Advertising, brand and neuromarketing or how consumer brain works

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Abstract

The present paper explores the relationship between the explicit (consumer's preference) and implicit (EEG measurement) consumers' responses and the important role of the reward-system. In particular we analyzed the impact of reward mechanisms to support cognitive and emotive processes in evaluating consumer goods. We measured the frequency bands (delta, theta, alpha, beta) at thirty-four subjects while they saw five commercials. Finally, the subjects evaluated the goods and explained their preferences.

Keywords: Neuromarketing; Reward system; Implicit; Explicit

1. Introduction

In the last two decades, the consumer's choice and preference have been studied with neuroscientific methods that observe the consumer's behavior and the elements partially unknown to the subject itself (Weinstein, Drozdenko & Weinstein, 1984; Lee, Broderick & Chamberlain, 2007). Today, neuromarketing is the subject matter that studies this topic. It is a new interdisciplinary field that links psychology, neuroscience and economics to understand how the brain is physiologically affected by advertising and marketing strategies (Lee et al., 2007; Madan, 2010). Recent studies showed that, when subjects made decisions between different brands, they had an increased activity in ventromedial prefrontal cortex (VMPFC) (Balconi, 2008; 2009;

Deppe, Schwindt, Kugel, Plassmann & Kenning, 2005). Other studies confirm the important function of VMPFC in preference judgment (McClure & Cohen, 2004; Paulus & Frank, 2003). VMPFC, including DLPFC, is fundamental in decisional processes and for processing emotional and motivational information related to reward (Balconi, Finocchiaro & Canavesio, 2014; Bechara & Martin, 2004). Talking about rewards, we can differentiate them in primary (food, drink and sexuality) and secondary (like social and financial reward). For the secondary reward, it was found that the elements with high social value activate specific cerebral areas (orbitofrontal cortex, anterior cingulate regions, occipital cortices) (Erk, Spitzer, Wunderlich, Gallery & Walter, 2002). In particular, DLPFC seems to be significantly active in the representation and integration of goals and reward information (Miller & Cohen, 2001) and might initiate reward-motivated behaviour (Ballard et al., 2011). Recent studies investigated changes in brain activity with EEG measurements by observing participants watching advertisements and tracking the cortical activity and changes in functional connectivity (e.g. Astolfi et al., 2008; Vecchiato, Kong, Maglione & Wei, 2012; Ohme, Reykowska, Wiener & Choromanska, 2010). These studies revealed the higher cortical spectral activity in frontal and parietal areas while watching advertisements that the subjects remembered from a previous viewing, in contrast to the TV commercials that were forgotten after the initial viewing. The present research aims to explore the implicit and explicit consumers' response to the vision of different consumer goods. We correlated the cerebral responses with consumers' explicit preferences and we predicted a significant brain activity in response to goods which were evaluated as preferred, linked to rewarding conditions. Then, we hypothesized a higher cerebral activity in DLPFC because it seems to be the cerebral area supporting reward mechanisms.

2. Method

2.1. Subjects

Thirty healthy volunteers took part in the study (fifteen women, age range 20-40, M = 28.09, SD = 1.88). They were undergraduate students of the Catholic University of Milan, all right-handed and with normal or corrected-to-normal visual acuity. Exclusion criteria were history of psychopathology for the subjects or immediate family. They gave informed written consent for participating in the study and the research was approved by the Ethical Committee institution where the work was carried out. The study conform the

Code of Ethics of the World Medical Association (Declaration of Helsinki, 1964).

2.2. Stimuli and procedure

The research participants viewed five advertisements relative to different commercial sectors (alimentary, pharmaceutical, electronic, financial, clothing). All commercial videos were interspersed from a black screen for the duration of five seconds. Each stimulus was associated with a name: "Barilla", "Enterogermina", "CheBanca!", "Calzedonia" and "Samsung".

Participants were comfortably seated in a moderately lit room with the screen positioned approximately 100 cm in front of their eyes. During the examination, the participants were requested to minimize blinking and they were required to attentively observe the videos during EEG recording. After each stimulus, subjects were required to evaluate their preferences, rating the video from 1 to 6 (six-point Likert scale, 1 = not preferred).

3. Results

3.1. Band analysis and preference rating

Repeated measure ANOVA, with two within-subjects factors, localization (4), and good (5), was applied to the dependent variable of mean power distinctly for each band. Significant effects were found for theta, with a significant main effect for good ($F[3, 29] = 7.12$, $p = 0.001$, $\eta^2 = .27$) and an interaction effect for good x localization ($F[12, 29] = 9.05$, $p = 0.001$, $\eta^2 = .30$) (Figure 1). As revealed by contrast analysis, an increased power was found for the brand Samsung and Barilla within the frontal area than the other areas (for all comparisons $p = .001$). Moreover a higher frontal increasing was found for Samsung and Barilla than the other goods (for all comparisons $p = .001$).

A significant effect was observed ($F[4, 29] = 9.93$, $p = 0.001$, $\eta^2 = .34$) about preference. A set of distinct ANOVAs was applied to preference option with independent factor good (5). Type I errors associated with inhomogeneity of variance were controlled by decreasing the degrees of freedom using the Greenhouse-Geiser epsilon. Post-hoc analysis (contrast analysis for ANOVA, with Bonferroni corrections for multiple comparisons) was successively applied. Coherently with EEG measurements, as shown by the post-hoc comparison,"Samsung" and "Barilla" were preferred than the other goods (for all comparisons $p = .001$).

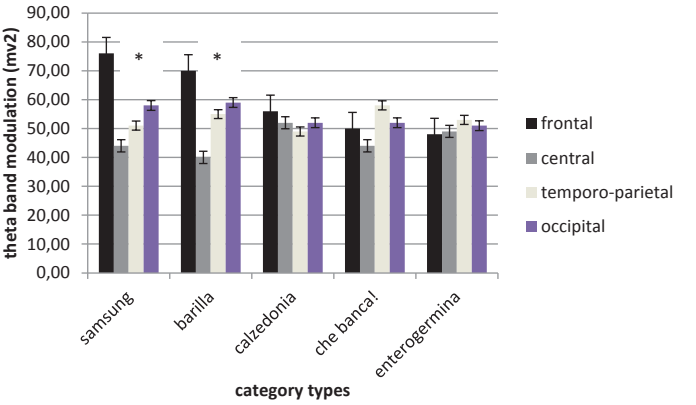

Figure 1.

3.2. LTA

The frontal brain log-transformed asymmetry (LTA) (log-transformed right power - log-transformed left power) was calculated to test a possible lateralization effect for theta. We considered F3 and F4 positions (left and right DLPFC). A more negative value indicated a more frontal left-sided increased power for theta. Conversely, a more positive value indicated more frontal right-sided increased power for theta. ANOVA revealed a significant effect of good for LTA (F[4, 29] = 10.32, p = 0.001, η^2 = .33). Indeed a decreased LTA (more left side activity) was found for "Samsung" and "Barilla" than the other goods (for all comparisons p = .001) (Figure 2).

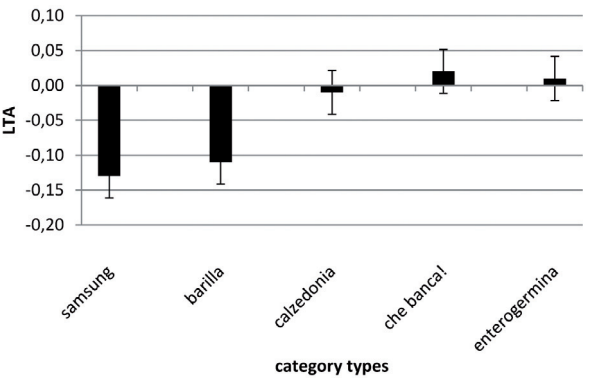

Figure 2.

4. Discussion

The integration between neuroscientific measurements and explicit consumers' preference has allowed for a substantial step forward in showing how the consumer brain works, especially when exposed to rewarding advertising that creates engagement. The present research showed an important role of the reward system in reaction to different types of consumer goods. The increase of the theta frequency band in the DLPFC was evident when the consumers saw preferred stimuli. In particular, two commercials were more appreciated: Samsung and Barilla. We hypothesize that these brands engage the consumer through a social reward. Unlike the other commercials, these advertisements use people (their emotions and lifestyles) to present their brand to consumers.

A main result of this research regards the strong relationship between the explicit evaluation of the consumer's preference in terms of the favorite commercial and brain activity. It is evident that there is a strong coherence between different typologies of measure (EEG measurements and preference ranking). In particular we observed a significant theta increase in the DLPFC. LTA index showed a more consistent left prefrontal cortex activity (F3) in response to some goods. Therefore, we may suppose a greater response on the left side for goods rated as more positive, emotionally significant and preferred. We may also hypothesize that the left DLPFC supports this reward system. Maybe some goods, more than others, were able to activate the prefrontal cortex because they may elicit a more direct representational significance in terms of rewarding-power (Schaefer & Rotte, 2007). The importance of frontal area was indicated in studies as work in Min and colleagues (Min et al., 2003) and Potts and Tucker (2001). Various research showed the association between the left frontal regions and stated preferences of the subjects (Balconi & Crivelli, 2010; Balconi & Mazza, 2010; Kawasaki & Yamaguchi, 2012). EEG is important for exploring a subject's response in the case of decision making and the preference for goods, and it offered a valid explanatory hypothesis for the cortical differences.

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