data). Categories where then developed to identify relationships between codes, followed by the creation of more theoretical entities called concepts. Four main concepts emerged from our data:

Aesthetics: Visual qualities of the website's elements. This concept is encapsulated by codes like 'pleasant', 'pretty', 'colorful', and 'bright'.

Symbolism: The overt or implied meaning of elements such as images, animations, graphics, and words. For instance, an image showing a man and a little girl may be interpreted as a representation of 'a father and daughter', even though this family relationship is not made explicit. The participant has therefore extracted a semantic or symbolic property from the image.

Affective property: Refers to emotion inciting qualities of the visual elements. The codes 'friendly', 'serious', and 'fun' are examples of affective properties.

Functional property: Elements of structure, information design, navigation, and layout. Examples of codes include 'organized', 'structured', and 'distracting'.

Table 3 summarizes the positive and negative concepts expressed during the interviews, across website conditions and cultures.

In general, participants from all countries reacted positively to the human images including facial features. They stated that these images incited positive emotions (affective properties). Canadians focused on the aesthetic aspects of these images and website, but Germans and Japanese participants did not mention them. Germans commented on the functional properties (useful for showing product features) and symbolism (community activities) of the images. Japanese participants mentioned that they also liked the community related symbolism of

these images. However, a small number of Canadian and German participants stated that the images served no purpose and were distracting.

		Canada	Germany	Japan
High-human	+	Aesthetic, Affective	Functional, Affective, Symbolic	Affective, Symbolic
	-	Aesthetic, Functional	Functional	None
Med-human	+	Symbolic	Functional	Affective, Symbolic
	-	Aesthetic, Functional	Affective	Aesthetic
No-human	+	Functional	Functional	None
	-	Aesthetic, Affective	Affective	Affective

Table 3. Summary of Interview Analysis across Cultures

In contrast, reactions to the no-human image condition were largely negative. Participants across the three countries criticized the affective elements of the blank images. They stated that the images and the website were unfriendly. Canadians also had a negative opinion regarding the aesthetic (stark) qualities of such images. Only a few positive comments were made about the no-human condition from Canadian and German participants, who believed images with no human pictures were functional. That is, they did not clutter up the site with distracting pictures. Japanese made no positive comments about this condition. Overall, there is support for H6 that between cultural groups there were different reactions to the three human image conditions.

CONCLUSION

There is a need to more thoroughly examine affect and emotion related to website design. In this context, the current investigation draws on the literature in marketing and usability to construct hypotheses concerning the impact of different levels of human imagery on the user. This approach gains further novelty by the inclusion of comparisons across cultural groups. In particular, human images are used in a model to determine the relationship to concepts well established in the existing literature on e-commerce such as trust, and less developed work in the area of social presence. The image appeal construct is new and offers additional information as to how users react to images. In addition, and to validate our proposed model, methodological contributions resulting from the triangulation of data are provided.

Concerning image appeal for all cultural groups, results indicate that websites with images that include facial characteristics are more positively received by users than images with no facial features or no human images at all. The presence of facial elements seems important to users, and alternately no statistically different reactions using survey data were recorded between the medium and low image conditions.

However, eye-tracking and interview data provide extensions to earlier work on images, and yield complementary perspectives. Eye-tracking data indicate that users spent the greatest amount of time viewing the images with no facial features and the no human image conditions. If we were to examine only the eye-tracking data, a conclusion of the results might be that users like these conditions more, or at least found them novel – although the researcher could not be sure. Of note, interview data seems to provide a rationale for this result in that viewers found the intermediate condition with a human image but no facial features to appear unnatural and even odd. This interesting finding suggests there is merit in triangulation of analysis methods to gain deeper understanding of the data.

Generally speaking, the findings from this investigation reveal the manner in which images are used on websites can affect user perceptions of the website in either a positive or negative way. It would seem that Web designers are well advised to avoid images that are odd and unexpected – as they may have undesired emotional effect on viewers.

Further, designers and others involved in e-commerce should also consider the impact of various design features related to culture. It is already known that culturally adapted websites have the potential for users to remain longer at the site (Singh et al. 2003; Sun 2001). Adapting websites to image preferences of users therefore appears to be of importance – given the escalating numbers of global Internet users and online shoppers.

REFERENCES

1. Garrett, J. J. (2003) *The Elements of User Experience: User-Centered Design for the Web*, New Riders, Indianapolis, IN, London.

2. Gefen, D., and Straub, D. (2003) Managing User Trust in B2C e-Services, *E-Service Journal*, 2, 2, 7–24.

3. Hassanein, K. and Head, M. (2004) Manipulating social presence through the web interface and its impact on consumer attitude towards online shopping, in *McMaster eBusiness Research Centre (MeRC) Working Paper Series*, #10.

4. Hassanein, K., Head, M. (2006) The Impact of Infusing Social Presence in the Web Interface: An Investigation Across Different Products, *International Journal of Electronic Commerce (IJEC)*, 10, 2, 31–55.

5. Hofstede, G. H. (1980). *Culture's Consequences, International Differences in Work-Related Values*, Sage, Beverly Hills, CA.

6. Karvonen, K. (2000). The Beauty of Simplicity, ACM Proceedings on the *Conference on Universal Usability*, http://doi.acm.org/10.1145/355460.355478, 85–90.

7. Lankford, C. (2000). GazeTracker: Software Designed to Facilitate Eye Movement Analysis. *Eye-tracking Research and Application Symposium*, West Palm Beach, Florida.

8. Rayner, K. (1998). Eye Movements and Information Processing of *20 Years of Research. Psychological Bulletin*, 124, 3, 372-422.

9. Riegelsberger, J. (2002). The Effect of Facial Cues on Trust in E-commerce Systems, Proceedings *Volume 2 of the 16th British HCI conference*, London, September.

10. Riegelsberger, J., Sasse, M. A., McCarthy, J. D. (2003), Shiny Happy People Building Trust?: Photos on E-Commerce Websites and Consumer Trust, Proceedings of the *Conference on Human factors in computing systems*, Ft. Lauderdale, Florida.

11. Rosen, D. E., and Purinton, E. (2004), Website Design: Viewing the Web as a Cognitive Landscape, *Journal of Business Research,* 57, 7, 787-794.

12. Singh, N., Xhao, H., and Hu, X. (2003), Cultural Adaptation on the Web: A Study of American Companies' Domestic and Chinese Websites, *Journal of Global Information Management*, 11, 3,. 63–80.

13. 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, *CHI '02 extended abstracts on Human factors in computing systems*, Minneapolis, Minnesota.

14. Sun, H. (2001), Building a Culturally-Competent Corporate Web Site: An Explanatory Study of Cultural Markers in Multilingual Web Design, *SIGDOC*, October 21-24, 95–102.

15. Yoo, Y. and Alavi, M. (2001), Media and Group Cohesion: Relative Influences on Social Presence, Task Participation, and Group Consensus, *MIS Quarterly*, 25, 3, 371–390.

16. Zhang, P. and Li, N. (2004), Love at First Sight or Sustained Effect? The Role of Perceived Affective Quality on Users' Cognitive Reactions to Information Technology, Proceedings of the *Twenty-Fifth International Conference on Information Systems*, 283-296.