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MEASURING EMOTIONS: WHICH ONE IS BETTER?

Wan-Chen Wang

Associate Professor

Department of Marketing, Feng Chia University

No. 100, Wenhwa Rd., Seatwen, Taichung, Taiwan 40724, R.O.C.

ABSTRACT

Self-report measures have been broadly applied to measure consumers' emotional responses to advertising stimuli or consumption-related experiences; and these measures have been a consistently popular method with practitioners and researchers. This technique, however, has a drawback—namely limitations in our thinking, or cognitive biases, often shade the consumer feedback. Consequently, recent research emphasizes the need for methods of evaluating emotion that go beyond self-report measures and calls for collaboration with other fields of research in order to advance the study of consumer emotion. The author collaborates with computer science researchers to recommend another two methods; namely, Voice Emotion Response and facial expression that presents very different findings than those from self-report measures. Preliminary outcomes reveal that self-report measures combine with psychophysiological measures can potentially improve the efficiency of marketing research

Keywords: Marketing research, Emotional response, Self-report measures, Psychophysiological measures.

1. Introduction:

Given the significance of emotions in the consumer behavior, correct measurement of emotions is essential. The complexity of measuring emotions needs to be considered, not ignored (Ambler et al., 2000). Consumers' emotional responses to advertising have been measured in various ways throughout the years (Bagozzi et al., 1999). Nevertheless, measuring emotions is understandably complicated. Many researchers have emphasized the need for measures of emotions to go beyond self-reported measurements (Bagozzi et al., 1999; Chamberlain and Broderick, 2007; Oatley, 1992) and Oatley (1992, p.21) mentioned that "autonomic nervous system and other physiological processes" at least accompany subjectively felt emotions.

2. Review of Literature:

Self-report measures

Several researchers (e.g., Nenycz-Thiel et al. 2013; Poels and Dewitte 2006) state that self-report measures have constantly been very well-liked with practitioners and scholars. Explanations can be given as follows: Firstly, they represent practical ways to measure emotional reactions to a comparatively large set of advertising stimuli. Secondly, self-report measurements have the

benefits of being user-friendly and taking rapid measures of emotional responses. Thirdly, they do not use complicated techniques. Thus, self-report measurement is easy and quick to conduct, and is an inexpensive method that is often appropriate for large-scale research.

However, a great amount of research has indicated that individuals are not fully conscious of numerous things they do in everyday life; rather, they often process information automatically and behave spontaneously (Chamberlain and Broderick 2007). Consumers are generally intuitive and emotional in their behavior, and are not usually dependent on conscious control (Pawle and Cooper 2006). Winkielman et al. (2005) offer evidence that there are emotions that can affect behavior without being consciously experienced by participants. Consequently, self-report measurements derived from subjective feelings may not always appropriately record all the emotions that may have a significant effect on our decisions (Chamberlain and Broderick 2007). In addition, social-desirability concerns can skew results (King and Bruner 2000) as participants may not always be willing to disclose their real feelings. This is particularly true for sensitive topics such as income, charity, racial issues, gender, age and sexuality.

Voice recognition

Voice recognition is a research stream within the HCI discipline that conducts computational studies of emotion in speech. A variety of physiological changes related to emotion can have an effect on speech. Hence, researchers ㅈattempt to infer vocal signs of emotion (Scherer 1986). Signal-based appraisal tools deal with some of the constraints of the self-report measures. For example, compared to self-report measures, it is a more natural way of measuring emotions. Additionally, findings of Wang et al. (2015) recent work suggests that the HCI - Voice Emotion Response provides better brand recall than self-reported measurements, thus presenting an opportunity for both practitioners and academics in marketing, to overcome biases and restraints that frequently come with self-report measures. Therefore, the following proposition will be examined:

Hypothesis1: Voice emotions measures are more recalled than self-report measures

Facial expression

Since Darwin (1872), facial expressions have been considered to reflect a person's present emotional state and as a method of communicating emotional information. Ekman and Friesen (1975) proposed the Facial Action Coding System (FACS), which codes visible facial muscle movements to measure changes in facial expressions that reflect emotional experience. Researchers (e.g., Bolls et al. 2001; Derbaix 1995; Hazlett and Hazlett 1999; Ravaja 2004) argued that FACS lacks the subtlety to measure the changes in muscular activity evoked by advertising. Facial electromyography (EMG) is a more precise and sensitive measure of facial expressions. Facial Electromyography (EMG) measures minute changes in the electrical activity of muscles, which displays minute muscle movements. Even when there are no changes in facial expression with the FACS system, the facial EMG has been revealed to be able to measure facial muscle activity to weakly evocative emotional stimuli (Cacioppo et al. 1986). EMG can still register the response even when participants are instructed to restrain their emotional expression (Cacioppo et al. 1992). Hazlett and Hazlett (1999) compared results of EMG and self-report on participants' emotional responses to TV commercials. They found that EMG was a more sensitive indicator of

participants' emotional responses to TV advertisements and those EMG responses were closely related to emotion-congruent events throughout the advertisement. In addition, compared to self-report measures, EMG measures were more connected to brand recall measures. The facial electromyography (EMG) has been the most commonly employed measurement tool for facial muscle activity in marketing research (Wang and Minor 2008). Wiles and Cornwell (1990) suggested that facial expressions can be applied to recognize the directions of affective responses (i.e., pleasure vs. displeasure) to external stimuli.

Nevertheless, facial EMG also has some restrictions. Firstly, electrodes placed on participants' faces can make them aware that their facial expressions are being measured. This awareness could make participants more aware of their facial expressions, which may decrease validity. Secondly, facial EMG needs to be done in unnatural lab settings; this could lead to the problem of ecological validity. Thirdly, facial EMG is also sensitive to noise; for instance, noise could induce unexpected movements of the participant that may reduce reliability (Bolls et al. 2001). Finally, facial EMG measurement is an individual appraisal method and its use for group data collection is impossible (Hazlett and Hazlett 1999; Poels and Dewitte 2006). For the above reasons, this study will use computer-aided emotion detection from facial expressions. These detection algorithms outperform non expert coders and are around as accurate as expert coders (Bartlett et al. 1999). Moreover, computer-aided emotion detection can be done in real time, which is much faster than that achievable by human coders (Teixeira et al. 2012). Therefore, the following proposition will be examined:

Hypothesis2: Facial expression emotions measures are more recalled than self-report measures

Hypothesis3: Employing self-report measures combined with Voice emotions measure and Facial expression emotions measures lead to the highest prediction.

3. Objectives of the study:

This research aims to prove that self-report measures combine with psychophysiological measures potientailly increase better prediticition.

4. Hypotheses of the study

Hypothesis1: Voice emotions measures are more recalled than self-report measures

Hypothesis2: Facial expression emotions measures are more recalled than self-report measures

Hypothesis3: Employing self-report measures combined with Voice emotions measure and Facial expression emotions measures lead to the highest prediction.

5. Research Methodology:

Apart from the self-report — that recognizes five primary emotions: happiness, anger, sadness, boredom, and neutrality (lack of emotion). This study conducted a human-computer interface — the Voice Emotion Response (Wang et al., 2015) — that recognizes five primary emotions in Mandarin speech: happiness, anger, sadness, boredom, and neutrality. Facial expression recognizes five basic emotions: angry, happy, neutral, sad and surprise was employed as well. The experiment involved 61 female and 57 male subjects. The author analyzed all the recorded files by using the Voice Emotion Response software and facial expression recognition system, thereafter transformed all the results into an SPSS dataset.

6. Data Analysis and Interpretation:

This study uses a Binary Logistic Regression to test the result. Brand recall is the categorical dependent variable. A set of five emotions: angry, happy, sad, bored and neutral from the self-report and Voice Emotion Response and five emotions: angry, happy, neutral, sad and surprise from the Facial expression serve as the independent variables.

Fort the case of 7-Eleven, the Cox & Snell R Square, and Nagelkerke R Square of the Voice Emotion Response are 0.107 and 0.242 respectively. Additionally, the Cox & Snell R Square, and Nagelkerke R Square of Facial expression are 0.087 and 0.197 respectivelly. Which are all higher than self-reports: 0.077 and 174 respectivelly. Even more, applying self-report, Voice Emotion Response and Facial expression got the highest R Square (the Cox & Snell R Square: 0.132 and Nagelkerke R Square: 0.300). (Table 1).

Fort the case of public welfare, the Cox & Snell R Square, and Nagelkerke R Square of the Voice Emotion Response (the Cox & Snell R Square: 0.157 and Nagelkerke R Square: 0.216), are lower than self-reports (the Cox & Snell R Square: 0.162 and Nagelkerke R Square: 0.223). Nevertheless, the Cox & Snell R Square, and Nagelkerke R Square of the Facial expression (the Cox & Snell R Square: 0.167 and Nagelkerke R Square: 0.230) are all higher than self-reports. Similar to the 7-Eleven, employing self-report, Voice Emotion Response and Facial expression got the highest R Square (the Cox & Snell R Square: 0.255 and Nagelkerke R Square: 0.352). Thus, the Hypothesis 1 is partially supported and the Hypothesis 2 is supported. Hence, generally, it is clear that either Voice Emotion Response or Facial expression can better predict brand recall than self-report. Employing the above three methods has the highest prediction. Thus, hypothesis 3 is supported. (Table 1).

Table 1 Binary logistic regression results summary

Advertising slogans	**Cox & Snell R Square**	**Nagelkerke R Square**
7-Eleven (Self-report)	0.077	0.174
7-Eleven (Voice emotion response)	0.107	0.242
7-Eleven (Facial expression)	0.087	0.197
7-Eleven (Self-report + Voice emotion response + Facial expression)	0.132	0.300
Public welfare (Self-report)	0.162	0.223
Public welfare (Voice emotion response)	0.157	0.216
Public welfare (Facial expression)	0.167	0.230
Public welfare (Self-report + Voice emotion response + Facial expression)	0.255	0.352

7. Conclusions:

Lazarus (1991:58-9) points out that "if the criterion of physiological activity was eliminated from the definition, the concept of emotion would be left without one of the most important response boundaries with which to distinguish it from non-emotion". Self-reported measurements

combined with psychophysiological measures can assist in managing the bias resulting from respondents' characteristics or surrounding disturbances (Wang and Minor, 2008; Wiles and Cornwell, 1990). At the same time, it is accepted that self-report measures of subjective experiences represent the most often used tool in marketing research (Nenycz-Thiel *et al.*, 2013). Consequently, this research combines the benefits of both, employing self-report measures and the Voice Emotion Response measures and facial expression measures in order to enhance marketing effectiveness.

Researchers (e.g., Hazlett and Hazlett, 1999; Chamberlain and Broderick, 2007) indicate that self-report measures evaluating subjective feelings may not always record right emotions, although these emotions may significantly affect individuals' decisions. Consumers generally behave intuitively and emotionally without conscious awareness (Pawle and Cooper, 2006). Given the preliminary nature of this study, the Voice Emotion Response and facial expression recognition can as yet, only recognize five basic emotions, which critically constrains the effort. Further research should involve more emotions or other psychophysiological measures to test the consistency of results with the aim of generating a clear understanding of the construct of emotions.

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