



# Emotion and advertising effectiveness: A novel facial expression analysis approach



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## ABSTRACT

Neuroscience has revealed the importance of emotion in the human cognitive process. For the first time, a GfK-EMO Scan, a facial expression recognition software developed by the Fraunhofer Institute for Integrated Circuits IIS, is used to investigate the long-term effect of advertising on individual attitudes toward driving. The effects of high emotional and low emotional advertising were measured using the GfK-EMO software on 60 participants with a 50/50 male to female ratio. Each participant was subjected to either a high emotional or low emotional safe driving video advertisement. While watching the advertisement, the GfK-EMO facial recognition software recorded the unconscious emotions of participants who were also requested to fill a modified version of the National Survey of Speeding Attitudes and Behavior. A driving attitude score was then computed using this survey directly after the participant had viewed the advertisement and again two weeks later. Noticeable differences in the attitude score were recorded between participants having watched the high emotional advertisement against participants having watched the low emotional advertisement. The high emotional advertisement generated a higher and more durable safe driving attitude score in comparison to the low emotional advertisement.

## 1. Introduction

Total advertising spending in the US is on an ever-increasing curve. In 2014, American businesses spent over B\$180.12 (Emarketer, 2015). Globally, in 2015, over B\$540 billion was spent on advertising, a 4.6% increase over 2014 (Adage, 2015) with the general public being exposed to an increasing number of advertisements. In 1985, the average urban American would see around 2000 advertisements per day. By 2016, this number is estimated to shoot up to 5000 advertisements per day (NY Times, 2015). Yet out of a sample of 350 advertisements watched per day, only 153 advertisements receive attention for more than a few seconds (SJ Insights, 2014). Measuring advertising effectiveness has always been the greatest challenge of marketing and advertising professionals. There are two main methods

for measuring advertising effectiveness (Lehmann and Reibstein, 2006): One focuses on measuring indicative marketing metrics (such as awareness, preference, customer satisfaction, and loyalty); while the other focuses on measurement of tangible marketing metrics (such as sales, market share, profits, return on investment, cash flow, and firm value) (McAlister et al., 2016). For most businesses, monitoring the effectiveness of their advertising campaign remain a challenge (McCarthy and McDaniel, 2000).

An effective advertisement influences consumer attitudinal and behavioral responses (Meyers-Levy and Malaviya, 1999; Lee et al., 2015). Advertising effectiveness can be assessed along five independent dimensions: the first dimension evaluates the target audience attitude toward the advertisement itself; the second sizes the audience's attitude toward the brand (Lewinski et al., 2014; Mitchell and Olson, 1981); a

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third and fourth measure the audience purchasing intention and actual purchase (Lewinski et al., 2014); and finally a fifth estimates recall for the brand and product being advertised (Turley and Shannon, 2000). Attitude toward the advertisement describes the likings, enjoyment, and valence of feelings of individuals toward the advertisement while attitude toward the brand measures the likings, enjoyment, and valence of feelings toward the brand in the advertisement (Chattopadhyay and Basu, 1990; Phillips, 2000). In terms of the audience purchasing intention, behavior intention has been defined as the subjective probability dimension of an individual that connects him or her to a particular behavior (Fishbein and Ajzen, 1975). A behavioral intention, therefore, refers to a person's subjective probability that he will perform a given behavior (Lewinski et al., 2014). Recall is recognized as a fundamental dimension of advertising effectiveness since it will impact the buying decision (Turley and Shannon, 2000).

The complexity of measuring advertising effectiveness increases if the variable “emotion” is introduced (Corvi and Bonera, 2010). Emotion has been found to considerably impact the response an individual will have toward a message (Lewinski et al., 2014; Mai and Schoeller, 2009). An emotional message in advertisements increases the audience attention toward the advertisement and product, boosts product attractiveness, and generates a higher level of brand recall. For example, Page et al. (1990) found that emotional advertisements are more likely to be remembered than informative commercials. Poels and Dewitte (2006) posited that emotion is a predictor of advertising effectiveness. Measuring consumer emotional response provides a robust appraisal of the advertisement impact on consumer attitude, behavior, and recall.

Wiles and Cornwell (1990) provided a comprehensive review of the various methods employed to evaluate emotion in advertising research. The emotional response can either be measured using self-report or autonomic measure. The visual self-report requires the respondent to choose a cartoon character matching his or her emotional state, while in verbal self-report respondents answer an open-ended question or rate their emotional state on a Likert-type scale (Lewinski et al., 2014). Self-reports usually capture the conscious state of the individual while the autonomic capture the body's reactions. Body reactions (such as heart rate fluctuation or variation in skin acidity) are, most of the time, beyond the conscious control of the individual (Lewinski et al., 2014). Self-reports and surveys suffer from heavy bias; for example, the Theory of Social Desirability posits that interviewees will tend to avoid socially unacceptable responses or will tend to provide answers which the interviewer perceives to match the value system of the interviewer (Benstead, 2013). Autonomic measures directly assess the respondent's unconscious appraisal of an issue and as such appear to overcome the limitations of self-report questionnaires (Lewinski et al., 2014; Poels and Dewitte, 2006). Tools such as facial readers or facial recognition software have been popular amongst researchers (Lewinski et al., 2014). Accordingly, this research uses facial recognition software to investigate the potential link between emotion and public service advertising effectiveness.

## 2. Literature review

Corvi and Bonera (2010) posit that measuring advertising effectiveness is problematic since an individual response to an advertisement is not only impacted by the advertisement itself but also by a broad range of economics, cultural, socio-demographics and psychosocial stimuli. Another challenge is that advertising outcomes vary and cannot always be translated into strictly quantitative terms, such as sales results. Lastly, the advertising impact does not immediately ensure the campaign launch with results differing in time (Corvi and Bonera, 2010).

### 2.1. Core elements of advertising effectiveness

The core elements of advertising effectiveness are the attitude toward the advertisement, the attitude toward the brand, the intention, and ultimately the actual behavior (Lewinski et al., 2014) and memory recall (Turley and Shannon, 2000).

Recent research has posited that attitudes toward advertising is significantly related to advertising effectiveness since attitude is a driver for behavior (Linget et al., 2010; Mehta, 2000; Ting and de Run, 2015). Fishbein and Ajzen (1975) define an individual's attitude toward an object as both a cognitive and affective evaluation of this object and a predictor for behavioral intention. In turn, behavioral intention is a predictor of the strength of the individual's willingness to perform a given behavior (Ajzen, 1988). Yet for Tan and Chia (2007) belief is the central dimension to attitude toward advertising (Tan and Chia, 2007) since a change in beliefs about advertising leads to a change in attitude toward the advertisement and consequently influences the purchase intention (Ting and de Run, 2015; Wang, Sun, Lei and Toncar, 2009). In other words, the intention to perform a behavior becomes more probable once a positive belief about the outcome is formed (Shook and Bratianu, 2010).

Advertising recall research has long been a research interest. Before neuroscience research, Bozinoff and Dacin (1985) proved that particular advertisements could be recalled after more than 11 years. Creativity has been pointed as an important component of advertising recall with highly creative advertisements being easier to recall than control advertisements (Lehnert et al., 2013). McDuff et al. (2015) studied 12,000 facial responses from 1223 persons who were exposed to 170 advertisements and found that advertisements with higher emotion were more likely to be remembered than advertisements with less intense emotion (McDuff et al., 2015). Using fMRI imaging Bakalash and Riemer (2013) found that emotional advertisements elicited stronger amygdala stimulation and consequently were also the most memorable advertisements.

### 2.2. Emotions and advertising effectiveness

#### 2.2.1. The role of emotions in the cognitive process

In humans, emotions are a reaction to stimuli that impact one's immediate sensory environment (Kiehl et al., 2001; Petrides, 2007; Ramsøy et al., 2012). LeBlanc et al. (2014) not only show that emotions are necessary to human function but also that emotion are strongly correlated to attention, decision making and memory. Researchers such as Öhman and Mineka (2001); Algom et al. (2004), and Estes and Verges (2008) have shown that emotion impacts the allocation of resources to the visual system. The emotional object, especially negative stimuli, will be allocated more attentional resources than neutral stimuli. In their research based on computational neuroscience, Milosavljevic and Cerf (2008) showed that attention is a corner stone to intention and decision making. Earlier Loewenstein (1996) emphasizes that primitive emotions, such as hunger or sexual arousal, can largely affect the decision-making process. Additionally, emotions influence both individual's attitudes and judgments, which in turn influence the decisions being made (Gutnik et al., 2006). Besides, Lerner et al. (2015) note that emotions constitute potent, pervasive, predictable, sometimes harmful and sometimes beneficial drivers of decision making. Across different domains, important regularities appear in the mechanisms through which emotions influence judgments and choices (Lerner et al., 2015).

#### 2.3. Measuring emotions in advertising

Poels and Dewitte (2006) distinguished between two types of measures of emotions in advertising which are: self-reports and autonomic. Self-report is indeed the simplest way to measure emotion (Lewinski et al., 2014). However, this forces the individual into a

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