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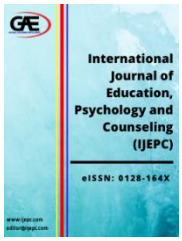

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CONSUMER EMOTION – A NEUROMARKETING RESEARCH

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Abstract:

We are exposed to over 2000 ads throughout our lives, the average adult can recognize thousands of brands, 700 new products are being offered daily to consumers, two million brands are competing for us, children are exposed today to 40,000 publicities each year and can recognize logos at 18 months. In terms of perception, attention and memory design, emotions can play an especially significant part. Emotions play an important element in how we behave and think. The emotion we feel every day could influence the decision making in our life. Based on Eysenck's theory, behavioral differences between individual are influence by the differential arousal. This study was implemented with neuromarketing approach to investigate the effect of arousal level on the process of emotion. ERP was recorded in 90 participants recruited from Health Campus, Universiti Sains Malaysia (USM) participated in ERP recording. Visual stimuli were taken randomly from International Affective Picture System (IAPS) and categories into three groups (high, moderate, low) based on the normative mean values of IAPS. In the present study, analysis for P300 component, the effect of arousal level is significant at Cz and Pz electrodes for both amplitude and latency. Meanwhile, O2 electrode indicated significant result for the latency parameter. It's clear that, consumer emotion could be influence by the level of arousal. This finding shows that, Eysenck's theory on the connection between individual behavior and level of arousal emotion almost supported. On the basis of the results of the study, marketing managers could prepare effective marketing strategies in order to concentrate consumer arousal emotions to meet their goal and benefit.

Keywords:

Consumer Emotion, Neuromarketing, ERP, P300, Eysenck's Theory

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Introduction

Today, marketing is taking place in our minds (Rushkoff,2004). Neuroscience is the science that helps us research and comprehend what's happening in the human mind and expand the mind of the consumer. In neuromarketing, scientists use medical technology, especially neuroimaging technology, to determine consumer responses to specific products, slogans and advertising. Neuromarketing enables us know the conduct of customers, why customers create particular choices and which portion of the brain is accountable for their choice. Zaltman researched the brain operations of volunteers in association with required products and brands to determine marketing neuroscience potential. He has created a novel quantitative technique ZMET (Zaltman Metaphor Elicitation Technique), capable of deciphering and uncovering "concealed" ideas in the subconscious of the consumer (Bertrand et al., 2006).

Marketing is at the heart of an enterprise, and the main objective of marketing is to bring the product to the target market. The most important characteristics are the customer's attention to our product. The decision-making process that takes place in the subconscious minds of consumers cannot be understood as one of the main reasons for any marketing campaign failure. Therefore, advertisers waste a lot of their budget by recruiting just 10% of the brain that drives consumer choices. In our way of thinking, emotions play an important role. The emotion we feel will affect our decisions in our lives every day. Evoking emotional states is an effective technique for encouraging customers. (Bardzell, Bardzell, & Pace, 2009; Peacock, Purvis, & Hazlett, 2011; Teixeira, Wedel, & Pieters, 2012; Li et al., 2018). In other fields, such as psychology, marketing and the media, scientists have attempted to address their criticism of emotional self-reporting interventions with alternative methods. Psychophysiologic measurements were used to provide a more objective and neutral approach for assessing emotional responses of individuals (Li, Scott, & Walters, 2015; Li et al., 2018). In our marketing strategy, the emotional aspect is really significant. It is already known, as indicated by previous studies, that human is sensitive to valence strength of the stimuli (Yuan et al., 2009; Yuan et al., 2012), the significant effect from pleasant visual stimulus (high and moderate valence) was found at P200 and P300 component. However, the effect of arousal strength from visual stimuli is not enough explored. It is important to know the neural correlate (amplitude and latency) from various arousal intensities (high, moderate and low) of visual stimuli.

Based on Eysenck's theory, behavioral differences between individual are influence by the differential arousal (Eysenck, 1967). Arousal is significant in information processing, modulating consciousness and attention. It is important in stimulating certain behaviors such as such as the pursuit of nutrition, mobility, the fight-or-flight response and sexual activity.

Literature Review

Robert Lee Hotz says that, we are exposed to over 2000 ads throughout our lives, the average adult can recognize thousands of brands, 700 new products are being offered daily to consumers, two million brands are competing for us, children are exposed today to 40,000 publicities each year and can recognize logos at 18 months and 3000 ads (5 times more than the average message two decades ago) are published every day in the USA (Hotz, 2005).
In 2003 Burne asked in Financial Times: "What is happening in your mind as your mind flips across the supermarket racks before you pick up a soap powder packet instead of another one? So, why did Coca Cola lastly go rather than Pepsi? (Burne, 2003).

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In summary, we could say that the rational brain evaluates, the emotions and the primitive decide what we will do in the view of the product. Only the outcomes of the logical assessment and part of our mental condition are known to the customer. If our fundamental responses and feelings are not influenced, we merely ignore the publicity message. This is why publicity should first of all be directed to the mental and primitive intellectual, which will open the focus channel / attention channel that will convey the data about the rational brain to have the impact, according to Cristina Burghelea (Burghelea, 2008).

Below are the methods of neuromarketing used to assist scientists know how we decide, perceive, and behave. These methods are divided into three categories: 1) brain metabolic activity recording (functional Magnetic Resonance Imaging (fMRI) and Position emission tomography (PET)), 2) brain electrical activity recording (Electroencephalography (EEG), Magnetoencephalography (MEG) Transcranial magnetic stimulation (TMS) and Steady State Topography (SST)), 3) without brain activity recording (Eye tracking, Measuring Physiological Responses, Implicit association test (IAT), Skin Conductance, Facial coding and Facial Electromyography) (Bercea, 2012).

ERP has been used extensively in the study of emotions. ERP is a brain activity index obtained from electricity measurements created by the firing of cortical neurons. The first person to measure the electrical activity produced by the living human brain, called the electroencephalogram (EEG), was Hans Berger (1929), who performed a study using two large saline-soaked sponges placed on the scalp of the human head and plugged into a differential amplifier. EEG recording has improved throughout the year by using mordant technique to enable better quality measurement of scalp voltage from different scalp sites (Davison et al., 2000). Continuous EEG tracking index shifts in brain voltage pattern over time, the amplitude of normal varies from -100 and +100 μV during the psychological analysis (Harmon-Jones & Peterson, 2009).

ERP refers from the physiological description to the summary of postsynaptic potential for synchronously active, predominantly cortical neurons from the population (Coles & Rugg, 1995). At the scalp, a powerful signal can be observed since the columnar position of cortical neurons arranges the direction of their potential electrical field. One end of the electric dipole formed by firing neurons responds to ERP. Not all neural signals could be detected by EEG, but only those producing scalp electrode-oriented dipoles could be recorded.

In our way of thinking, emotions play a huge role. The emotion we feel every day will affect our life's decision-making. These emotions could motivate us to act. Researchers already found that people who suffer brain injury and who are less likely to make the right decision have an impact on their ability to feel emotions. Emotions help us to understand others. It is important to provide clues when we interact with others to help them understand what we feel.

To conclude, neuromarketing is a fresh field that marries two branches, marketing and neuroscience, with a view to enhancing communication and effective consumers ' services and promoting their products better, that is to say, higher profit. Consequently, the purpose of this study is to identify unique and complementary perspectives on neuromarketing approaches to analyze the consumer's subconscious emotional mechanism. In order to understand the subconscious response, it is important to research the effect of the arousal level (high,

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moderate, low) by using the IAPS as an independent variables and ERP element, amplitude and latency of P300, as a dependence variable.

Research Methodology

This study was implemented with neuromarketing approach. ERP was recorded in 90 participants recruited from Health Campus, Universiti Sains Malaysia (USM) participated in ERP recording. This study has been approved by the Human Ethical Committee of USM with the reference number USM/JEPeM/15040127. Visual stimuli were randomly taken in the categories of three classes of arousal (high, moderate, low) from the International Affective Picture System (IAPS), with valance regulation dependent on IAPS normative mean values.

E-prime software running on the computer screen and viewed from a distance of 100 cm controlled the stimulus presentation. Subjects viewed 30 arousal images randomly displayed in the first block of the assignment and were told to clearly interpret the images as they were presented and well-focused on each. At the centre of the computer screen, the presentation of each stimulus was prefaced by the presentation of the fixation mark (+). At the beginning of each experiment, a fixation mark was provided for 500 ms to guide the subjects to the centre of the computer screen. 2000 ms after the offset of the fixation mark, IAPS images emerged. The interval between the IAPS image offset and the following fixation mark was 800 ms. The block of each image was shown, generating a total of 90 test trials. The block structure in Eprime software is shown as shown in Figure 1.

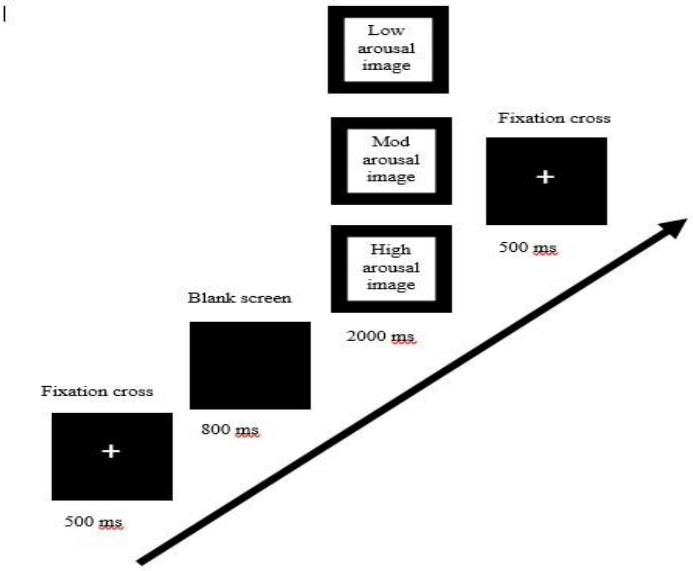

Figure 1: Visual Stimuli Presented By E-prime Software

Participants placed about 1 meter from a computer monitor in a dark and silent room. The HydroCell GSN layout of 128 channels was applied to the head of the subject. Frontal, central, parietal and occipital scalp sites with Ag/AgCl electrodes applied on sites using the international 10/20 system were recorded with electroencephalographic (EEG) from these ERPs. This recording took approximately 5 minutes to finish. Subjects were provided with a stimulus operated by E-prime software running on a computer screen linked to their head's sensor network (the 128 channel HydroCell GSN layout). Various images were shown with various levels of arousal taken from IAPS, such as animals, people, buildings and so on. The

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amplitude and latency of the subject's response were monitored and recorded for each image. The ERP data collection setup is shown in figure 2.

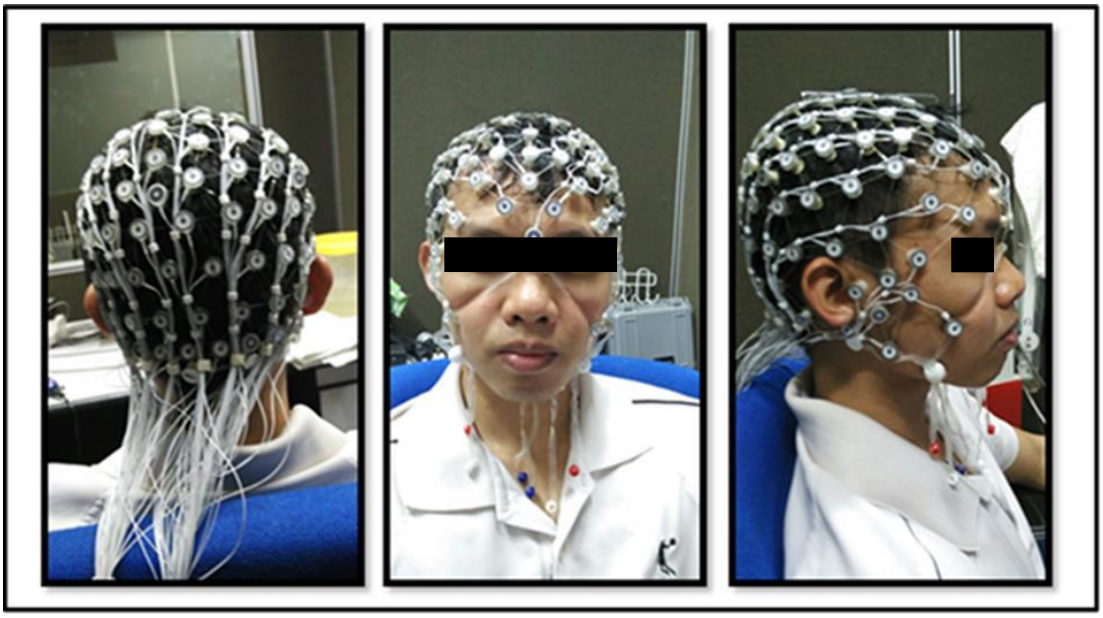

Figure 2: The 128 Channel Hydrocell GSN Layout Applied On Subject's Head

For further study, P300 raw data for 5 electrons (3 central, 2 occipital) were selected for the ERP (latency and amplitude). All the data collected was analysed using version 24 of the Statistical Package for Social Sciences (SPSS) software. The two-way mixed design was therefore used to examine the impact of arousal levels on the emotion phase.

Result and Discussion

This research, analyse P300 part, mainly shows that the effect of arousal level at both amplitude and latency is significant for Cz ([F (2,86) =17.70, $p<0.001$); [F (2,86) =4.37, $p<0.05$)) and Pz ([F (2,158) =5.95, $p<0.01$); [F (2,86) =5.45, $p<0.01$)) electrodes. O2 electrode showed significant latency parameter data, [F (2,168) =8.22, $p<0.001$). Comparisons in pairs between levels between high and low arousal levels were found to be substantially different.

Trust in the decision is correlated positively with the P300 amplitude in relation to the outcome, which means that increased confidence in the decision-making process leads to a higher P300 amplitude (Pirtošek et al., 2009). Luck (2005) in fact believed that this was valid because when respondents put more efforts into a task, the amplitude of P300 is higher. Latency refers to respondents' time to react to stimuli. Response time can be interpreted as a measure of difficulty or decision deliberation, that is to say that longer latency responses can be observed in more difficult decisions (Lepping et al., 2015).

P300 suggests that a dopaminergic modulatory effect has a correlation with decision-making by a previous study carried out by Nieuwenhuis et al (2005) with the phasic function of the locus coeruleus-norepinephrine system. Commonly, the analysed ERP outcome showed that maximum amplitude at the parietal cortex indicates high emotional activity in the cortical structure involved in goal processing activity (Sabatinelli et al., 2007). More attention was

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given to greater amplitude of the P300 component (Sur & Sinha, 2009; Samsuri et al., 2016). The Latency Component P300 is a P3a and P3b subcomponent combination which has reacted to initial memory and attention (Polich, 2007). The study therefore coincides with the previous studies, because we have found higher amplitudes of the component P300 compared to the low arousal levels at the high arousal level at most locations.

Conclusion

Neuromarketing has been at the center of the marketing field in recent years, using neuroscience techniques. It's clear that, consumer emotion could be influence by the level of arousal. This finding shows that, Eysenck's theory on the connection between individual behavior and level of arousal emotion almost supported. On the basis of the results of the study, marketing managers could prepare effective marketing strategies in order to concentrate consumer arousal emotions to meet their goal and benefit. But this study only focuses on arousal emotion. The recommendation for upcoming research is to take a look at the valence emotion and other psychosocial aspect.

Neuromarketing can detect any subconscious movements that do not comply with the conventional study process. This evidence offers a new marketing strategy for marketers to improvise their marketing strategies and accelerate the growth of sales. This concludes that the simple yet basic marketing strategy theory becomes stronger with neuromarketing strategy. In future studies, instead of the conventional process, this approach must be considered.

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