Reading cognitively consistent product reviews increases my attention to apparel products:
An event-related potentials (ERPs) study

Keunyoung Oh, SUNY Buffalo State, USA

Keywords: Brain activity, electroencephalography, event-related potentials, product reviews

In the recent interactive marketing environments, a growing number of consumers publish product reviews on the online shopping sites. Zhang, Craciun, and Shin (2010) reported both positive and negative bias effects of electronic word-of-mouth (online consumer product reviews) on persuasiveness as related to consumption goals. The purpose of this research is to examine the effects of product reviews on the cognitive perception of apparel products using a neural response measure, event-related potentials (ERPs). Cognitive consistency theories including balance theory, congruity theory, and cognitive dissonance theory suggest that individual strives to seek consistency and to avoid inconsistency leading to psychological tension and discomfort within and between his cognition (Awa & Nwuche, 2010).

The brain activity reflects one's sensory and cognitive processing of external stimuli. Electroencephalogram (EEG) detects subtle electrical changes on the scalp to measure brain activity. Event-related potentials (ERPs) use averaged raw EEG signals providing important information about how the human brain normally processes information. The ERP components (the transient electric potential shifts) are time-locked to stimulus onset appearing as a sequence of positive and negative voltage deflections. The late positive potential (LPP) is a long-lasting, positive slow wave around 500 – 700 ms after stimulus onset. Previous studies repeatedly found that higher amplitude of the LPP tends to occur more often for emotionally significant (pleasant and unpleasant) than for neutral visual stimuli indicating sustained enhanced attention allocation and motivational significance to emotional visual stimuli (Pozharliev, Verbeke, Van Strien, & Bogozzi, 2015). In this study, changes in the neural responses to two types of apparel products (most desirable styles versus least desirable styles) are measured using event-related potentials (the LPP emotional effect) when two types of product reviews (consistent versus inconsistent product reviews) are presented. It is hypothesized that more positive-going ERP amplitudes for the LPP will appear for most desirable styles than least desirable styles when consistent product reviews are presented than inconsistent product reviews.

Thirty undergraduate students (27 females, 3 males, age $M = 22.17$ years, $SD = 1.21$) from a northeastern university in the United States participated in this study in exchange for course credit. All participants had normal or corrected-to-normal vision. Participants were asked to choose 10 most desirable styles and 10 least desirable styles from their favorite online store prior to the experiment regardless of prices and brands. A customized visual set consisting of the top five styles from the most and least desirable groups were developed for each individual. Positive product reviews with five-star ratings and negative produce reviews with one-star ratings were added to the customized visual sets resulting in two consistent review combinations (positive reviews with most desirable styles and negative reviews with least desirable styles) and

two inconsistent review combinations (negative reviews with most desirable styles and positive reviews with least desirable styles).

Two sessions of ERP experiments were conducted. In the first session, the individually customized visual set was presented to the participant where five most desirable style pictures and five least desirable style pictures were randomly presented 54 times each. Each picture was presented for 500 ms, with an interval of between 1000 and 1500ms with a fixation point (+) at the center of computer screen between pictures. After the first session, one version of the four style and review combinations was randomly assigned to each participant. After the style and review combination set was presented, in the second ERP session, the same individually customized visual set was shown again to participants with the same condition as in the first ERP session. Participants were instructed to watch the visual stimuli without making any overt response or movement. To reduce the amount of ERP artifacts caused by eye movements, the participants were instructed to relax and to reduce unnecessary blinking and facial movements during the ERP sessions.

The EEG was recorded using a 21channel electrode cap with standard International 10-20 Electrode system layout. All electrodes impedances were maintained below 5 kΩ. All EEG activity was recorded by the NeXus-32 system (Mind Media Inc.) with a bandpass of 0.1-40 Hz at a sampling rate of 512 per second. Grand-averaged ERP waveforms after rejecting artifacts with epochs with large amplitude (more than $\pm 100\ \mu$V) were generated using BioTrace+ software. Averaged ERPs from 200 ms prior to the onset of the visual stimulus to 1000 ms after the onset were generated for each participant before (session 1) and after (session 2) the presentation of the product reviews. A two-way repeated measures analysis of variance was performed to examine the effect of consistent and inconsistent reviews on the neural response to apparel products: the within-subject factor was style types (most desirable, least desirable) and the between-subject factor was condition (before and after reading product reviews).

A repeated measures ANOVA with style types (most desirable and least desirable) as within-subject factor on the LPP mean amplitude in the 500 – 700 ms time window revealed that greater ERP amplitudes occurred for most desirable styles than least desirable styles (Wilk's Lambda = .846, $F(1, 35) = 6.381$, $p = .016$, Partial Eta Squared = .154) for the groups who read consistent reviews (either positive reviews with most desirable styles or negative reviews with least desirable styles) at PZ electrode site. More importantly, a style types (most desirable styles versus least desirable styles) X condition (before versus after reading reviews) interaction (Wilk's Lambda = .893, $F(1, 35) = 4.636$, $p = .038$, Partial Eta Squared = .117) was found only for the consistent review groups. The results support that reading product reviews consistent with the consumer's desirability enhances the level of attention in the cognitive processing of apparel products. Product reviews consistent with consumer's attitude toward the product that evoke greater LPP amplitudes would like to induce more emotionally motivated attention, which may result in more active cognitive engagement either with the product or the online shopping site. Further research is called for to investigate how positive versus negative product reviews affect the cognitive processing of apparel products using ERPs.

References

Awa, H. O., & Nwuche, C. A. (2010). Cognitive consistency in purchase behavior: Theoretical & empirical analysis, *International Journal of Psychological Studies, 2*(1), 44-54.

Pozharliev, R, Verbeke, W.J.M.I, van Strien, J.W, & Bagozzi, R.P. (2015). Merely being with you increases my attention to luxury products: Using EEG to understand consumers' emotional experience with luxury branded products. *Journal of Marketing Research, 52*(4), 546–558. doi:10.1509/jmr.13.0560

Zhang, J. Q., Craciun, G., & Shin, D. (2010). When does electronic word-of-mouth matter? A study of consumer product reviews. *Journal of Business Research, 63*(12), 1336-1341. doi:10.1016/J.jbusres.2009.12.011