The application of physiological observation methods to emotion research
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Abstract
Purpose - The purpose of this paper is to examine consumer emotions and the social science and observation measures that can be utilised to capture the emotional experiences of consumers. The paper is not setting out to solve the theoretical debate surrounding emotion research, rather to provide an assessment of methodological options available to researchers to aid their investigation into both the structure and content of the consumer emotional experience, acknowledging both the conscious and subconscious elements of that experience.

Design/methodology/approach - A review of a wide range of prior research from the fields of marketing, consumer behaviour, psychology and neuroscience are examined to identify the different observation methods available to marketing researchers in the study of consumer emotion. This review also considers the self report measures available to researchers and identifies the main theoretical debates concerning emotion to provide a comprehensive overview of the issues surrounding the capture of emotional responses in a marketing context and to highlight the benefits that observation methods offer this area of research.

Findings - This paper evaluates three observation methods and four widely used self report measures of emotion used in a marketing context. Whilst it is recognised that marketers have shown preference for the use of self report measures in prior research, mainly due to ease of implementation, it is posited that the benefits of observation methodology and the wealth of data that can be obtained using such methods can compliment prior research. In addition, the use of observation methods cannot only enhance our understanding of the consumer emotion experience but also enable us to collaborate with researchers from other fields in order to make progress in understanding emotion.

Originality/value - This paper brings perspectives and methods together to provide an up to date consideration of emotion research for marketers. In order to generate valuable research in this area there is an identified need for discussion and implementation of the observation techniques available to marketing researchers working in this field. An evaluation of a variety of methods is undertaken as a point to start discussion or consideration of different observation techniques and how they can be utilised.

Keywords Physiological psychology, Consumer behaviour, Research methods

Paper type Research paper
recorded using machines or humans. Observations can be structured or unstructured, be conducted in a natural or controlled setting with either participatory or non-participatory observers (Burns and Bush, 2000; Malhotra, 1999). Owing to many variations in observation techniques available and an abundance of applications, this paper will specifically focus on a discussion of how observation methods can be utilised to advance research concerning the emotional experiences of consumers.

Although used infrequently, observation methods have been utilised in marketing research, for example, to research purchase behaviour (Wells and Lo Sciuto, 1966), parent and children behaviour in stores (Rust, 1993) and the link between in store music and shopping behaviour (Milliman, 1982). Indeed, observation is a useful technique for examining subconscious influences on consumer behaviour and can provide detailed records of individuals’ behaviour “in situations where they do not wish to reveal their behaviour or where they genuinely do not have a ‘conscious’ reason for their behaviour” (Boote and Mathews, 1999, p. 19). It is this recording of the subconscious experience which is useful for emotion research; observation methods can enhance our understanding of this construct by providing us with detailed objective and subjective data regarding the subconscious and conscious emotional experience.

Recent years have seen huge developments in the measurement of emotions, partly due to the technological advances that have given researchers the ability to generate accurate data, for example, using neuroimaging techniques. However, much of this research has been conducted in the fields of psychology and neuroscience and has not yet been widely taken up by social science researchers. This has been acknowledged by both marketers (Lee et al., 2007) and psychologists who have called for a “collaboration among social, cognitive, developmental and neuroscientists” (Cacioppo and Gardner, 1999, p. 192). Such calls for collaboration encompass both the development of theory and methodologies for the study of emotional phenomena. In the field of psychology and neuroscience, machines, for example, magnetoencephalography, functional magnetic resonance imaging and electroencephalography (EEG) are often used to observe the physiological changes associated with brain activity. In addition, machines to measure electrodermal activity (EDA) are used to observe changes in skin conductance. Such techniques among others have been used in the study of emotion in a wide range of contexts, for example, investigating the role of emotions in attention and perception (Niedenthal and Kitayama, 1994); memory (Bradley and Lang, 1995; Cahill et al., 1996); psychological defence (Paulhaus et al., 1997); attitudes and persuasion (Cacioppo et al., 1992); decision making (Forgas, 1995; Schwarz and Clore, 1996); the meaning of interpersonal relationships (Reis and Patrick, 1996); cancer progression speech and facial recognition in computer and robotic software (Murray and Arnott, 1993; Pittam and Scherer, 1993).

In light of the need for collaboration with other research fields to advance consumer behaviour research in the study of emotion we must acknowledge the complexity of the construct itself. This complexity is reflected by many different theories and subsequent debates generated in the field of psychology. A variety of perspectives have been generated by such debates; some researchers conceptualise emotions as categories, some dimensions (bipolar concepts), some presuppose simple structure, some a circumplex, and some a hierarchy (Russell and Barrett, 1999). Laros and Steenkamp (2005) identify that it is not just the structure of emotion that has generated discussion but also the content of emotion. They state that some researchers view emotions as
broad general factors, for example, pleasure and arousal (Russell, 1980), some as positive and negative affect (Watson and Tellegen, 1985). This is further complicated by boundaries and definitions of emotion, which have been described as “blurry” (Russell and Barrett, 1999, p. 805). Given this diversity of perspectives it can be summarised that there is no simple answer to the question “what is an emotion?” It is not our intention to attempt to “solve” this conceptual and theoretical debate; however, in this paper we will consider how to conceptualise emotion in a consumer behaviour context in order to further understand how observation techniques can be implemented to capture emotional experiences.

Emotions are a central component of consumer responses and are generated by a wide variety of advertising cues, store atmospherics, service interactions, the use of specific products and satisfaction evaluations, to name but a few. Indeed, emotions are key influences on the behaviour of both consumers and managers alike (Richins, 1997). Although emotions have been identified as an important part of the consumption experience and responses to advertising, “[i]n comparison to information processing and behavioural decision research we know much less about the role of emotions in marketing behaviour” (Bagozzi et al., 1999, p. 184). Thus, in order to further research in this area it is important to consider the opportunities presented by observation methods to generate detailed information in this complex area. This is not to say, however, that little research has been conducted concerning emotions in a marketing context, to the contrary, for five decades marketing and consumer behaviour researchers have been investigating the influence of emotion in many areas.

Emotion is a key explanatory construct of consumer behaviour which has been approached from a variety of theoretical perspectives, thus generating wide ranging and sometimes contradictory results. Given that prior research is grounded from many disciplines we will provide an overview of theoretical and methodological considerations drawing from the fields of psychology, neuroscience, consumer behaviour and marketing. We aim to examine consumer emotions and the social science and observation measures that can be utilised; we are not setting out to solve the theoretical debate surrounding emotion research, rather to provide as assessment of methodological options available to researchers to aid their investigation into both the structure and content of the consumer emotional experience, acknowledging both the conscious and subconscious elements of that experience. This paper brings perspectives and methods together to provide an up to date consideration of emotion research for marketers and will outline the key issues for consideration and possible directions for future research in the area.

**Conceptualising emotion**

Before we can delve further into the specifics of methodological techniques for capturing emotion we must consider the construct of emotion in order to identify the methodological implications for measuring this construct. There are a variety of definitions of emotion and related constructs. In order to consider emotions in marketing and consumer behaviour contexts it is important to define emotion and distinguish it from other states (Richins, 1997) as there is “little consistency can be found in the terminology related to emotions” (Bagozzi et al., 1999, p. 184). Indeed, the terms affect, mood and emotion have been used inconsistently in prior research.
The definition of emotion, as opposed to affect, mood or feeling, for example, has been widely discussed and several attempts have been made to tighten the construct (Rosenberg, 1998; Russell and Barrett, 1999). Despite the debates regarding the boundary conditions of emotion, however, there is considerable agreement that emotional responses are relatively brief, phasic events that are accompanied by physiological processes, often expressed physically (for example, in gestures, posture, facial features) and may result in specific actions to affirm or cope with the emotion depending on its nature and meaning for the person experiencing the emotion (Bagozzi et al., 1999; Lazarus, 1991; Oately, 1992). Although affect is a term often used interchangeably with emotion we identify with the distinction made by Bagozzi et al. (1999, p. 185) that it can be seen as an “umbrella” for a set of more specific “processes including emotions (and) moods ... Thus, affect might be considered as a general category ... rather than a particular psychological process per se.” This is an important distinction as it distinguishes between emotions and moods whilst acknowledging that these states are not wholly unrelated. Moods are considered to be of longer duration than emotions, lasting from a few hours up to a few days, and have a lower intensity than emotion (Bagozzi et al., 1999). Moods are usually unintentional and global or diffused (Frijda, 1993) whereas emotions are typically intentional, i.e. they have an object or referent.

In light of the distinctions made by the definitions outlined above it is necessary to briefly outline the theoretical debate regarding the conceptualisation of emotions. One psychological perspective is that emotions (for example, happiness, fear, sadness, hostility, guilt, surprise and interest) are discrete entities. That is, emotions are assumed to be unique experiential states that stem from distinct causes and are present from birth (Izard, 1977). The assumption behind this view is that individuals experience emotion because people have internal mechanisms for a small set of reactions (typically happiness, anger, sadness, fear, disgust, and interest) that, once triggered, can be measured objectively. Emotions such as anger, sadness, and fear are treated as entities that researchers can make discoveries about and this assumption shapes the scientific treatment of emotions (Barrett, 2004). For example, it is assumed that an individuals’ fear mechanism must trigger in order for them to feel fear. It is that feeling of fear that subsequently shapes an individuals perception and behaviour. However, this perspective has been criticised on the basis that individuals may experience more than one emotion at the same time. This would suggest that individuals do not meaningfully separate emotions in conscious experience, indeed individuals often report that they experience “mixed emotions”.

In line with this perspective researchers have attempted to identify a set of basic or fundamental emotions, although there is no widespread agreement concerning the number or the nature of basic emotions. Plutchik (1980, p. 138) used an evolutionary perspective to identify eight “primary” emotions consisting of fear, anger, joy, sadness, acceptance, disgust, expectancy and surprise. According to Plutchik (1980) these eight emotions have adaptive significance in the struggle for survival and are identifiable in some form at all levels in the animal kingdom. Similarly, Izard (1977) examined emotions by focussing on the role of facial muscle responses associated with emotion in enhancing survival. Based in part on the identification of emotions that are universally associated with and recognisable in, distinctive facial expressions, the ten fundamental emotions proposed consist of interest, enjoyment, surprise, distress (sadness), anger,
disgust, contempt, fear, shame/shyness, and guilt. Izard’s (1977) Differential Emotions Scale (DES) measures these ten emotions and is available in four forms and according to Richins (1997) the DES II has been used most frequently in consumption emotion research.

Plutchik (1980) and Izard (1977) have argued that other, more complex emotions are the result of mixtures of their “basic” emotions. However, the mechanisms by which love, hate, envy, relief, pride, and other every day emotions can be identified through the use of the DES or Plutchik’s measure have not been well explained. The reliance on basic emotions has been criticised by Ortney and Turner (1990, p. 315) who extensively reviewed the basic emotions literature and concluded that there is “no coherent nontrivial notion of basic emotions as the elementary psychological primitives in terms of which other emotions can be explained”. This calls into question the fundamental validity of measures founded on the notion of basic emotions.

In light of such criticisms we turn to an alternative psychological perspective that has generated much research in recent years. This perspective identifies emotion as a global feeling construct (Shapiro et al., 2002) where distinct emotional states can be described by their position on two fundamental dimensions: arousal and valence. Valence is defined as pleasantness or hedonic value and arousal as bodily activation (Barrett, 1998, p. 579). Within this perspective there is an element of debate. Some researchers emphasise either valence or arousal as basic to the experience of emotion (Lazarus, 1991; Ortony et al., 1988; Thayer, 1978; Zajonc, 1980). Other researchers, however, incorporate both dimensions (Lang, 1994; Reisenzein, 1994; Russell, 1980; Schacter and Singer, 1962). This school of thought proposes that each dimension of arousal and valence may have a different effect on consumer behaviour (Shapiro et al., 2002) and has been widely accepted by many researchers in the field.

Research that has used the dimension perspective has generated interesting results and enables a variety of measurement techniques to be utilized to gather detailed data using both self report and observation measures. For example, language itself and specifically language used to describe emotion can be characterised in terms of valence and arousal (Osgood, 1969; Russell, 1991; Wierzbicka, 1992). In addition, objective measures of arousal and valence include, judgments of facial behaviours (Russell, 2003), autonomic physiology (Cacioppo et al., 2000), and expressive behaviour (Cacioppo and Gardner, 1999). In light of this compelling evidence, we will continue our discussion of the measurement of emotion using the dimensions perspective and therefore focusing on arousal and valence and the methodological implications of this.

**Alternative perspectives of the measurement of emotion**

An assessment of prior research suggests that marketing and consumer behaviour researchers have tended to take an empirical approach to the measurement of emotions but to rely on self report measures, for example, either unipolar or bipolar items on questionnaires. In the typical application, many items cutting across numerous positive and negative emotions are administered to measure reactions to stimuli, and methods such as factor analysis, multi dimensional scaling, or cluster analysis are used to identify the underlying emotional dimensions (Baganz et al., 1999). However, self-report techniques are not the only method by which to capture data concerning valence and arousal. An alternative, observation-based approach, may focus on body posture and gestures, facial expressions, physiological responses (such as electrodermal responses,
heart rate or brain activity), action tendencies and overt actions as equally valid measures of emotional responses. In order to assess the methodological options available to researchers for the measurement of emotion using the dimensions of arousal and valence we must discuss both self report and physiological measures.

Self report measures
In order to capture emotional states or processes it is necessary to directly measure cognitive activities relate to these states or processes. Self report scales of subjective experiences are the most frequently used procedure in this regard. We have identified four widely used measurement instruments of consumer emotion for discussion: standardised emotional profile (SEP) (Holbrook and Batra, 1987); feelings towards ads (Edell and Burke, 1987); consumption emotions set (Richins, 1997); pleasure-arousal-dominance (PAD) dimensions of emotions (Mehrabian and Russell, 1974). These four scales are all used to measure consumers emotional responses and highlight the different approaches taken by researchers (Table I).

Edell and Burke (1987) developed a 52 item “Feelings Towards Ads” scale for measuring emotions towards advertisements and analysed the items in their scale which identified three factors: upbeat feelings, negative feelings and warm feelings. Similarly, Holbrook and Batra (1987) developed a 94 item SEP scale, which was later reduced to 34 items (Batra and Holbrook, 1990). Holbrook and Batra (1987) used factor analysis, but in a slightly different way. Their 94 items were first generated a priori to measure 29 emotional indices. For example, joyful, happy, delighted and pleased were hypothesised to indicate a joy index, and ashamed, embarrassed and humiliated were hypothesised to indicate a shame index. Then, based on factor analyses of the 29 indices, a three factor solution for emotions was found: pleasure, arousal and domination which correspond closely to those discovered by Edell and Burke (1987). Other researchers (Oliver, 1994; Westbrook, 1987), also using factor analysis, have found emotional items to load on two factors: positive affect and negative affect. Most studies incorporating multiple instances of both positive and negative emotions find that the measures load on two factors corresponding to positive and negative emotions (Bagozzi et al., 1998; Oliver, 1994).

Richins (1997) argues that consumption related emotions are more complex than the two and three factor solutions observed in studies of reactions to advertisements or consumer satisfaction. Moreover, because exploratory factor analyses often yield a small number of factors, a multidimensional scaling procedure was employed in conjunction with examination of clusters based on location and semantic similarity of emotional descriptors in two-dimensional spaces. About 16 clusters of emotions were identified, each measured by 2-8 indicators. This study was based on the conceptual work of Clore et al. (1987) and Ortony et al. (1988), where emotion is viewed as a “valenced affective reaction to perceptions of situations” (Richins, 1997, p. 127). This view excludes from the domain of emotions descriptors referring to:

- non-valenced cognitions such as interest and surprise;
- bodily states such as sleepy and droopy; and
- subjective evaluations of people such as self-confident or feeling abandoned.

Based on this view the CES was developed to assess a range of emotions most frequently experienced in consumption situations.
<table>
<thead>
<tr>
<th>Authors</th>
<th>Scale title</th>
<th>Description</th>
<th>Scale dimensions</th>
<th>Number of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holbrook and Batra (1987)</td>
<td>Standardised emotional profile</td>
<td>Emotional responses to print advertisements are comprised of the dimensions of pleasure, arousal and domination. Particularly useful in exploring the effects attributable to nonverbal components of advertising</td>
<td>Pleasure; arousal; domination</td>
<td>27 items</td>
</tr>
<tr>
<td>Edell and Burke (1987)</td>
<td>Feelings towards ads</td>
<td>Feelings toward ads are composed of both positive affective feelings towards a given ad and negative affective feelings towards a given ad</td>
<td>Upbeat feelings; warm feelings; negative feelings</td>
<td>65 items</td>
</tr>
<tr>
<td>Richins (1997)</td>
<td>Consumption emotions set (CES)</td>
<td>Emotion is viewed as a “valenced affective reaction to perceptions of situations” (Richins, 1997, p. 127). This view excludes from the domain of emotions descriptors referring to: non-valenced cognitions such as interest and surprise; bodily states such as sleepy and droopy; and subjective evaluations of people such as self-confident or feeling abandoned. Based on this view the CES was developed to assess a range of emotions most frequently experienced in consumption situations.</td>
<td>Anger; discontent; worry; sadness; fear; shame; envy; loneliness; romantic love; love; peacefulness; contentment; optimism; joy; excitement; surprise; other items</td>
<td>47 items</td>
</tr>
<tr>
<td>Mehrabian and Russell (1974)</td>
<td>Dimensions of emotions (PAD)</td>
<td>Emotional reactions to one's environment can be characterised by three response dimensions of pleasure, arousal and dominance. These dimensions are conceptualised to be relatively independent from one another (Mehrabian and Russell, 1974, pp. 18-20)</td>
<td>Pleasure; arousal; dominance</td>
<td>18 items</td>
</tr>
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Table I. A comparison of self-report emotion measures

[Table I continues with physiological observation methods]
Mehrabian and Russell (1974) developed the PAD scale. This has been used widely by marketing researchers to assess emotional responses to some types of marketing stimuli. The objective of this scale is quite different to that of measures based on emotion theory, both in terms of content and context. With respect to context, the PAD scale was designed not to capture the entire domain of emotional experience but rather to measure emotional responses to environmental stimuli, such as architectural spaces. Although the scale may be suitable to assess consumers’ responses to store environments, for instance, its validity in assessing emotional responses to the interpersonal aspects of shopping and consumption cannot be assumed. A difference in context between the PAD scale and other measures is even greater than the difference in context. The PAD scale does not purport to measure emotions per se, instead it assesses the perceived pleasure, arousal and dominance elicited by a set of environmental stimuli. It contains 18 semantic differential items, six each for pleasure, arousal and dominance. One cannot unequivocally infer the existence of specific emotions states such as joy, anger, guilt or fear from individuals PAD scores. Thus, the PAD is best used when a researcher is interested in measuring the dimensions underlying emotion states and does not need to know the specific emotions being experienced by study participants.

Although the approaches used by marketers to date have been largely empirically driven (Edell and Burke, 1987; Holbrook and Batra, 1987; Oliver, 1994; Richins, 1997; Westbrook, 1987), they are somewhat consistent with leading perspectives on emotions in psychology. For instance, Holbrook and Batra (1987) sought to incorporate wider range of emotional intensity in understanding consumers’ responses to ads and assumed homogenous responses on the part of consumers toward given advertisements. The authors’ findings support the PAD model posited by Mehrabian and Russell (1974) which categorised emotion according to positive or negative valence and level of arousal. Edell and Burke (1987) demonstrated independence of mood and cognition influencing advertising response (as advocated by Zajonc (1980)). The authors demonstrated that feelings and thoughts generated by advertisements are conceptually distinct in explaining advertising effects. This research, however, also demonstrated a variety in emotional responses to stimuli, for instance, what one person finds to be a “warm” advertisement, another finds to be a “cool” advertisement. These findings are contrary to the assumption made by Holbrook and Batra (1987) that consumers have homogenous emotional response to given advertisements, therefore, highlighting the individual differences between consumers’ emotional experiences.

Although the emotions measures described above have proved useful in the contexts for which they were developed, several limitations in their application to the study of consumption – related emotions must be recognised. In addition to limitations associated with each scale, mentioned above, the following considerations limit their usefulness. First, all of the scales ignore some of the emotions that are particularly central in people’s lives. None of the measures grounded in emotions theory assess feelings of love, for instance. Second, most of the measures contain some terms not familiar to many consumers. Words such as “melancholy” “contemptuous” “sheepish” “revulsion” and “brooding” are not part of the everyday vocabulary of most people yet they appear in the scales described above. Some measures are also confusing. The PAD scale uses semantic differential items where the two anchor points are not always clear opposites (e.g. bored and relaxed, cared for and in control) potentially causing...
confusion among respondents. Consumer behaviour researchers have routinely revised or adapted existing emotions measures for use in the consumer context, which suggests that they recognise some of these problems.

Third, the appropriateness of using existing measures to assess emotions elicited in consumption situations is unknown. Emotions are context specific, and the emotions that arise in the context of intimate personal relationships are likely to differ in intensity and quality from the emotions experienced when viewing an advertisement. Consumption emotions may also differ in character from emotions experienced in other contexts; that is, some emotions experienced in the context of interpersonal relationships may rarely be experienced during consumption. In their desire to represent the full range of emotional experience, emotion scholars usually examine many possible experiences, without focusing on any particular one. Whether the measures developed for this larger perspective are efficient and appropriate for the types of emotions experienced in consumption situations has not been systematically investigated.

Finally, it has been argued that self-reports reflect individuals’ beliefs about what they feel as opposed to the contents of “conscious feeling” (Dennett, 1991; Frijda et al., 1995; Ortony et al., 1988). The conclusion drawn by such critics is that valence and arousal are artefacts of the self-report process, and do not directly inform on emotion experience. There is mounting evidence, however, that valence, and to a lesser extent arousal, represent more elemental aspects of a person’s internal state, and are not merely artefacts of language or belief (Barrett and Russell, 1999).

Physiological measures
A number of researchers stress the need for measures of emotion to go beyond self-report measurement (Bagozzi et al., 1999) and state that “autonomic nervous system and other physiological processes” at least accompany subjectively felt emotions (Oatley, 1992, p. 21) and 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 nonemotion (Lazarus, 1991, pp. 58–9).

If indicators of an emotional response are connected by a single, common cause, it should be possible to measure more easily observable aspects of emotion (for example, the facial movements, the vocal expression, in order to learn something about experience (which itself is not observable). Lambie and Marcel (2002) made this argument when they stated that first-order emotional experience could be measured by observing expressive behaviour (following the principle that what an emotion feels like can be determined by how a person behaves). Thus, the more observable aspects of emotion should validate a person’s self-report of their own experience. If there is lack of correspondence between verbal reports and behaviour, then researchers assume that the verbal reports are invalid. Similarly, in an everyday context if a person says he is angry, but moves his face in a way that we easily label as sad, then we will believe him to feel sad. Thus, behaviour outweighs verbal description, particularly as behaviour is perceived to be a result of a causal mechanism (Lambie and Marcel, 2002).

One view presented in the psychology literature upholds that emotional states have specific and unique patterns of changes within the autonomic nervous system.
Although individual studies sometimes report distinct autonomic correlates for different emotion categories (Christie and Friedman, 2004; Ekman et al., 1983; Levenson et al., 1990), meta-analytic summaries generally fail to find distinct patterns of peripheral nervous system responses for each basic discrete emotion (Cacioppo et al., 2000). Studies that have looked at peripheral nervous system responses for conditions of threat and challenge show consistencies between results (Quigley et al., 2002; Tomaka et al., 1993, 1997). Similarly studies that consider positive versus negative affect generate similar results (Cacioppo et al., 2000; Lang et al., 1993). However, these studies do not distinguish between categories of emotion.

Most bodily systems are active during cognitive activities (McGuigan, 1979), consequently marketing and consumer researchers look to physiological functions as indicators of psychological activity which is in accordance with the dimensional approach. Arousal is defined as the level of alertness or activation on a continuum ranging from extreme wakefulness to extreme drowsiness (Duffy, 1962; Humphreys and Revelle, 1984) and is held to be a complex rather than a unitary process which may require multiple physiological measures (Olson and Ray, 1985). The following discussion identifies three prominent physiological measures of arousal.

Early work using measures of pupil dilation focused on physiological changes of the pupils in response to stimuli (Simms, 1967) and the response indicator of valence (Hess and Polt, 1960) as pupils dilate in response to pleasant stimuli and contract in response to unpleasant stimuli. Hensel (1970) used pupil dilation and EDA measures to investigate retention of radio advertisements. The study used EDA readings as a measure of “global nervous excitation” and pupil dilation response as a measure of “active processing of particular information” (Hensel, 1970, p. 125). The results of this study showed support for a positive relationship between the levels of arousal and advertising retention, i.e. high EDA and high pupil dilation is associated with high retention of advertising.

Many social scientists value EDA, generated by placing electrodes on the skin to measure electrical activity in the skin, as a valid measure of physiological arousal (Edelberg, 1972; Kroeber-Riel, 1979). Increases in EDA are easily elicited by threatening stimuli, for example, exposure to an angry face or a loud noise. Thus, this method has particular potential in a marketing context, for example, in the study of fear appeal stimuli and their effects. However, as Critchley (2002) indicates, such responses are also sensitive to the type of stimuli presented. That is to say, if there is motivational significance, for example, potential threat or reward, wins or losses, anticipation and outcome, or a degree of cognitive abstraction, for example, novelty and familiarity, love and hate, memory recall and cognitive work, these factors will influence EDA responses. This is an important consideration for marketing research as there is a level of awareness on the part of the consumer that the stimuli they are exposed to, is designed specifically to generate an emotional response. Thus, any research that uses EDA measures in a marketing context should either measure or control for motivational significance and cognitive abstraction factors. In advertising research, increases in EDA have been related to interests, attention, involvement and attitude change. Such studies assume that physiological arousal of the sweat glands is an indicator of psychological activity. Caffyn (1964) measured EDA to posters, newspapers and television advertisements. By summing the amplitudes of each electrodermal response, a measure of response magnitude was created which was presented as a reliability check.
of the stated emotional reactions of participants. This demonstrates that EDA data can be used in conjunction with self report measures of emotion to provide both a more detailed understanding of the physiological arousal experienced and to identify correlations between the subjective experience of the individual as captured by self report measures and the objective data generated by EDA responses.

Brand recall, attention and emotional responses are examples of criterion measures that have been related to brain hemispheric activity (Klebba, 1985). EEG measures, where electrodes are placed on the skull to measure electrical pulses generated by brain activity, can be used to improve our understanding of consumer information processing and other cognitive processes. Direct measure brainwave studies allow researchers to identify the sequence of brain activity as well as the location of activity within the brain. Cacioppo and Petty (1982) used EEG measures as an indicator of information processing and emotional responses to audio communications in favour or against a topic for which the subject had strong feelings. The authors found that respondents with more right hemispheric activity had more emotional response. Young (2002) explored whether specific moments within ads are primarily responsible for brand development and attention. Memory and information processing have also been of interest, with Rossiter and Silberstein (2001) using EEG to show that certain visual scenes – showing fastest activation in left frontal cortices – are also better recognised. In a study which received substantial attention, McClure et al. (2004) discovered that there was a higher preference for Coca Cola over Pepsi, and increased activity in the areas of the brain associated with emotion when respondents were told they were drinking Coca Cola. However, blind testing suggested no such thing. Such work reinforces the complexity of choice-making, as well as the value of emotional, situational, and informational resources.

Many theorists assume that types of emotion have specific activation points within the brain (Buck, 1999; Damasio, 1999; Dolan, 2002; Ekman, 1992; Izard, 1993; LeDoux, 1996; Panksepp, 1998). Yet, two recent meta-analyses of neuroimaging studies (Murphy et al., 2003; Phan et al., 2002) failed to find consistent evidence for particular neural correlates for anger, sadness, disgust, and happiness (Barrett, 2004). Although there are a number of methodological and theoretical factors that currently limit researchers' ability to draw inferences about the neural brain activity associated with emotional responses, the failure to find neural patterns for distinct emotions is consistent with the behavioural evidence. For example, there is evidence that specific behaviours (for example, freezing) may depend upon specific brainstem and subcortical nuclei (Panksepp, 1998), but there is little evidence to suggest that each behaviour can be associated with any single emotion category. Because we can assign them to one does not make doing so scientifically accurate or useful. So while freezing may be an innate behaviour, and may be part of the general understanding for the category fear, it is not necessarily innately linked to some module of fear responding. This is an important consideration for marketers as the use of objective observation data concerning physiological arousal generated by exposure to stimuli is very useful, in order to generate a deeper understanding of the consumers experience it may be necessary to compliment such methods with self report scales to access both the conscious and subconscious experiences of the consumer.

Several different limitations have been suggested to account for the lack of physiological or behavioural markers for different emotion categories. One argument
suggests that social factors, like display rules (Ekman, 1972; Ekman and Friesen, 1969) or other regulation processes might mask or inhibit responses that would otherwise be correlated. A second argument suggests that scientists do not accurately observe brain activity because response systems differ in their temporal dynamics, sensitivity and reliability of measurement (Bradley and Lang, 2000). A third argument is that laboratory studies of emotion do not employ emotion-eliciting stimuli that are strong enough to produce emotions where responses would be correlated with one another (Tassinary and Cacioppo, 1992). While any of these explanations may be correct, an equally plausible explanation is that scientists have failed to observe stable and reliable response clusters because they are not really there. At this point, enough evidence has accumulated for some theorists to conclude that the lack of coherence within each category of emotion is empirically the rule rather than the exception (Bradley and Lang, 2000; Russell, 2003; Ortney and Turner, 1990; Shweder, 1994).

This discussion has highlighted that although physiological measures of arousal are not without fault, or in need of further investigation, they can, nevertheless, provide marketers with essential data concerning emotional experiences of consumers. We posit that while self report measures of valence and arousal are very useful in the capturing of the conscious emotional experience, leading to a categorisation of emotional responses, they can be complimented by the use of observation methods such as pupil dilation, EDA and EEG. The investigation of correlations between subjective self report measures and objective observation measures can provide valuable insight into the consumers’ emotional experience and aid the advancement of theoretical understanding in this field.

Conclusion and directions for further research
This paper aims to provide insight into the variety of measurement instruments available to capture emotions in a marketing context. It is apparent from the discussion that the physiological responses captured using observation methods responses to marketing stimuli have not been adequately considered by marketers. As we have highlighted, observation methods are not without limitations. However, we posit that the objective measurement of physiological arousal in consumer emotion research is a valuable insight, which can be used to investigate correlations between the conscious reported emotional experience of both valence and arousal and the subconscious physiological arousal experienced by individuals. Such research will generate a deeper understanding of the construct of emotion itself and also the effects of manipulating emotions using marketing tools.

In utilising such methodological approaches, we as marketers cannot only develop our understanding of the specific nuances of the emotional experiences of consumers but also make a contribution to the fields of psychology and neuroscience by researching this area. We can contribute to the theoretical debates surrounding the conceptualisation of emotion by addressing the complexity of the construct and indeed, its application in a marketing context. It is important to note that in order to make such contributions we must employ up to date and rigorous methods to achieve valid, reliable and comparable results.

Research by emotion theorists who have studied specific emotions in clinical settings or other contexts may serve as useful starting points for future investigations. We suggest that there is a significant need to investigate the validation of current
measures of emotions used in a marketing context. We have identified that emotions are a central component of consumer responses and acknowledge the impact that theoretical and methodological advances in this area can have for marketing. Such advances can be used to research the effects of advertising stimuli in online, television, print and radio advertisements; the consumers shopping experience and reactions to store atmospherics or layout; both online and offline service interactions; product satisfaction; consumers reactions and opinions of brands and packaging.

From a marketing perspective we suggest that a further complication arises in the study of emotion. Marketers often place emotional cues in advertisements, package design and brands designed to trigger an emotional response, therefore, some consumers have an element of awareness inherent in their response or appraisal of a stimulus that they are being encouraged to experience emotion. That is not to say that emotions generated by marketing stimuli are different to those examined in psychological research, rather, that it is a suggested consideration for researchers dealing with the complexity of emotions in this context.

While advances in technology have aided observation measurement of emotions and created prolific avenues for research in the field of psychology, this paper has demonstrated that measurement of physiological indicators of emotion have been used on an ad hoc basis to investigate marketing and consumer behaviour research questions for many years. It is important to note that technology is constantly evolving, meaning that better and more objective measurement and observation can currently be utilised in the examination of emotional responses to marketing stimuli and in the consumption experience to contribute to the body of research that has already been conducted in this area.

References


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