

The Neural Correlates of Rapid Website Evaluation

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Literature has examined the cognitive processes that underlie user evaluation of websites. In general, these studies have found that usefulness and enjoyment can effectively predict usage behavior in conditions under which users have abundant knowledge about the target websites and are allowed ample resources to make such evaluations (Davis, et al., 1992, Van der Heijden, 2004). Alternatively, individuals may rely on a mechanism of extremely rapid evaluation that employs only limited information about a website. Indeed, recently researchers have recognized the importance of rapid evaluation in the Electronic Commerce domain and showed that brief exposure to Internet stimuli is adequate to evoke basic psychological responses (Lindgaard, et al., 2006).

However, the neural correlates of the rapid evaluation process are still unclear. It is also unclear whether these neural correlates, if any, can predict subjects' future enjoyment and usefulness evaluations toward these websites. To answer these questions, we seek to capture the neural signatures of rapid evaluation with the event-related potential (ERP, or the brain wave pattern) methodology. Twenty-four subjects participated in an ERP study and a behavioral study. In the ERP study, subjects needed to make extremely rapid evaluation (like vs. dislike) toward novel website logos that were presented with only 200 milliseconds (ms). Next, in the behavioral study, subjects reported their perceived enjoyment and perceived usefulness toward the website logos with a 5-point Likert scale at their own pace.

The results showed that four ERP components were correlated with subjects' like-dislike responses (Table 1). These findings suggest that liked and disliked logos were differentiated very early in the information process stream (120 ms). Furthermore, the results (Figure 1) suggest a negativity bias, i.e., logos that were disliked elicited stronger P1 amplitude than those that were liked. The liked stimuli only elicited stronger ERP signals in the later stages (P2, N2 and LPP). The finding of P1 is consistent with past studies of rapid evaluation using emotional pictures as stimuli (Smith, et al., 2003), in which negative emotional pictures show stronger P1 (peaking around 120 ms) than positive emotional ones. It is argued that P1 is activated from visual cortices and hence indicates early attention process (Smith, et al., 2003). According to this interpretation, our results suggest that a fast and bottom-up emotional response toward the logos might directly influence evaluations and that negative emotion may capture attention faster than the positive emotions.

Component	Peak Time	Direction	Areas
P1	120 ms	Dislike > Like	Occipital sites
P2	190 ms	Like > Dislike	Central sites
N2	300 ms	Like > Dislike	Frontal sites
LPP	510 ms	Like > Dislike	Centroparietal sites

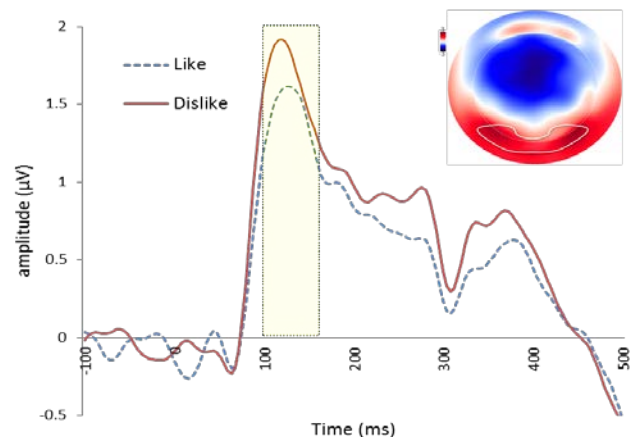


Figure 1 The waveforms (blue line: Like, red line: Dislike) for the P1 component; Upper right: the topography and the occipital sites used to quantify P1.

It has been shown that neural activities might predict future buying behavior (Knutson, et al., 2007). We hypothesize that these four components can predict subjects' future enjoyment and usefulness evaluations. Future analysis is needed to understand whether brain activations precede and predict subjects' website evaluations.

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