The Effect of Types of Banner Ad, Web Localization and Customer Involvement on Internet Users' Attitudes

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CyberPsychology and Behaviour, 2009, 12(1): 71-73

1. Introduction

As internet advertising is becoming more important, researchers have turned their focus from traditional media to online advertising⁵. Some firms consider product web sites as a form of advertising; companies can give detailed product descriptions and also provide additional information (e.g. regarding customer service) when consumers browse through the Internet⁶, 7.

2. Factors to be considered

Types of Banner Ads

According to¹⁹, banner ads (also called display ads) are “one of the popular formats of internet advertising. They often made of text and graphics, either static or animated”. Although banner ads are the most traditional format of advertising on the internet, they still play important roles in the internet advertising market.

Consumer Involvement in Purchasing a Product

In any given purchase situation, some customers seem to be more psychologically engaged than other customers in evaluating the product for possible purchase; this engagement is called Product Involvement. The concept of product involvement has a long history in psychology, starting with the work of Sherif and Cantrl³¹. Initially, the concept of involvement was used to explain the receptivity of individuals to communication. Later the concept of product involvement was employed in the study of how advertising works³².

Web Site Localization

When a global brand company wants to incorporate research findings into its web advertising strategy numerous questions must be considered. Among them: Is using a standardized, English, global web site or localized web site the better approach? Under what conditions is one approach better than the other?

3. Data Collection and Results

College students (n = 120 from each Taiwan and Thailand) voluntarily participated in the study, providing relatively homogenous, comparable samples across the two cultures.
<table>
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<th>Hypotheses</th>
<th>Findings</th>
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<tr>
<td><strong>H1</strong>: Internet users are likely to have favorable attitudes toward a website with animated graphic banner ads rather than an identical website with static graphic banner ads.</td>
<td>Supported in Thai sample</td>
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<tr>
<td><strong>H2</strong>: Internet users who report that they have high psychological involvement with the product are more likely to have favorable attitudes toward the website than users who report that they have low involvement with the product.</td>
<td>Supported in Taiwan sample</td>
</tr>
<tr>
<td><strong>H3</strong>: Internet users are likely to have a more favorable attitude toward a website with animated graphic banner advertisements when they are experiencing low product involvement than when they are experiencing high product involvement.</td>
<td>Supported in Thai sample</td>
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<tr>
<td><strong>H4</strong>: Internet users are likely to have a more favorable attitude toward a local-language version of a website rather than the standardized English website.</td>
<td>Supported in both data sets</td>
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| **H5a**: Thai internet users will have a significantly more favorable attitude toward web content if it is in the Thai language rather than a standardized English website.  
**H 5b**: Taiwanese internet users will have a significantly more favorable attitude than will Thai internet users toward web content presented at a standardized English website. | H5a supported in both data sets  
H5b not supported |

### 4. Conclusion

Previous research has demonstrated that positive attitudes toward advertisements are positively and significantly related to brand attitudes and to purchase intentions\(^5\). As discussed above, several authors have suggested that attitudes toward websites are a psychological equivalent of an attitude toward the ad in an online environment. The present study identifies factors that are related to positive attitudes toward websites. Websites with animated graphic banner ads, and local-language websites foster positive attitudes, as does highly-involved consumers. The study also identifies an interaction between type of ad and consumer involvement supporting the ELM model of persuasion. Thus, the present research replicates previous findings, extends them to new samples, products, and different types of banner ads. It also demonstrates that the RHM has robust effects which are greater than NATID differences among Asian nations. Continued research in this area may further extend these findings (e.g., to other types of banner ads).

For managers, the conclusions of this study are clear: Local-language websites with animated graphic banner ads elicit positive attitudes which may influence brand attitudes. Such attitudes, may, in turn, enhance sales, particularly with highly-motivated consumers.

Note: CyberPsychology and Behaviour is indexed in SSCI, Impact Factor (2007 JCR): 1.368, ranked #10 out of 45 journals in Communication.
Using an Electro-Microchip, a Nanogold Probe, and Silver Enhancement in an Immunoassay
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BIOSENSORS & BIOELECTRONICS Volume: 24 Issue: 6 Pages: 1661-1666 Published: FEB 15 2009

This paper presents a novel immunoassay that uses an electro-microchip to detect the immuno-reaction signal, gold nanoparticles (ANPs) as a label of antigen or antibody and as a catalyst for silver precipitation, and the silver enhancement reaction to magnify the detection signal. The ANPs were introduced into the electro-microchip by the specific binding of the antibodies-ANPs conjugates and then were coupled with silver enhancement to produce black spots of silver metal. The silver precipitation constructs a “bridge” between two electrodes of the electro-microchip allowing electrons to pass. Various gap sizes (20, 50, 100, and 200 μm) of the electrodes of electro-microchips were designed for the sensitivity study. The experimental data show that a chip with a 20 μm gap has the highest sensitivity. There was a significant difference in impedance between the experiment sample and the negative control after 10 min of reaction time. The proposed method requires less time and fewer steps than the conventional enzyme-linked immunosorbent assay (ELISA).

Fig. 1 Schematic illustrations of antibody-ANP conjugate recognition and signal amplification with silver enhancement: (a) direct immunoassay (two-layer format) and (b) sandwich immunoassay (three-layer format). The ANPs labeled with antibodies act as catalysts to reduce silver ions to silver metal.

The principle of the proposed method is illustrated in Fig. 1. The framework of this study is based on the direct immunoassay (two-layer format) which is designed for qualitative analysis, as shown in Fig. 1a, and the sandwich immunoassay (three-layer format) which is designed for qualitative and quantitative analysis, as shown in Fig. 1b.
For the direct immunoassay, the antigens are immobilized on the glass slides, and the gold-conjugated antibodies are then bound to the antigens, resulting in the formation of a two-layer complex, as shown in Fig. 1 (a). In the silver enhancement process, the silver ions in the silver enhancement solution are reduced by the promotion of the nanogold, and a large number of silver particles are precipitated.

![Diagram of immunoassay](image)

Fig. 2 Images of the impedance immunoassay electro-microchip include electro-microchip with parallel electrodes and PDMS immuno-reaction well. PDMS bonded to be electro-microchip, and a close-up view of the electrode gaps: (I) 20 µm, (II) 50 µm, (III) 100 µm and (IV) 200 µm (from left to right).

The proposed electro-microchip consists of two components: an immuno-reaction well and thin-film parallel electrodes. The electro-microchip was fabricated on glass slides, as shown in Fig. 2. MEMS technology was used to fabricate the gold/chromium thin film electrodes. The measurement system shown in Fig. 3 includes: an LCR meter, which is the main instrument used to measure the variation of the impedance, a Lab-VIEW® program for acquiring the data automatically, and an electro-microchip. The LCR meter is set to measure the impedance at 100 Hz using 0.5 V, which is below the oxidation reduction potential of silver ions, to prevent the output voltage from reducing the silver ions to silver metal.

![Diagram of measurement system](image)

Fig. 3 Experimental setup of the proposed immunoassay, including a computer, an LCR meter, and an electro-microchip. The GPIB protocol is used to link the computer and the LCR meter, and the Lab-VIEW® program is used to automatically capture the data.
The results show that the concentration effect of antigen is not very noticeable in the direct immunoassay. However, the values of impedance between experiment samples and the controls are very obvious (Figs. 4a to 4d). This means that the detection time of the 20 µm gap electro-microchip is faster than that of the other electro-microchips. Experiments were carried out in different concentrations of protein A, as shown in Fig. 4a. A 20 µm electrode gap of the electro-microchip had the best sensitivity and its detection time was the shortest.

The results in Fig 5 (a) show that the impedance of antigen concentration 1 µg/mL is lower than the impedance of antigen concentration 10 µg/mL. Since the concentration effect did not exist, the concentration of antigens and antibodies decreased. We found an apparent decrease of the impedance of the antigen concentration 0.1 µg/mL.
after the silver enhancement solution reacted for 15 min in experiments, while no decrease was found in the negative control, which means that our immunoassay approach can distinguish the detected antigen, as shown in Fig. 5 (b). With a silver coating, the impedance decreases when detected by the LCR meter. After silver enhancement solution reacts for 21 min, the decrease of impedance is directly proportional to the concentration of the detected antigen. The results show that the silver enhancement immunoassay can be measured with electro-signal detection methods. The relationship between the concentration and the signal was established. The antigen detection limit is 1 ng/mL. The result of the proposed immunoassay are faster than those of conventional ELISA.

We developed a novel immunoassay based on an electro-microchip to detect the immuno-reaction signal, using ANPs as a label of antigens or antibodies and as a catalyst for silver precipitation, and using the silver enhancement reaction to magnify the detection signal. Experimental data show that an electro-microchip with a 20 μm gap has the highest sensitivity. The detection limit is 1 ng/mL of antigen (protein A) with 10 μg/mL of 1st antibody (IgG) immobilized on slides. Our results indicate that our proposed electro-immunoassay method can provide a highly accurate in arid surface of the electro-microchip which protein immobilized on slides with patterned parallel electrodes. The proposed method is easy to perform, only a small amount of the reagent is required (as little as 40 μL sample protein per well), and it is fast (within 30 min), convenient, and low-cost. This approach has many potential uses in protein microarray research and clinical diagnosis.
Down-regulation of myeloid cell leukemia-1 through inhibiting Erk/Pin 1 pathway by sorafenib facilitates chemoresistance in breast cancer

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Cancer Research 2008;68:(15).6109-6117 August

The constitutive activation of several growth signaling pathways contribute to cancer development and resistance to anti-cancer chemotherapy. Myeloid cell Leukemia-1 (Mcl-1) is a Bcl-2 like antiapoptotic protein; increase Mcl-1 expression plays a important role in chemoresistance in a number of human malignancies such as breast cancer, leukemia, melanoma, pancreatic cancer and hepatocellular carcinoma. Upon growth factor stimulation, RAS-RAF-extracellular-signal-related kinase (ERK) pathway phosphorylation could stabilize the Myeloid cell leukemia-1 protein expression through Pin-1 protein binding to Mcl-1 and enhance the tumor cells proliferation and survival. Currently, the anticancer treatment is to make further progress from systemic chemotherapy to molecular target therapy. Sorafenib is a oral multiple tyrosin kinases inhibitor (TKIs) drug which could effective suppress the tyrosine kinases activity in the cell than inhibit the epidermal growth factor receptor and RAS/MEK/MEKK signaling pathway activation. We hypothesis that combination of chemodrugs, sorafenib and chemotherapy, could overcome the chemoresistance in breast cancer cell. To investigate the pathological revelance of the relationship between Pin-1 and Mcl-1 expression in vivo, we analyzed these two proteins in 101 human breast cancer tissue samples. We found that the immunohistochemical sating showed that was a positive correlation between the level of Mcl-1 and Pin-1 in human breast cancer samples. Over expression of Mcl-1 and Pin-1 proteins was significantly associated with a decrease of breast cancer patients’ survival. The expression level of Mcl-1 and Pin-1 proteins may be the potential prediction marker of poor prognosis in breast cancer patients. (Fig1)
Fig 1 Expression of Mcl-1 correlates with Pin-1, which is associated with poor survival in 101 human breast cancer specimens. A) Case 1 is a representative specimen with high expression of Pin-1 and Mcl-1; Case 2 is a specimen with low expression of Pin-1 and Mcl-1. B) Mcl-1 expression is significant correlated with Pin-1 expression in human tissue specimens. C) Kaplan-Meier overall survival curves indicated that high expression of Mcl-1 and Pin-1 is associated with a decrease of breast cancer patients’ survival.

To further investigate whether Erk may play a role in the Pin-1 mediated stabilization of Mcl-1, the result Mass spectrometry analysis indicated that Erk could phosphorylate Mcl-1 at the residue Thr 163 and Thr 92. To validate the Mass spectrometry data, we found that the double mutation of Mcl-1-92/163 AA could completely abrogate the phosphorylation of Mcl-1 by Erk. The Pin-1 could bind phosphorylation Mcl-1 than stabilize the Mcl-1 expression in the cell to prevent the cell apoptosis. (Fig 2)
Fig 2 Purified GST-Mcl-1 protein was incubated with activates Erk-1 kinase and reaction products were subjected to SDS-PAGE; the phosphorylated samples were analyzed by Mass spectrometry. The results of Mass spectrometry analysis indicated that Erk could phosphorylate Mcl-1 at the residue Thr 163 and Thr 92.

Our findings are important for breast cancer chemoresistance study. We found that Sorafenib suppressed Mcl-1 expression in a dose-dependent manner in two breast cancer cell lines, MCF7 and MDA-MB435. When combined Sorafenib and Taxol or 5-Fu to treat MCF7 cells, we found that Sorafenib could dramatically sensitize the tumor cells to chemodrug Taxol or 5-Fu in a dose-dependent manner. (Fug3) Taken together, our results indicate that Sorafenib circumvents Mcl-1-caused chemoresistance, which suggests that combination chemotherapy of Taxol and Sorafenib may be a promising treatment for overcoming breast cancer chemoresistance in clinic.
Fig 3 Sorafenib sensitizes chemotherapy through down-regulation Mcl-1. A) Sorafenib suppressed Mcl-1 expression in a dose-dependent manner in two breast cancer cell lines, MCF7 and MDA-MB435. B) When combined Sorafenib and Taxol or 5-Fu to treat MCF7 cells, we found that Sorafenib could dramatically sensitize the tumor cells to chemodrug Taxol or 5-Fu in a dose-dependent manner.
Controlling pre-tilt angles of liquid crystal using mixed polyimide alignment layer
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OPTICS EXPRESS 16, 17131-17137 (2008)
2008中華民國物理學會研究生優良論文獎

In liquid crystal displays (LCDs), a uniform LC pre-tilt angle is very important for the proper functioning of the display, because it has a marked influence on the display quality and the response time of LCD devices. In addition, a nonzero pre-tilt angle is required to avoid the formation of the reverse tilt domains (Fig 1.).

In this article, control of the pre-tilt angle in a LC cell, which is defined as the angle made between the LC director with respect to a substrate surface is reported. This technique allows us to precisely control the pre-tilt angle in LC cells, and has a high potential for practical application. The pre-tilt angle was measured by fitting the data obtained using the crystal rotation method with self-developed Labview software. The measured angle was doubly checked by fitting the transmission versus voltage (T-V) curve using Dimos software.

Fig. 1. LC director configurations of (a) pre-tilt angle is zero and (b) pre-tilt angle is nonzero before and after electrical switching.

LC devices are currently being applied for uses for many electro-optic devices, including display, phase modulator,…, etc. due to their low operating voltage, low power consumption. In particular, the optically compensated bend (OCB) mode LCDs designed with bend alignment has recently attracted much attention because it possesses excellent features of fast response and wide viewing-angle. Operationally, the bright and dark states are the bend state (B-state) and homeotropic state, respectively. However, a typical OCB LCD with a low pre-tilt angle is actually stable in the splay state (S-state). Thus, an OCB display has to be switched to the B-state first by applying a bias voltage to maintain the LCD in the B-state to avoid a very slow response from the S-state to B-state. It is found that OCB LSDs with a pre-tilt angle higher than ~47° can be operated without applying a bias voltage [1-3].

In this letter, we demonstrate simple approaches, based on a Horizontal (H) + Vertical (V) Polyimide (PI) mixture to obtain an arbitrary pre-tilt angle by controlling the H- to V-PI concentration ratio, the baking temperature and the rubbing strength. The pre-tilt angle can be varied in a wide range from 85° to ~15° by three approaches.
The materials adopted herein were H-PI (AL-1426B; from Daily Polymer Corporation) and V-PI (AL-00010; from Japan Synthetic Rubber Company). The homogeneously mixed PI compound was coated on an indium-tin-oxide (ITO) glass substrate by spin coating. After they had been baked and rubbed, two substrates that had been treated identically were assembled to produce an empty anti-parallel LC cell with a ~ 12 um gap. An empty cell was finally filled with K15 liquid crystal (Merck) to form a LC cell.

The first approach is to vary concentration ratios of V- to H-PI. The PI-coated substrate was treated at a baking temperature of 200 °C for 1 h and rubbed with a pile impression of ~ 100 μm, which represented the distance from the flannel to the surface of the substrate measured using the scale provided in the rubbing machine, was produced to fabricate an empty LC cell. Figure 2(a) plots the pre-tilt angle increases (~ 20° to 60°) monotonically with the increasing concentration of the V-PI (~ 3.57 to 4.55 wt%).

The second approach is to vary the baking temperature ranging from 180 to 240 °C for 1 hour. A substrate was coated with a mixed PI layer with a V-PI concentration of ~ 4.55 wt% and rubbed with a pile impression of ~ 0.1 μm. Figure 2(b) shows the pre-tilt angle declines (75° to ~ 15°) monotonically as the baking temperature increases, since over-baking in the polyimide has two effects; 1) it causes the further imidization of the backbones of V-PI, promoting the planar alignment; 2) it cleaves away a proportion of the side chains of the V-PI component, weakening the vertical alignment.

The third approach is to change the rubbing strength with various pile impressions. The substrate coated with a mixed PI layer, with a concentration of V-PI ~ 4.55 wt%, was baked at 200 °C for 1 h. Figure 2(c) indicates that the pre-tilt angle declines (90° to 15°) monotonically as the rubbing strength increases, since the liquid crystals align in a direction that is determined by the equilibrium between the two orthogonal easy axes. For weak rubbing, the V-PI side chains dominate, and the formed LC cell is homeotriphal, θ ~ 90°.

Using the techniques obtained from these studies, an LC cell was fabricated for use as a polarization converter, as presented in Fig. 3. Notably, LCs on the bottom substrate of the cell are aligned at continuously varying tilt angles, while those on the top substrate are vertically aligned. This cell was fabricated as follows. The top substrate was coated with a vertical layer, and the bottom substrate was coated with a mixed PI layer with a V-PI concentration of ~ 4.55 wt%, and baked at 200 °C for 1 h. It was then rubbed along the x axis with increasing rubbing strength with pile impressions from 0 to 350 μm.
Fig. 3. LC director configurations in cell with one substrate rubbed with increasing strength.

Figure 4 presents images of the LC cell under an optical polarized microscope (OPM) with a white light source. In the figure, $\beta$ is the angle made between the rubbing direction and the polarization of the incident beam. Fig. 4(a) obtained the cell image under a parallel-polarizer OPM is fully bright, since the polarization of emergency beam is the same as the incident beam, and is transmitted through the analyzer. As expected, the cell is completely dark observed under the crossed-polarizer OPM, as presented in Fig. 4(b). Figures 4(c) and 4(d), the color image show the effects of phase retardation when white light passes the cell with $\beta$=45° between the parallel-polarizer and the crossed-polarizer conditions, respectively.

To verify the results presented in Fig. 4, the cell with the structure in Fig. 4 was simulated using Jones Matrix method. The pre-tilt angle on the bottom substrate is assumed to be 15° on one side, increasing continuously to 90° on the other side. The conditions presented in Figs. 4(c) and 4(d) were used to simulate the incidence of light of three wavelengths - 450, 550 and 650 nm onto the cell. The reason to perform simulations with three different wavelengths of incident light instead of using white light is for simplifying the calculation.

Figure 5 presents the comparisons between experimental (Fig. 4(c)) and simulated results under $P \parallel A$ and $\beta$=45° conditions. As seen, region 1 shows reddish orange color. It results from the mixture of rich red with weak green color. Similar argument is applied to regions 2 - 5. The experimental results are consistent with the simulated ones.

The light transmittance of the LC cell that was placed between two crossed polarizers was measured using a He-Ne laser ($\lambda$=632.8 nm) to further confirm that the cell indeed functions as a variable polarization converter. The dots in Fig. 6 plot the measured position-dependent transmittance of the LC cell. The position is defined from the left to the right side of the sample, as presented in Fig. 4(d). Because continuously varying tilt angles induced the varying LC birefringence $\Delta n$, the transmittance through the analyzer changes with the phase retardation along the x axis. An ideal transmittance curve for tilt angles from ~15° to 90° was simulated using the Jones Matrix formulism. Figure 7 gives the results, and clearly indicates that the experimental results are consistent with the simulated results. The error is attributed to the finite spot size (~ 1 mm) of the probe laser beam.
In conclusion, we demonstrate three approaches to controlling the LC pre-tilt angles (≈15° to 85°) in a cell by varying the concentration ratio of H- to V-PI, the baking temperature and the rubbing strength. Notably, the technique developed in this thesis utilizes a conventional rubbing machine and mixture of commercial PIs. Thus, it is compatible with the existing manufacturing processes. Additionally, a variable-polarization converter, based on the LC cell that is presented in Fig. 4 was fabricated with one substrate rubbed with increasing strength. The polarization of a polarized beam incident on the cell can be converted continuously upon emergence from the device.

Acknowledgements

The authors would like to thank the National Science Council (NSC) of the Republic of China (Taiwan) for financially supporting this research under Grant No. NSC 95-2112-M-006-022-MY3.

References


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