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Topic:

Measurement of emotional reactions to television advertisements – A state of the art review

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Abstract

Human emotions and their measurement present a complex and intricate affair which perpetuates an ongoing discourse in marketing research. Since emotions play a pivotal role in the success of advertisements, the exploitation of tools for their precise measurement is crucial to researchers and practitioners alike. Yet, there is no single gold standard instrument existent that enables a comprehensive detection of all emotion facets at once. This thesis therefore focuses on the theoretical conceptualization of emotion, and afterwards presents a variety of measurement methods that address different emotion components. Thereby, particular emphasis is placed on their applicability as regards television commercials.

Table of contents

List of figures

List of tables

List of abbreviations

AAAA	American Association of Advertising Agencies
AC	Alternating Current
Ad	Advertisement
AFA	Automatic Facial Expression Analysis
ARF	Advertising Research Foundation
AU	Action Unit
CERA	Continuous Emotional Response Analysis
DC	Direct Current
DES	Differential Emotion Scale
EDA	Electrodermal Activity
EDL	Electrodermal Level
EDR	Electrodermal Response
EPI	Emotion Profile Index
FACS	Facial Action Coding System
fEMG	Facial ElectroMyoGraphy
fMRI	Functional Magnetic Resonance Imaging
GAQ	Geneva Appraisal Questionnaire
G&R	Gallup and Robinson Inc.
HRT	Heart Rate Turbulence
MEG	MagnetoEncephaloGraphy

mPFC	Medial Prefrontal Cortex
PAD	Pleasure-Arousal-Dominance
PrEmo	Product Emotion Measurement Instrument
SAM	Self Assessment Manikin
SC	Skin Conductance
SEC	Stimulus Evaluation Check
SR	Skin Resistance
TV	Television

1 Introduction: Emotion evocation as a key driver for television advertising success

In the last century, advertising research was dominated by the belief that commercials had to send out a highly *cognitive* message and were predominantly processed in a *conscious* manner (e.g. Micu and Plummer 2007; Haimerl 2007). Hierarchical, linear sequential models of how advertising works, such as AIDA (Attention-Interest-Desire-Action), which was first introduced by Elmo Lewis in 1898 (Lewis 1903), or variations like DAGMAR (Awareness-Comprehension-Conviction-Action) were long used as a vehicle to explain the effect of commercials and are still being applied today, mainly due to the fact that these mental models are attractive in terms of being easy to control, of behaviorist source, and susceptible to measurement (Gordon 2006, 2).

However, the stringent *Think-Feel-Do* order that these theoretical approaches propose is nowadays considered to be flawed by many researchers (e.g. Ambler 1998; Lürssen 2004). Ambler (1998, 501), for instance, states that "first, it [A/N: a model of the described nature] ignores experience, and second, the brain just does not work that way".

Hence, the research of emotion impact in advertising has gained steam since the 1980s, when these traditional concepts of consumer behavior were initially questioned: Zajonc first concluded that emotions must be *precognitive* for three main reasons: First, emotions are unable to be avoided, as "one might be able to control the expression of emotion, but not the experience of it" (1980, 156). Second, emotions occur without verbalization, as "the communication of affect relies (…) on non-verbal channels (…). Yet it is remarkably efficient" (1980, 157). Third, they are hard to measure: "If (…) preferences were nothing more than cognitive representations (…), then the problems of predicting attitudes, decisions, aesthetic judgments, or first impressions would have been solved long ago" (1980, 158).

In accordance with Zajonc, Damasio has demonstrated emotions to be formed in the so-called *proto-self* (sic), while thoughts are shaped in the *core consciousness*. Further, the author proves activity taking place in the proto-self to

precede action in the core consciousness, and hence infers emotions to be of pre-cognitive character (2000, 281; cf. figure 1).

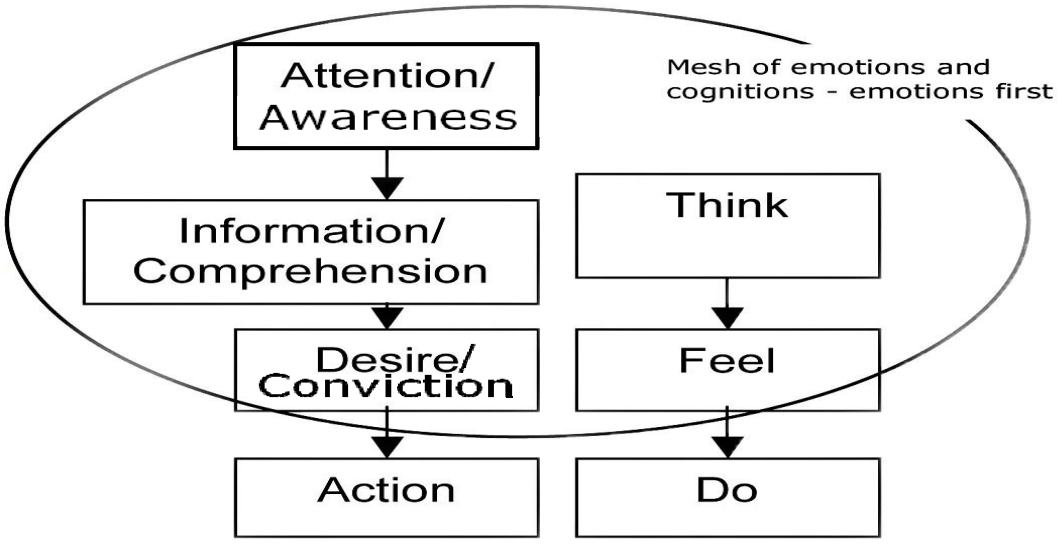


Figure 1: Emotions dominate cognition
Source: Referring to Micu and Plummer (2007), p. 3.

As the role of emotions in advertising has come to the fore and gained in importance, so has the study of their *measurement*. This thesis aims to present a state-of-the-art review of current instruments utilized in emotion measurement, and to assess their applicability and feasibility with particular regard to commercials.

First, an introduction into the definition of the term emotion, its distinction from other affective phenomena, different forms of emergence of emotions, as well as the most prevalent conceptualizations of emotions discussed in academic literature is given. Afterwards, existing measurement methods used to capture various types of emotions are outlined and subsequently evaluated by means of Scherer's component model of emotions, thereby taking into account the distinctive nature of television advertisements. A summarizing conclusion reviewing the presented and discussed measurement instruments rounds this thesis out.

2 The theoretical conceptualization of human emotions as a foundation for emotion measurement

In this section, the focus will be laid on the *theoretical construct* behind the term emotion. As outlined in the introduction chapter, emotions play a pivotal role in

the success of television advertisements. As Egner and Agüeras-Netz (2008, 22) point out, finding a definition of *what* exactly an emotion is, along with *systematizing* the variety of different existing emotions presents a major challenge to their measurement. Up to the present day, though, this has proved to be a rather intricate affair. Fehr's and Russell's (1984, 464) remark that "everyone knows what an emotion is, until asked to give a definition" underscores the difficulty of getting a grip on its underlying meaning.

Kleinginna and Kleinginna, after reviewing a slew of different approaches to emotion understanding, conclude that "emotion is a complex set of interactions among subjective and objective factors, mediated by neural/hormonal systems, which can (a) give rise to affective experiences such as feelings of arousal, pleasure/displeasure; (b) generate cognitive processes such as emotionally relevant perceptual effects, appraisals, labeling processes; (c) activate widespread physiological adjustments to the arousing conditions; and (d) lead to behavior that is often, but not always, expressive, goal-directed, and adaptive" (1981, 355).

Further, Scherer (2005, 699-702) utilizes a so called *design feature approach* in order to differentiate emotion from other affective phenomena and to distinguish between *aesthetic* and *utilitarian* emotions (see table 1). In addition to Kleinginna's and Kleinginna's above-mentioned definition, Scherer thereby most notably points to emotion as being of *high intensity*, *short* in *duration*, *stimulus dependant*, as well as *rapid* in *change*.[1]

Aesthetic emotions are formed through the valuing and admiration of the intrinsic qualities of a piece of music, art, etc., or the personal identification with an enthralling story or the idyllic world related or depicted in a commercial. These kinds of emotion (e.g. being moved, awed, or fascinated by sth.) draw out an ini-

[1] Scherer (2005, 703-706) delineates rafts of terms that are closely related to the construct of emotion, such as *preferences*, *attitudes*, *moods*, or *affect dispositions*. Preferences denote steady reactions to (positive or negative) stimuli and, as a result, may lead to intrinsic appraisals/pleasantness checks, are of low intensity, and do not induce specific action tendencies aimed at satisfying any personal needs. Attitudes are of a long-term nature, do not require any impetus, and also only exert low behavioral influence. Moods represent temporary diffuse affect states that may occur independently of a stimulus or a particular appraisal process; however, despite their intensity level being not very high, moods can last for up to several days (e.g. being gloomy, depressed, or cheerful). Contrary to the rather transient character of moods, affect dispositions represent a general tendency of a person to encounter certain states of mind. For instance, being anxious or irritable can either refer to relatively short-lived moods or, alternatively, to lasting affect dispositions.

tial response to the respective stimulus; hence, aesthetic emotions are of considerable importance as regards the impact of an advertisement, as they help creating a bond between the consumer and the ad, or the brand. However, the elicited physiological reactions that embody aesthetic emotions, such as goose bumps, shivers, or moist eyes, are rather unclear and do not serve any subsequent, action-oriented behavior (Scherer 2005, 706f.).

Design features Type of affect	Event focus	Intrinsic appraisal	Transactional appraisal	Synchronization	Rapidity of change	Behavioral impact	Intensity	Duration
Preferences	VL	VH	M	VL	VL	M	L	M
Attitudes	VL	L	L	VL	L	L	M	H
Moods	L	M	L	L	M	H	M	H
Affect dispositions	VL	L	VL	VL	VL	L	L	VH
Interpersonal stances	H	L	L	L	VH	H	M	M
Aesthetic emotions	H	VH	L	MH	H	L	L–M	L
Utilitarian emotions	VH	M	VH	VH	VH	VH	H	L

Note: VL = very low, L = low, M = medium, H = high, VH = very high.

Table 1: Design feature differentiation of different types of affective phenomena
Source: Scherer (2005), p. 704.

In contrast, *utilitarian* emotions are seen to be of particular benefit in terms of coordinating an individual's organismic subsystems, and to prepare a person to choose their action tendencies in conformity with what is best for their welfare. Examples of utilitarian emotions are anger, joy, disgust, or shame (Scherer 2005, 706; see subchapter 2.1 for a further outline). Emotions that fall into this category are predominantly studied in emotion research, as it is suggested that the behavioral function of utilitarian emotions that leads to an anticipated consumption behavior is superior to any attitudes or thoughts about a brand created by aesthetic emotions (e.g. Allen, Machleit, and Kleine 1992; Erevelles 1998; Hirschman and Holbrook 1982). Hence, utilitarian emotions are the focus object of this thesis.[2]

[2] *Aesthetic* and *utilitarian* emotions are respectively named *direct* and *anticipated* emotions by Haimerl (2007, 19).

A literature review as regards the *emergence* of human emotions reveals the existence of two major trends, which are presented in the following.

2.1 The appraisal theorist's standpoint: Emotion evocation by means of cognition

Appraisal theorists claim emotions to be the result of deeper *cognitive* processes (e.g. Arnold 1960; Frijda, Kuipers, and ter Schure 1989; Lazarus 1982, 1991).[3] According to them, emotions arise through a comparison of (un-)desirable personal objectives and their respective achievements. Hence, whether or not a stimulus event arouses any emotions in an individual, and, if so, what kind of emotions are being stirred (happiness, grief etc.) depends on each person's interpretation of the initial stimulus (Reisenzein 2000, 117). In other words, emotions are the result of their *appraisal* of the preceding impetus (Reisenzein 2000, 124).

Scherer (1987, 5), in accordance with Kleinginna's and Kleinginna's aforementioned description (see page 3), additionally posits emotions to be conducive to organisms in five focal ways: They (1) *assess* any stimuli encountered concerning their pertinence to a person's welfare; moreover, emotions (2) *coordinate* an individual's organismic subsystems for their behavioral action (in some of his later publications, the author entitles this emotional function as *response synchronization* (e.g. Scherer 2000, 2001)). Emotions then (3) *trigger* subsequent, motivationally underpinned action tendencies that are then (4) *expressed* and *communicated*. On top of that, emotions (5) contribute to a person's *observation* of any organismic alterations. Zeitlin and Westwood (1986, 36) have depicted the elicitation of emotions by means of cognitive appraisal as follows (see figure 2):

[3] Therefore, *appraisal* theories of emotion are sometimes denominated as *cognitive* emotional theories (e.g. Meyer, Schützwohl, and Reisenzein 1993).

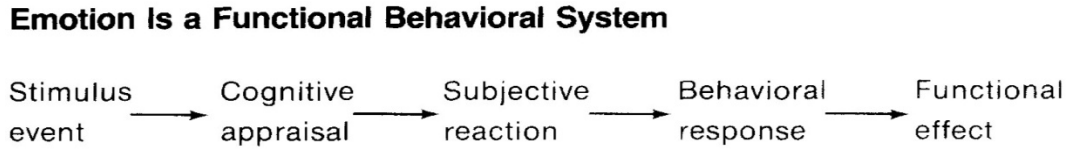


Figure 2: Emotion evocation through cognition
Source: Zeitlin and Westwood (1986), p. 36.

2.2 The theory of biological underpinnings: The autonomic elicitation of emotions

The second school of thought considers emotions to be *innate* (e.g. Zajonc 1980). Hence, as Hoch and Loewenstein (1991, 498) stress, they may "occur with the minimum conscious deliberation characteristic of automatic or mindless behavior", and "with little or no cognition". Several neurophysiological studies (e.g. Bechara et al. 2005; Damasio 1996; LeDoux 1989) emphasize that emotions indeed can precede cognition and thus influence the decision making process *before* any rational thought has been drawn out.

However, further neurological studies (e.g. LeDoux 1996), although revealing that the processing of emotional stimuli is preconscious in nature to a large extent, nevertheless also demonstrate the possibility of a cognitive anticipation and construction of emotions. The following example illustrates how the elicited emotion of *fear* can be the result of either innate, autonomic reaction or higher cognitive appraisal:

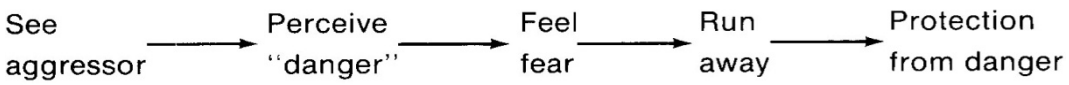


Figure 3: The autonomic evocation of fear
Source: Zeitlin and Westwood (1986), p. 37.

Figure 3 can be applied to describe the innate emergence of fear, for instance after encountering a predator (the aggressor). The immediate perceived danger and subsequent feeling of fear then causes a person to run away (or to undertake any other behavioral action) to rescue themselves from a dangerous situation.

Alternatively, as Poels and Dewitte (2006, 19) outline, fear can also be aroused by means of cognition: After committing a series of major errors (which would represent the stimulus event in figure 2), fear can be elicited in view of the undesirable prospect of losing one's job. On this occasion, however, cognition plays the crucial part in letting the emotion of fear arouse, and eventually leads to corrective behavioral action to prevent the individual from any negative consequences. In both cases, emotions fulfill a *utilitarian* function, as the perceived feeling of fear in either instance serves an individual in the form of escaping from an unpalatable outcome.

As a result, Kroeber-Riel, Weinberg, and Gröppel-Klein (2009, 118f.) summarize that both the appraisal and biological approaches need to be taken into account: Emotions can either occur automatically and outside of conscious awareness (*low-road* processing of emotions), accompanied by respective autonomic (e.g. increasing blood pressure) and behavioral (e.g. becoming petrified) reactions; or, they can be the result of *high-road* cortical processing to the effect that the attainability of an individual's goals are consciously assessed.[4]

Based on the findings of both the biological and appraisal theorists, three different *conceptualizations* of the vast number of existing emotions that have emerged and are prevalently discussed in academic discourse are portrayed hereinafter.

2.3 Lower and higher order emotions as cornerstones on the emotional continuum

According to Poels and Dewitte (2006, 19), the complete range of human emotions can be placed on a so-called *emotional continuum*, depicted in figure 4. On the left hand side, the authors place emotions that occur spontaneously and are outside of the individual's control. These emotions do not require any kind of deeper cognitive appraisal and mainly happen in the pleasure and arousal sphere. Thus, the authors call them *lower-order* emotions.

[4] The *low-road* and *high-road* classification refers to emotional stimuli being transferred either straight to the amygdala, and before any cognitive appraisal has happened or, alternatively, from related sections of the neocortex, after intricate cognition has taken place (Hazlett and Hazlett 1999, 8).

Emotions located at the other extreme of the continuum are elicited only after comprehensive cognitive activity; correspondingly, Poels and Dewitte (2006, 19) characterize them to be of a *higher-order* nature.[5] Ambivalent emotions that, as delineated earlier, can be evoked either automatically or via cognition, are placed by the authors in the in-between section of the continuum.

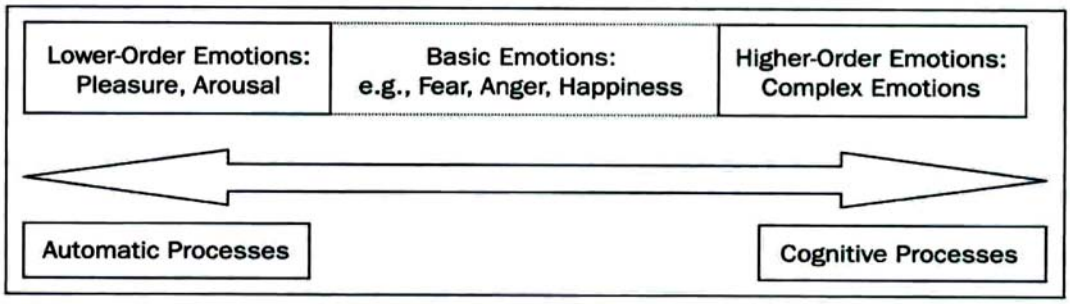


Figure 4: The emotional continuum
Source: Poels and Dewitte (2006), p. 19.

2.4 The three-dimensional Pleasure-Arousal-Dominance (PAD) approach to emotional studies

Another established classification of emotions divides them into three *meta-dimensions* (e.g. Davitz 1969; Lang et al. 1993; Osgood 1957; Russell 1980). According to this approach, which was introduced by Wilhelm Wundt (1905), human emotions can be regarded as compounds being expressed in a three-dimensional way: The *pleasure* dimension is an indicator of the *valence* level of an individual (*positive* or *negative*), the *arousal* dimension describes the extent to which a person is *excited*, and the degree to which this person feels to be *dominated* or *controlled* by the encountered emotion is found in the third dimension. The PAD-approach is of particular importance given that it serves as the foundation for a well-known scale with emotion adjectives, developed by Mehrabian and Russell (1974), and applied in verbal self-report measurement of emotions discussed later on in this thesis.

[5] Synonymously, lower- and higher-order emotional reactions are also named *type 1*- and *type 2*-emotions (e.g. Bellman 2007; Rossiter and Bellman 2005).

2.5 Basic/primary and secondary emotions

The concept of *primary* and *secondary* emotions, as opposed to the previously outlined PAD-approach, is founded on a limited set of basic emotions, with multifaceted secondary emotions being considered a blend of them (e.g. Damasio 2000; Plutchik 1962, 1980). Whereas primary emotions are seen to be universal and either innate or developed in early childhood (in accordance with the biological theorist's stance, e.g. Ekman 1972, 1992; Izard 1971; Plutchik 1991; Tomkins 1962), secondary emotions are the result of more complex thought (in line with the viewpoint of appraisal theorists, e.g. Izard 1999; Plutchik 2003).

A matrix overview outlining the primary components of some secondary emotions is presented in table 2. This table is based on Plutchik's (1980) eight primary emotions (joy, acceptance, fear, surprise, sadness, disgust, anger, and anticipation)[6], placed at the top, and with an assortment of secondary emotions (e.g. cowardliness as a compound of fear and anticipation) listed on the left hand side.

As it is the case with the PAD-approach, many established scales that are utilized in the verbal measurement of emotions have emanated from the idea of the existence of a limited set of basic emotions, such as Plutchik's (1980) *Emotion Profile Index* (EPI), or Izard's (1977) *Differential Emotion Scale* (DES) (referred to in subchapter 4.4 in more detail).

[6] The number of primary emotions varies across different scholars; Izard (e.g. 1971, 1977, 1999) for instance utilizes ten primary emotions (interest, enjoyment, surprise, distress, disgust, anger, shame, fear, guilt, and contempt).

Components of Some Secondary Emotions

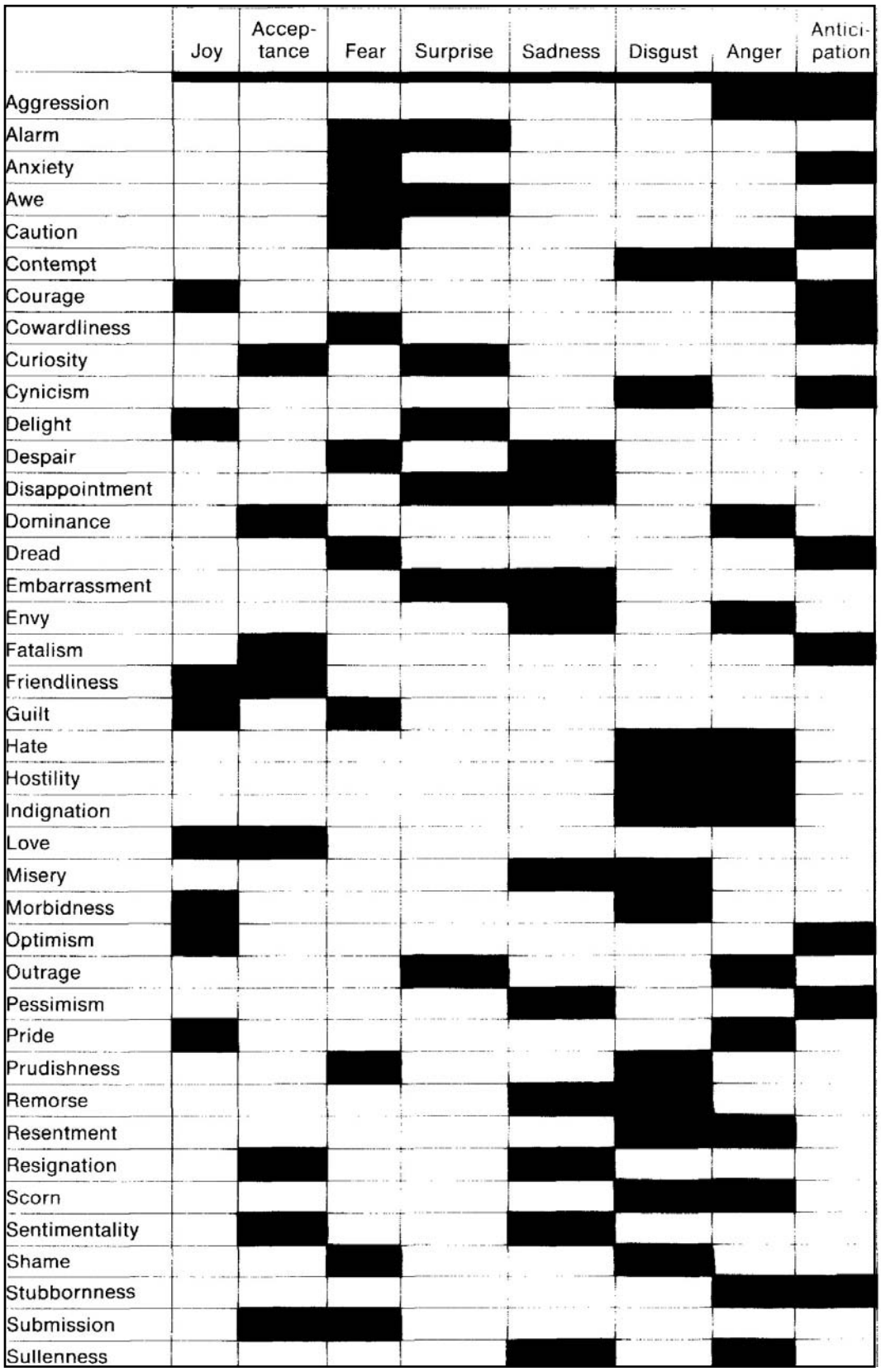


Table 2: Secondary emotions as a mixture of basic/primary emotions

Source: Zeitlin and Westwood (1986), p. 38.

3 Criteria for the emotion measurement of television commercials

So as to analyze the large variety of available emotion measurement tools, this thesis employs Scherer's (e.g. 1984, 2001, 2005) component process model of emotion shown in table 3.

Emotion function	Organismic subsystem and major substrata	Emotion component
Evaluation of objects and events	Information processing (CNS)	Cognitive component (appraisal)
System regulation	Support (CNS, NES, ANS)	Neurophysiological component (bodily symptoms)
Preparation and direction of action	Executive (CNS)	Motivational component (action tendencies)
Communication of reaction and behavioral intention	Action (SNS)	Motor expression component (facial and vocal expression)
Monitoring of internal state and organism–environment interaction	Monitor (CNS)	Subjective feeling component (emotional experience)

Note: CNS = central nervous system; NES = neuro-endocrine system; ANS = autonomic nervous system; SNS = somatic nervous system.

Table 3: Scherer's component process model of emotion
Source: Scherer (2005), p. 698.

As Kroeber-Riel et al. (2009, 120) point out, Scherer's five components of emotion offer a comprehensive outline as regards important *indicators* of emotion measurement. Further, the component process model covers most of the previously discussed theoretical concepts in chapter 2:

The *cognitive component* addresses emotions elicited through conscious appraisal, i.e. higher-order or secondary emotions; the *neurophysiological component* refers to the level of pleasure/valence and arousal of an individual found in the PAD-

approach[7], and also reflects the coordination of organismic subsystems denominated by Scherer (2000, 2001) as response synchronization; the *motivational component* points to the behavioral or action tendencies delineated in Kleinginna's and Kleinginna's definition (d) on page 3 of this thesis, and confirmed by Scherer (e.g. 1987, 2005); the *motor expression component* is also represented in the aforementioned response synchronization, and in addition is a means of expressing and communicating a person's emotional state as given in Scherer's five functions of emotions (4) on page 5. Last but not least, the *subjective feelings/emotional experience component* is again mirrored in Kleinginna's and Kleinginna's above-mentioned definition (a).

Since the measurement of the motivational component only starts coming into play when emotionally driven, concrete behavior can be observed (e.g. Buck 1985; Frijda 1986), this component, although representing an important and differentiating feature as regards distinguishing between utilitarian and aesthetic emotions, as well as separating emotions from other affective phenomena (e.g. Frijda 1986, 1987; Scherer 2005), can be dispensed with when focusing on the measurement of the initial emotional reactions to television advertisements.

An additional *generic* measurement criteria that will be regarded concerning how to capture emotional reactions is the aspect of *intercultural comparability* of measurement instruments, as suggested by Scherer (2005, 709).

A *special* characteristic of television commercials separating them from print advertisements or radio commercials is the one of being of a certain *length*, with its footage combining a *visual* and *audio* component at the same time. For this reason, measurement tools aiming to give consideration to these specific criteria of television ads have to place particular emphasis on Scherer's emotion distinguishing features (*high intensity*, *short duration*, *stimulus dependency*, and *rapidity* of *change*; see page 3 of this thesis).

The nature of the commercial (a sequence of audio and visual stimuli) makes the *continuous* measurement of fast *changing* and *adapting* emotional reactions very

[7] Due to problems determining a third dimension (dominance, control, or potency), it is regularly omitted by emotion theorists (e.g. Haimerl 2007; Poels and Dewitte 2006; Scherer 2005).

important. In consequence, these *distinctive* characteristics, next to the *generic* indicators of emotion measurement, will further be scrutinized when analyzing the strengths and weaknesses of the different respective state-of-the-art instruments available.

4 Exposition of emotion measurement methods and their critical appraisal in terms of the discussed criteria

The most common emotion measurement tools used in advertising research can be clustered into two main groups as regards the *evoked* emotional reactions of the respondents, namely *physiological/autonomic* and *prompted/self-report* instruments (see table 4). This variety of emotion measurement tools applied to capture the different components of human emotions will now be analyzed for each of the outlined components so as to assess their respective added value as regards the emotion measurement of commercials.

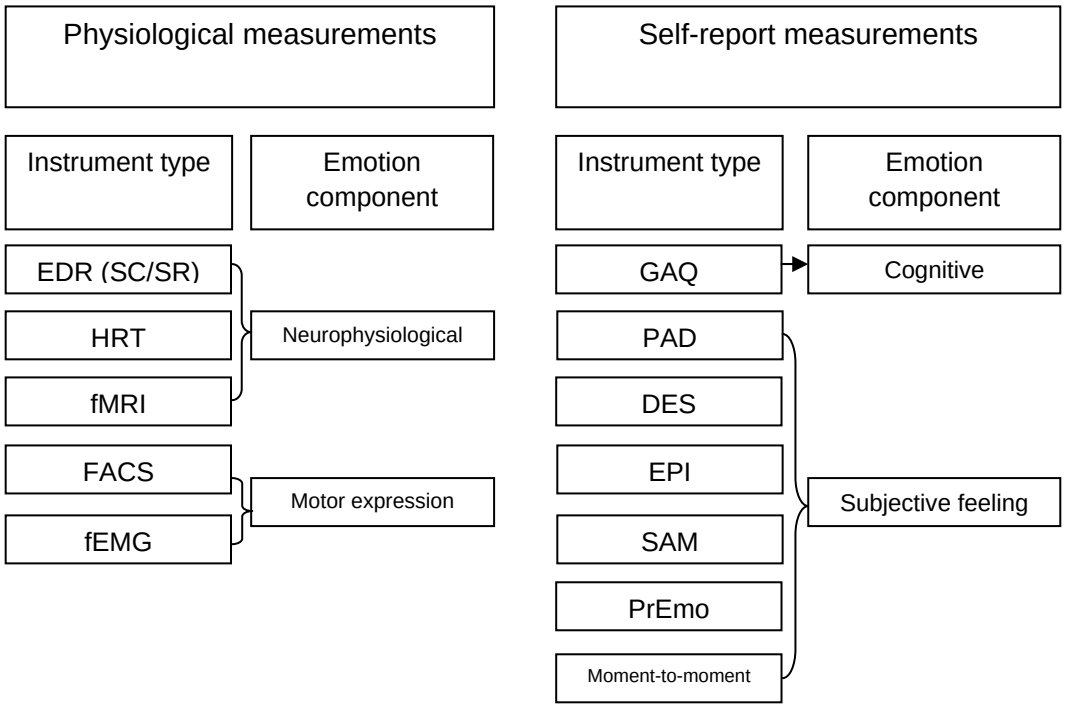


Table 4: Emotion measurement instruments and the emotion components addressed
Source: Author's illustration

4.1 Retrospective measurement of cognitive appraisal

Although all the verbal, visual, and moment-to-moment self-report tools listed in table 4 are susceptible to a so-called *cognitive bias* (e.g. Egner and Agüeras-Netz 2008; Micu and Plummer 2010; Poels and Dewitte 2006), an important instrument focusing on the measurement of the human *appraisal process itself* after being exposed to an advertising stimulus can be found in the Geneva Appraisal Questionnaire (GAQ).

This verbal questionnaire aims at measuring the five essential stimulus evaluation checks (SECs) posited by Scherer that occur during the cognitive processing of an encountered stimulus (for a complete list of SECs see Scherer (2001, 114f. (table 5.4)); for a comprehensive definition of each of the SECs delineated in the following see Scherer (2001, 94-99)):

Novelty check: Any new incoming stimulus (whereby the degree of novelty depends on the familiarity of the impetus, based on past experiences of the individual, and concomitant with its predictability and expectation, along with the suddenness and level of intensity with which the stimulus occurs) is likely to arouse attention in the form of an orientation response.

Intrinsic pleasantness check: As Scherer underscores, intrinsic pleasantness has to be distinguished from the assessment of whether a stimulus event is regarded as pleasant or painful (as the evaluation of the pleasantness or unpleasantness of a stimulus and thus the significance of the stimulus to an organism depends on its motivational state, and hence addresses the third SEC, which eventually determines the behavioral action represented in Scherer's third component (see table 3 on page 11)).

Rather, the check of the level of pleasantness can be seen as an *intrinsic* characteristic of the impetus itself which is independent of a person's preferences or the conduciveness to their personal goals. An example presented by Scherer is the feature of intrinsic pleasantness of chocolate cake, which, on the other hand, may be quite contrary to an individual's personal goal to lose weight, and their respective motivational/behavioral state of trying to avoid any food of high calories.

Goal/need significance check: The appraisal of whether or not a stimulus will be beneficial for the achievement of one's individual goals or the satisfaction of personal needs happens during this SEC, which subsequently either paves or blocks the way for any further goal-directed behavior being expressed in the aforementioned motivational/behavioral component.

Coping determination: The coping determination check can be defined as the setting of feasible options for the reaction to a stimulus event, founded on the outcome of each of the possible stimulus responses and their respective way of affecting the organism. "The net result of the evaluation on this check is the estimated degree of coping potential for the most promising response option available to the individual in this situation" (Scherer 2001, 97). Eventually, coping with a stimulus event can be regarded as being successful if the organism's synchronized subsystems (cf. page 5) can finally be decoupled by the time the initial concern about how to deal with the faced impetus has vanished. This, however, does not necessarily imply that the person has actually achieved its goals. The individual may as well have decided to settle for their current level of satisfaction if the ultimate goal is considered to be beyond reach.

As an example, a woman desperately trying to get slimmer may, after being exposed to a commercial proclaiming the use of a certain dietary product to result in a perfectly shaped body, conclude that this personal goal is likely to be unattainable due to the lack of trust in the advertising message, and hence decide not to bother about bodily imperfections any more.

Normative significance check/compatibility with standards: The objective of this SEC is to take sociocultural norms and values into regard when appraising an emotion-arousing stimulus event. In consequence, such "social desirability constraints" (Poels and Dewitte 2006, 24) lead to the assessment of an impetus in view of its meaning and pertinence to an organism's society as a whole. Thereby, it needs to be distinguished between the compatibility of a stimulus provoking action with an individual's *internal standards* of obligatory conduct, or moral commandments, and the like-mindedness of a person's behavioral tendencies with the demands and *external standards* of their surrounding social organization.

Table 5 provides an overview of the matching of question numbers utilized in the GAQ and the respective SECs they are meant to evaluate. The full questionnaire is attached to this thesis and can be found in appendix 1.

	GAQ Question no.
Stimulus Evaluation Checks	
Novelty	
- Suddenness	6
- Familiarity	8
- Predictability	7
Intrinsic Pleasantness	4, 5
- Goal/Need Importance	9
Goal/Need Significance	
- Cause: Agent	12, 13, 16
- Cause: Motive	14, 17
- Outcome Probability	18, 20, 21
- Discrepancy from expectation	19
- Conduciveness	22, 23
- Urgency	26
Coping Potential	
- Control	25
- Power	27
- Adjustment	28
Compatibility with Standards	
- External	10, 11, 24
- Internal	10, 15

Table 5: Assignment of GAQ-questions to their respective SECs
Source: http://www.affective-sciences.org/system/files/page/2636/GAQ_English.PDF

Through addressing these five key SECs, which are also confirmed by a number of other authors, such as Frijda, Ortony and Clore, Roseman, Smith and Ellsworth, and Solomon (Scherer 1993, 327 (table 1)), and along with

supplemental questions about the *timing* and the *social context* of the emotional experience and the stimulus event, as well as questions on *intensity*, *duration*, and *regulation* of the emotional experience, the GAQ tries to retrospectively seize the result of an individual's complete appraisal process after being exposed to the impetus.

As Haimerl (2007, 21) points out, the GAQ provides a comprehensive, theory-based measurement tool as regards capturing the *appraisal-component* of a person's emotional reaction to a stimulus event. It also takes Scherer's emotion distinguishing attributes (cf. page 3) into account, as it addresses all the *intensity level*, the *duration*, and the *regulation/adaptation* of the emotional experience. On top of that, question 34 of the GAQ addresses both basic and secondary emotions, as well as a possible emotion blend in case two emotions have been experienced at the same time – a concept which is built on the theory of basic and secondary emotions discussed in subchapter 2.5. Most of the emotion adjectives utilized by the GAQ can thereby also be found in table 2.

Since the GAQ belongs to the verbal self-report measurement instruments, its language dependency can be seen as one of the questionnaire's pitfalls when it comes to its applicability and respective comparability of data in intercultural contexts. A slew of researchers in the field of social and behavioral science have been dealing with the semantic differences of emotion terms, or affect labels that have developed in the evolution of different languages over the years (e.g. Levy 1984; Lutz 1988; Russell 1991; Russell et al. 1995; Wierzbicka 1999).

Though, transferring such folk concepts of emotion onto scientific construct definitions of emotion has proved to be challenging: For instance, Scherer (2005, 708) points out that "while dictionary definitions of emotion labels in different languages, as well as thesaurus entries, may be useful, reflecting the learned intuitions of the language experts responsible for the respective entries, this approach is neither sufficiently comprehensive nor consensual enough to be appropriate for scientific profiling of emotion terms."

The author therefore suggests the establishment of so-called semantic grid profiles of emotion: Such semantic grids, according to Scherer, enable a definition of

cross-cultural emotion terms in diverse native languages in the form of their rating regarding archetypical emotion arousal and reaction/response characteristics. As an example, the rating of these characteristics for any emotional label (e.g. being irritated, delighted, desperate etc.) can help defining the respective emotion terms in their native tongue (for a comprehensive description of the development of semantic grid profiles as well as their foundations see Scherer (2005, 707ff.)). An example of a semantic grid profile of the delineated quality is provided in appendix 2.

Although the GAQ is of universal nature and thus can be applied for all sorts of emotion eliciting stimuli, the inclusion of questions concerning the social environment makes the GAQ a very interesting instrument for the measurement of emotions generated by television commercials, given that TV ads are usually embedded in a variety of broadcasts, with some programs more likely to be watched alone (e.g. newscasts), and others are regularly watched in groups (e.g. sports events, movies etc.).

However, as mentioned above, the GAQ is limited to the retrospective measurement of an individual's conscious appraisal process of an emotional stimulus. The next chapter now focuses on methods that are intended for the measurement of real-time, neurophysiological emotional reactions of an organism to an impetus, and hence address Scherer's second component (cf. table 3).

4.2 Real-time measurement of neurophysiological reactions

When encountering an emotion eliciting stimulus, an organism's autonomic nervous system responds to its alterations caused by the incoming stimulus in various different ways that are beyond an individual's control (e.g. Bagozzi 1991; Dawson, Schell, and Filion 2000; Winkielman, Berntson, and Cacioppo 2001). "The basic assumption (…) is that cognitive activity is implemented in the nervous system by means of physiological changes" (Coles, Gratton, and Ghering 1987, 13).

These *neurophysiological* changes, as part of a person's autonomic reactions (which further comprise facial expressions discussed in subchapter 4.3), according to Poels and Dewitte (2006, 24), are "manifestations of lower-order emotional

processes". The most commonly measured neurophysiological symptoms include a person's *electrodermal response* (EDR, either in the form of *skin conductance* (SC) or *skin resistance* (SR)), *heart rate turbulence* (HRT), and brain activity and are presented in the upcoming subchapters.

4.2.1 EDR measurements

Recordings of electrodermal activity (EDA) comprise *exo-* and *endosomatic* measurements, whereas the former method puts either direct (DC) or alternating (AC) external current to the skin in order to determine an individual's skin conductance, or skin resistance respectively; endosomatic measurements, on the other hand, do not apply any external current and are only intended to capture variances arising from the skin itself. Exosomatic measurements applying DC are thereby predominantly utilized, as hereby electrodes have to be attached to a single hand only (left or right, depending on the experimentee's handedness). The EDA parameters obtained on the skin surface can be divided into either the electrodermal level (EDL), which indicates *tonic*, i.e. long-term activity, or the aforementioned (EDR), showing *phasic*, i.e. short-term activity. EDR measurements are generally considered to be the best indicator of a person's reaction to a stimulus (for a full introduction into EDA see Boucsein 2012).

In literature, EDR is often equated with SC (e.g. Micu and Plummer 2007, 2010; Peacock, Purvis, and Hazlett 2011; Poels and Dewitte 2006), although EDR, as mentioned above, can actually be measured either via SC (if voltage is kept constant) or SR (when current remains unchanged) (e.g. Boucsein 2012). However, both SC and SR data are inversely proportional to each other and hence are expressive in the same way, as a high level of SC goes along with a low degree of SR, and vice versa (e.g. Dietz 2006). The term SC is therefore used in the remainder of this thesis.

As SC is positively correlated to an increase in activation of the autonomic nervous system, it can be used in emotion research to indicate an individual's level of arousal, or interest/involvement (e.g. Bolls, Lang, and Potter 2001; Ravaja 2004), and "measures unconscious mental connection and the activation of emotion" (Micu and Plummer 2007, 20). In comparison with verbal self report

measurements, Kroeber-Riel et al. (2009, 73) underscore that the advantage of SC measurements lies in its precision, as even the smallest alterations in the level of arousal can be measured virtually in real-time (with a maximum lag of 1 second), which is of particular importance with regard to the nature of television commercials. Also, as Haimerl (2007, 20) points out, a high level of *intensity* is required in order to measure emotion by means of neurophysiological measurement methods, which is exactly one of the emotion distinguishing features (cf. Scherer's definition on page 3).

Examples of arousal/interest patterns created during the exposure to three automotive commercials are presented in figure 5:

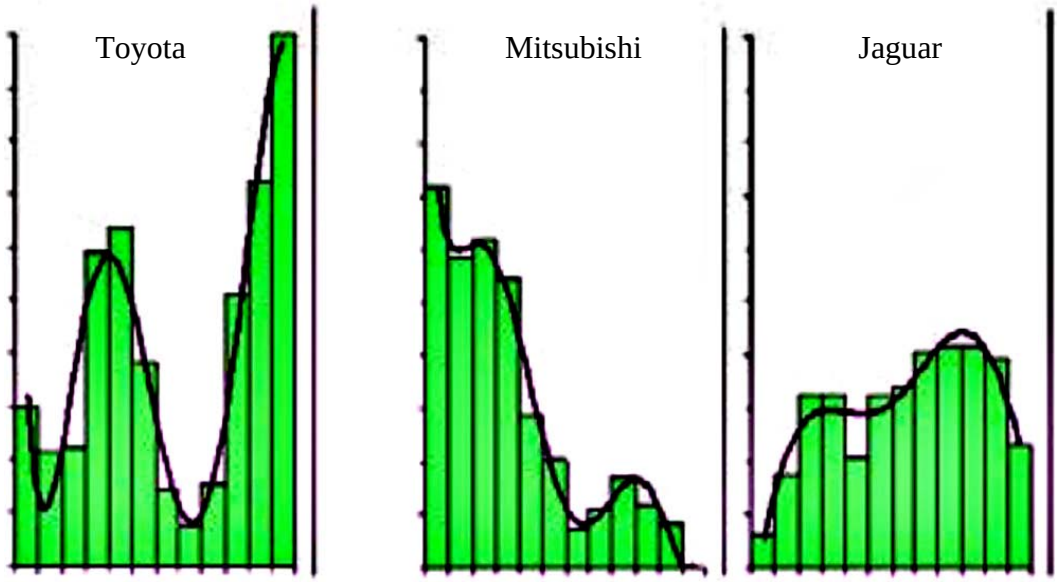


Figure 5: Interest patterns for the automotive TV ads of *Toyota*, *Mitsubishi*, and *Jaguar*
Source: Micu and Plummer (2007), p. 20.

With the three graphs plotting the level of activation intensity on the ordinate versus their respective occurrences on the time axis (abscissa), the importance of measurement *continuity* becomes evident: Whereas the *Toyota* commercial evokes arousal in the form of two distinctive peaks midway and at the end, viewers of the *Mitsubishi* ad are initially treated to a high level of interest, which then abates fairly quickly before eventually being reactivated towards the closing stages. Lastly, the *Jaguar* advertisement aims at moderately building attention over its course before finally waning again.

A further advantage of SC measurements is their *intercultural applicability*, as the problem of ambiguity of emotion adjectives can be circumvented with this non-verbal method. On top of that, modern wireless technology (e.g. the Affectiva Q-Sensor 2.0 (Affectiva 08/12/2012)), as Kroeber-Riel et al. (2009, 73) accentuate, nowadays enables SC measurements to be conducted outside of laboratories and in an individual's natural environment.

However, the measurement of SC, as all neurophysiological measurements, happens to be a rather cumbersome method, as very specific hardware is required for its conductance, which further demands most meticulous calibration and a painstakingly detailed set-up. The measurement and analysis of data needs to be done utterly carefully by proficients, as there is a considerable hazard of not being able to separate the pertinent stimulus from other surrounding noise (e.g. Egner and Agüeras-Netz 2008; Poels and Dewitte 2006).

In addition, SC only gauges a person's level of *arousal*, hence the second emotional dimension of the PAD-approach, but does not address its first dimension, i.e. their state of *pleasure/displeasure* (e.g. Micu and Plummer 2007, 2010; Poels and Dewitte 2006). A neurophysiological indicator capturing both dimensions – heart rate turbulence (HRT) – will be discussed in the next subchapter.

4.2.2 HRT measurements

In addition to an individual's state of arousal, HRT measurements can shed some light on their *valence* level as well. The heart beating speed, measured in the number of milliseconds since the foregoing heart beat (Micu and Plummer 2010, 139), according to a study done by Lang (1990), enables the continuous measurement of an experimentee's attention, arousal, and, at the same time, their valence: While rising attention goes along with a *phasic* slow down of heart rate, intensifying arousal coincides with its *tonic* speeding up.

Moreover, the degree of valence can be estimated as regards the positivity or negativity of a stimulus: Whereas impetuses of both natures in the short term cause an organism's heart rate to decrease, in the long run, positive event stimuli lead to heart rate acceleration, while with their negative counterparts it remains at

a low level (e.g. Cuthbert, Bradley, and Lang 1996; Greenwald, Cook, and Lang 1989; concerning the stimuli of commercials refer to Bolls et al. 2001; Lang 1990).

Nonetheless, as it was the case with SC measurements, the interpretation of HRT data needs to be done very cautiously and can easily be misleading, as various phenomena may occur at the same time that have *contradictory* effects to a person's heart rate development (e.g. Micu and Plummer 2010; Poels and Dewitte 2006). For instance, Poels and Dewitte (2006, 25) point to a thriller, where, during its exposure, tonic heart rate can increase due to a surge of arousal, and, simultaneously, decrease because of negative emotions elicited by it.

Hence, HRT measurements should not be used as a single measurement on their own; however, because of its characteristic of being cheap and easy to apply (heart rate can be registered at the finger with minimum disturbance caused to the experimentee), this method can well be put into operation along with SC measurements to provide additional information about a person's valence state while changes in SC occur (e.g. Hopkins and Fletcher 1994; Lang 1994).

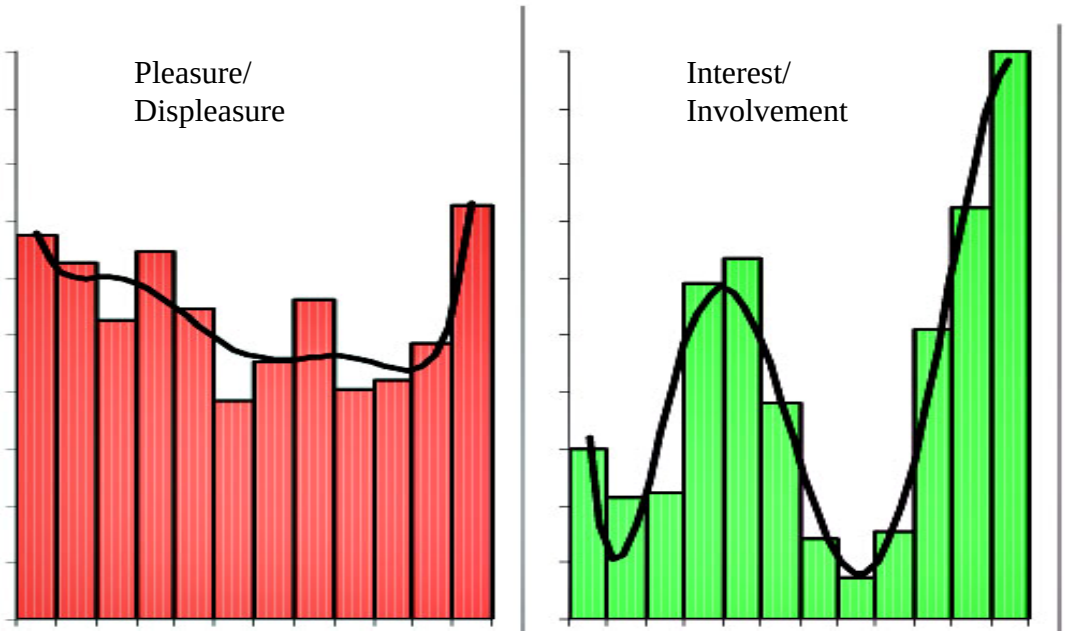


Figure 6: Comparison of pleasure/displeasure and interest/involvement traces for the *Toyota* commercial
Source: http://mrcouncil.org/uploadedarchives/MRC%20-%20Jan_20_06%20Speaker%20presentation-recd%202-10-06.pdf

Figure 6 compares the interest/involvement (arousal) pattern of the *Toyota* commercial depicted in figure 5 with its corresponding visualization of pleasure/displeasure (valence).

4.2.3 Brain imaging

Brain imaging comprises a raft of methods used in medical brain science aimed at identifying brain areas reacting to emotion eliciting stimuli. So as to be able to spot any differences in activation, brain imaging usually employs different kinds of impetuses and then compares the respective reactions of brain parts to them (for a complete introduction refer to Camerer, Loewenstein, and Prelec 2004, 557f.).

FMRI is the most recent measurement technique utilized to tap into an individual's mind (e.g. Camerer et al. 2004; Micu and Plummer 2007). Oxygenated blood is abundantly supplied to activated parts of the brain and, because it has different magnetic features than its deoxygenated counterpart, generates a signal which can be spotted via fMRI (Camerer et al. 2004, 557).

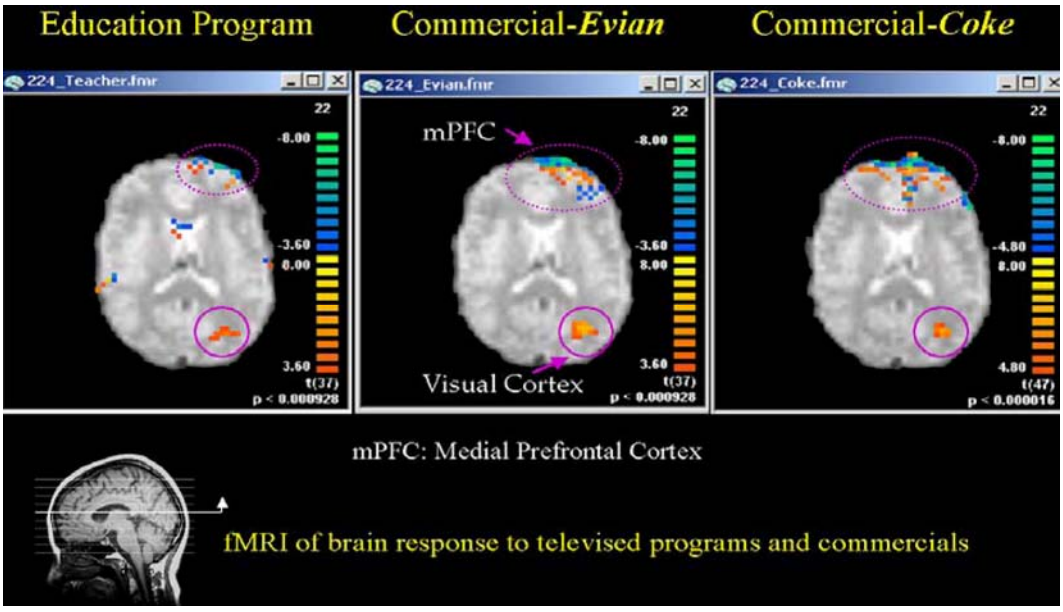


Figure 7: Comparison of brain responses to an ASP educational program and the TV ads of *Evian* and *Coke*
Source: http://mrcouncil.org/uploadedarchives/MRC%20-%20Jan_20_06%20Speaker%20presentation-recd%202-10-06.pdf

An example of an fMRI study conducted by AdSAM Marketing researchers who compared brain responses to a cognitive ASP teaching program on the one hand, and two affective television commercials, *Evian* and *Coke*, on the other hand, is given in figure 7.

While the study findings show a comparable brain activity in the *visual* cortex, there is a noteworthy dissimilarity as regards the activation of the *prefrontal* cortex, the *cortical* area of the brain implicated in emotion evaluation and inhibition: During exposure to both of the commercials, prefrontal cortex activity was much stronger. A previous study done by Ioannides et al. (2000), utilizing *magnetoencephalography* (MEG) to put images of brain activity throughout exposure to cognitive and affective advertising stimuli side by side, had lead to a similar outcome.

To this day, though, studies as regards the processing of emotional stimuli in TV advertisements applying brain imaging methods have been rather scarce. So far, most of them have examined memory processes taking place in the brain (e.g. Rossiter et al. 2001; Rothschild and Hyun 1990; Rothschild et al. 1988; Rothschild et al. 1986), but did not scrutinize happenings in the brain regions responsible for emotional processing. Whether or not brain imaging methods should be employed to a greater extent to study emotional reactions elicited by commercials remains a contentious issue: While market research company Millward Brown's stance, represented by Graham Page (08/14/2012), is that additional insight provided by brain imaging does not justify its extra costs and complexity brought along with it (as, for instance, a rather weak signal quality in fMRI measurements may require repeated sampling and several trials (Camerer et al. 2004, 557f.)), Poels and Dewitte (2006, 31) argue that these new techniques are very promising in view of how advertising works and thus call for their further use in emotion research.

A crucial matter of fact may strengthen the latter point of view: The *prefrontal cortex* (see the aforementioned AdSAM study) is the *central brain lobe* responsible for the *coordination* and *processing* of information from all other major systems of the forebrain and enables an individual to draw on experience so as to behave in an *intelligent* and *goal-directed* way (Miller, Freedman, and

Wallis 2002, 1123). This goal-directed behavior at the same time represents one of the emotion defining characteristics (see Kleinginna's and Kleinginna's definition on page 3).

Hence, at least this part of the brain should be worthy of further probes by means of brain imaging instruments, as, alongside other emotion measurement methods, they could prove to be fruitful as regards establishing causal links between a person's activation *intensity* in the prefrontal cortex and their *behavioral action/response patterns*.

4.3 Real-time measurement of facial expression

The motor expression component of emotion encompasses all aspects of an individual's body language; however, the main focus has been laid on the analysis of their *facial* expression, which is hard-wired/innate and instinctive, and hence occurs reflexively as part of a person's emotional process (Izard 1999, 119). Further, Weinberg (1986, 6) stresses that facial expression in particular serves as a vehicle to communicate different kinds of emotion. Two of the most frequently used methods in emotion research, the facial action coding system (FACS) as well as facial electromyography (fEMG), are presented in the following.

4.3.1 Facial Action Coding System (FACS)

The FACS, which was developed by scholars Paul Ekman and Wallace V. Friesen (e.g. 1976, 1978), is a taxonomy that categorizes an experimentee's apparent facial muscle movements and analyses them through assigning every such movement to a separate action unit (AU). Initially, the FACS incorporated 44 distinguishable AUs (Ekman, Friesen, and Ancoli 1980, 1127), but has been further developed and made more granular over the years and now (as of 2002) embodies a total of 61 AUs (Cohn, Ambadar, and Ekman 2007, 207-210). Any facial expression can be *coded* by means of one or more AUs (e.g. surprise via AUs 1+2+5, or sadness by means of AUs 1+4 (Cohn et al. 2007, 205)). A

complete list of AUs, along with respective example images, is provided in appendix 3.[8]

Although the camera observation and analysis of AUs is a cumbersome process, Kroeber-Riel et al. (2009, 128) point out that the FACS ensures a hidden surveillance of emotions in a non-reactive way, that is unnoticed by the experimentee. In that regard, the FACS distinguishes itself from the facial electromyography (fEMG) delineated in the next subchapter, which, as Cohn and Kanade (2004, 3) stress, requires the positioning of electrodes on a person's face, which naturally tends to inhibit certain facial movements and hence cannot be applied as a measurement means in an individual's natural (social) environment.

In the past, the FACS has repeatedly been criticized for being too imprecise to capture the subtle alterations of the facial muscular system (e.g. Bolls et al. 2001; Hazlett and Hazlett 1999; Ravaja 2004). Further, systems aimed at automatically recognizing single or combined AUs used to solely place emphasis on basic human emotions (e.g. Lien et al. 2000; cf. page 9 for basic emotions), without taking the full range of facial expressions into consideration.

However, recent years have seen the development of a slew of new computer systems, like the Automatic Facial Expression Analysis (AFA), which are not only capable of identifying a larger number of AUs; in addition, they also address real-life conditions, such as ongoing head movements, covered facial parts (e.g. through the wearing of headscarves or spectacles), or lateral postures in order to spot facial expressions during authentic action situations (for a comprehensive introduction into the AFA system see Cohn and Kanade 2004). An overview of the structure of the AFA system is depicted in figure 8.

[8] In addition to the basic study of an AUs presence or absence, their intensity can also be determined by way of five distinctive levels: A (trace), B (slight), C (marked), D (extreme), and E (maximum) (Ekman, Friesen, and Hager 08/13/2012). However, as of now, coding guidelines, particularly concerning the degree of intensity of AUs in the mid-term range, are rather subjective and hence require further refinement in the future to ensure their proper applicability and practicability in emotion research (Cohn et al. 2007, 211).

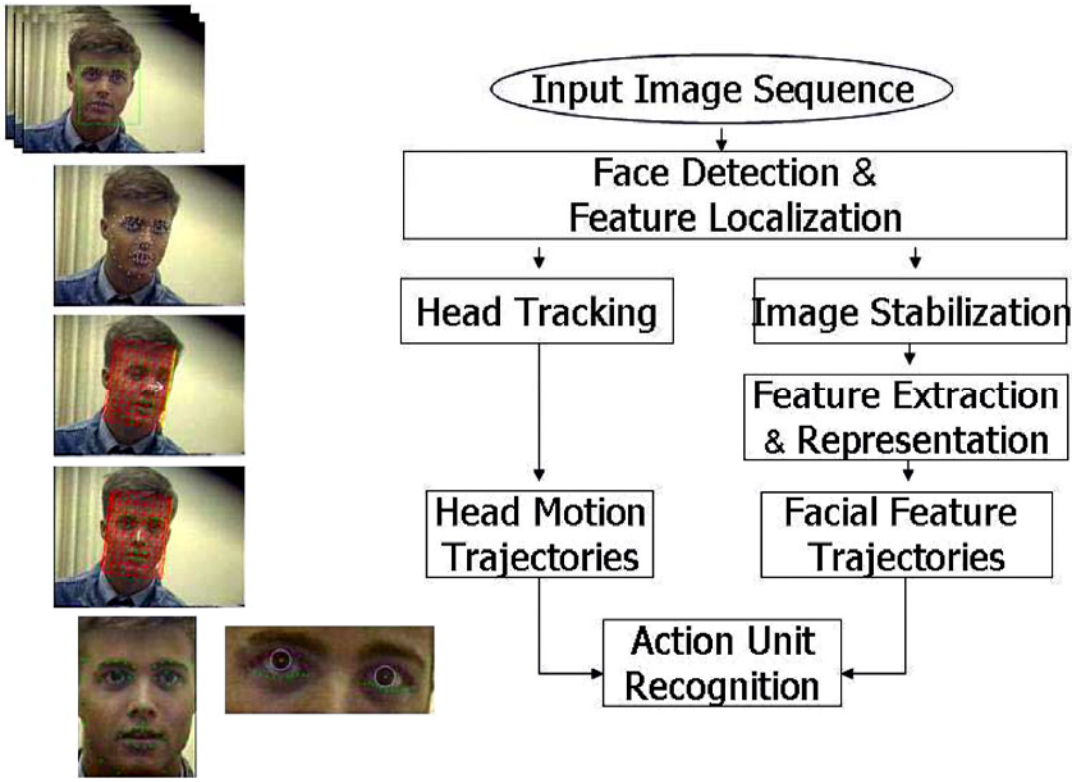


Figure 8: Overall structure of the AFA system
Source: Cohn and Kanade (2004), p. 40.

First, the AFA system is fed with a digitized image sequence, either in the form of a continuous series of image files or a single movie file in which images are packaged; after framing and outlining the region and individual characteristics of the experimentee's face (a process that may require manual adjustments in case of non-frontal pictures), a person's head motion (in the form of a possible bend or twist) is subsequently restored to a standard canonical view. All through the sequence of images, fleeting (e.g. furrows) as well as stable (e.g. brows) facial traits are being traced offline and afterwards are clustered into groups of feature parameters, such as the degree of displacement, velocity, and appearance. Both the head motion and facial feature trajectories are input into a classifier for the eventual detection of AUs. To further ensure that facial expressions are continuously tracked, the AFA system also quantifies the respective timings of facial actions and head movements (Cohn and Kanade 2004, 4f.).

As much as the coding and analysis of facial expressions has improved over the years, though, research has shown that muscle movements can occur without any noticeable alterations in facial expression (e.g. Cacioppo et al. 1986; Gallup and

Robinson 08/12/2012). Facial electromyography (fEMG) is utilized in order to accurately register these subtle muscular activities and will be introduced in the upcoming subchapter.

4.3.2 Facial electromyography (fEMG)

As already outlined before, fEMG makes use of sensors/electrodes which are placed on an individual's face so as to detect positive and negative emotional reactions. The electrodes are thereby positioned on two significant muscles: the *corrugator* muscle, which is situated atop of the nose nearby the eyebrow and involved in frowning, and the *zygomatic* muscle, located around the cheeks, which controls smiling. Activity of the corrugator and zygomatic muscles can hence be related to *negative* and *positive* emotional reaction to a stimulus, respectively (e.g. Gallup and Robinson 08/12/2012; Lang, Greenwald, and Bradley 1993; Micu and Plummer 2007).

Therefore, fEMG can be regarded as a tool to measure both the *arousal* and *valence/intensity* level of an experimentee's emotional reaction. Figure 9 shows the result of such a fEMG measurement conducted by Gallup and Robinson, where muscle activity for both the zygomatic and corrugator muscle was recorded during exposure to Budweiser's *Whassup* commercial.

Despite getting a more accurate read of facial muscle stimulations compared to measurements done by means of the FACS, fEMG suffers not only from its aforementioned limitation of only being applicable in unnatural lab settings; moreover, the electrodes placed on a person's face can make them aware of the fact that their facial expressions are being tracked, and thus may have a distorting impact on the measurement of both muscle movements (e.g. Bolls et al. 2001; Poels and Dewitte 2006).

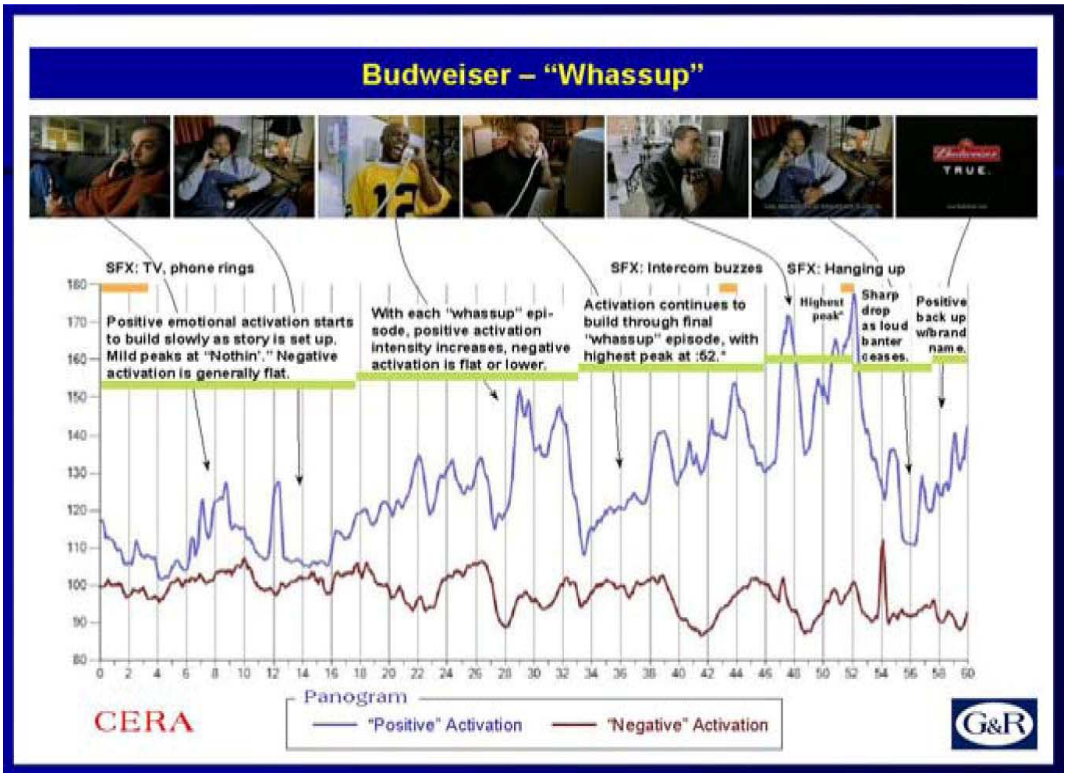


Figure 9: Sample output of a fEMG measurement during exposure to Budweiser's *Whassup* television advertisement
Source: http://www.gallup-robinson.com/reprints/g_r_engagementmeasurement.pdf

In summary, neurophysiological as well as facial expression measurements can be assessed as being a valuable addition to the assortment of emotion measurement tools in terms of being *continuous, real-time* measurement instruments addressing emotional reactions that are *unconsciously* evoked by television advertisements. Also, due to the quality of being *non*-dependent on *language*, these measurement methods are *interculturally applicable*. Nonetheless, apart from the level of intensity/arousal and some general tendencies as regards the positivity/negativity, or pleasure/displeasure, these instruments – barring the FACS – do not provide any revelations concerning distinctive lower and higher order, or basic and secondary emotions (cf. page 9).

As Scherer emphasizes, nonverbal behavior in the form of physiological or facial reactions can be utilized to deduce the emotional state of affairs of an individual; however, with regard to the final emotion component – the subjective feeling/emotional experience (see page 11) – the author further points out that "there is no access other than to ask the individual to report on the nature of the

experience" (2005, 712). These self-report measurements can be conducted by means of either *verbal* or *visual* response formats and are portrayed in the following.

4.4 Verbal, visual, and moment-to-moment measurements of subjective feeling/emotional experience

With all self-report measurements, including the GAQ delineated in subchapter 4.1, the focus is laid on the *introspective* reflection of a person's emotions elicited via a stimulus (e.g. Micu and Plummer 2010; Poels and Dewitte 2006). Whereas the GAQ aims at examining an individual's conscious appraisal process, the subsequently introduced questionnaires are meant to obtain information about a person's experienced emotional feeling, that is "the qualitative nature of the affective state experienced" (Scherer 2005, 712), and are either of verbal or visual nature.

Verbal questionnaires cover a number of standardized verbal rating scales, the most familiar ones being Mehrabian's and Russell's PAD-scale as well as Izard's DES and Plutchik's EPI.

The PAD-scale was developed by Mehrabian and Russell (1974, 18ff.) and is based on the dimensional approach to emotion discussed in subchapter 2.4. Respondents are asked to rate a total of 18 semantic differentials (6 item pairs per dimension) on a scale ranging from -4 to +4. Some scholars, based on an empirical classification, have developed slight modifications of the PAD-dimensions: Holbrook and Batra (1987), for instance, employ a *domination* instead of a *dominance* dimension, whereas Pieters and de Klerk-Warmerdam (1996) make use of a *pleasantness*, *intensity*, and *direction* emotional space. As already outlined (cf. page 12), on some occasions, the dominance dimension is waived entirely, and emotional feelings are then found to be better represented by a two-dimensional, circular structure (e.g. Russell 1983).

The aim of the PAD-scale, as it was the case with neurophysiological and facial expression measurements, is not to find out about *distinctive* emotions felt while being exposed to environmental stimuli, and hence, as Chamberlain and Broderick (2007, 206) conclude, "one cannot unequivocally infer the existence of specific

emotion states such as joy, anger, guilt, or fear from individuals' PAD scores". Rather, the PAD scale is suggested to be applied so as to determine the general undertone/state of feeling (positive/negative) and bodily excitation that the impetus has evoked (e.g. Chamberlain and Broderick 2007; Kroeber-Riel et al. 2009; Scherer 2005).

Discrete emotions are addressed via the use of verbal scales, where the emotional experience is reflected by a set of emotion adjectives which are rated on *nominal*, *ordinal*, or *interval* type of scales. Nominal scales thereby require respondents to check emotion words that best describe their emotional experience; ordinal and interval scales ask a person to indicate how *intensely* a series of given emotional terms was felt. These scales can either be set up individually by researchers, or be of a standardized type, like the aforementioned DES and EPI (e.g. Kroeber-Riel et al. 2009; Scherer 2005).

Izard's DES makes use of 10 basic emotions (cf. footnote 6 on page 9), with each one of them subdivided into three subtler emotion adjectives, which individuals have to rate on a 5-point ordinal scale concerning the extent to which the respective emotion was experienced. Plutchik's EPI was introduced in the Journal of Advertising Research by Zeitlin and Westwood (1986), and operationalized by Holbrook and Westwood (1989). The EPI employs a combination of rating scales: Each of Plutchik's eight basic emotions (see page 9) has to be reflected by means of a 3-point ordinal scale; on top of that, participants have to further assess the respective stimuli via a check list of 16 additional emotion adjectives.

Scherer (2005, 712) summarizes that, while enabling an efficient and standardized collection of data, these verbal scales, with their fixed response alternatives, nonetheless suffer from some major shortcomings: Concerning nominal scales, the predetermination of response alternatives can cause respondents to choose from a set of emotion adjectives they would not have picked otherwise. For instance, an emotion label selected by the researcher may be not be accustomed to a person, who instead would have used another synonym (e.g. jittery as a replacement for anxious). Intensity (ordinal/interval) scales, on the other hand, might prevent an individual from indicating an intensely felt emotional feeling missing out on the questionnaire.

Visual counterparts of the PAD-scale and the DES/EPI can be found in Lang's (e.g. 1980, 1985) and Morris' (1995) *Self Assessment Manikin* (SAM) and Desmet's (2002) *Product Emotion Measurement Instrument* (PrEmo), respectively. The SAM portrays a set of 5, 7, or 9 pictograms each for the *pleasure-*, *arousal-* and *dominance* dimension. An example for the 5-figure version is given underneath (for the 7- and 9-figure variations see Irtel (08/15/2012)).

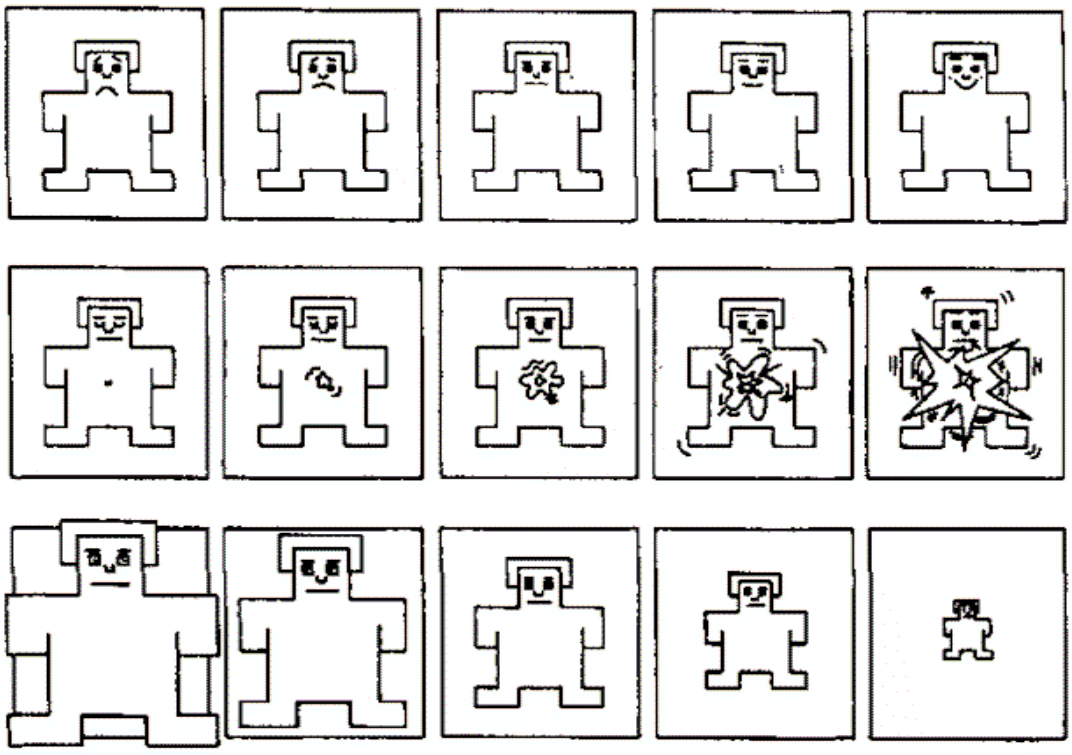


Figure 10: Self Assessment Manikin (SAM)
Source: Morris (1995), p. 64.

A major advantage of the SAM lies in its *in*dependence from *language* and *culture*, and it is therefore a suitable instrument for *cross-cultural* research (e.g. Bradley, Greenwald, and Hamm 1994; Morris, Bradley, and Wei 1994). Further, Morris stresses the SAM to be less time consuming and wearying, and therefore allowing for a raft of stimuli to be examined over the course of a short period of time. Also, the author highlights this measurement instrument to be applicable for children (1995, 65). Nevertheless, as it is a *dimensional* approach, Kroeber-Riel et al. (2009, 122) point to similar limitations of the SAM in comparison with the PAD-scales (cf. page 31).

The PrEmo was initiated by Pieter Desmet (2002). It is a visual measurement tool comprising a total of 14 animations, with seven of them representing *distinctive, pleasant* emotions (desire, pleasant surprise, inspiration, amusement, admiration, satisfaction, and fascination), and the remaining ones standing for their *un*pleasant counterpart (indignation, contempt, disgust, unpleasant surprise, dissatisfaction, disappointment, and boredom). Participants are requested to indicate how strongly they have felt each of the 14 emotions, while the above-mentioned cartoon animations are each played for about 1-2 seconds (for a comprehensive delineation refer to Desmet (e.g. 2002, 08/15/2012)). As Kroeber-Riel et al. (2009, 122) underscore, one of the main benefits of the PrEmo is the traceability of the animated puppets that allows respondents to follow the gradual development of each separate emotion. Figure 11 shows a sample of the *evolution* of the emotions *inspiration* and *disgust* by means of their respective animation sequences.

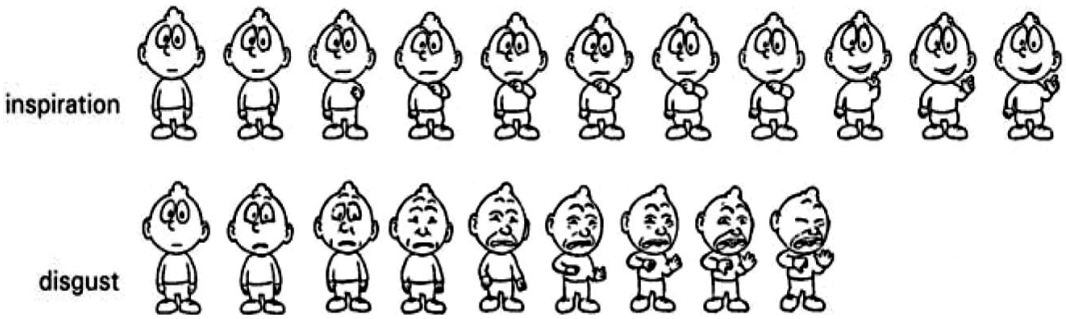


Figure 11: Sample PrEmo animation sequences for emotions *inspiration* and *disgust*
Source: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.104.1400&rep=rep1&type=pdf

PrEmo combines the qualities of the DES and EPI of being able to capture distinctive, concrete emotions with the advantage of being a *non-verbal, cross culturally* applicable tool that is *affordable, user-friendly* and does not ask for any previous technical knowledge (e.g. Desmet 08/15/2012; Morris et al. 2002). One of the main woes of both the verbal DES and EPI scales, as well as the PrEmo, though, is the fact that basic human emotions are consciously and retrospectively reflected, although, as shown at the beginning of this thesis, these primary emotions are oftentimes innate and thus are elicited spontaneously and without

any cognitive processing (cf. the *emotional continuum* on page 8). Moreover, as regards commercials, it is impossible to trace any emotional development over the course of their exposure, as the retrospective nature of all verbal and visual self-report instruments allow only for a *static*, overall review of the felt emotional experience.

Moment-to-moment measurements endeavor to overcome the shortfall of retrospection of the previously discussed instruments. Their principle is to let participants move a device along a *continuum* between opposite poles, or end descriptors, while being exposed to a stimulus. In advertising research, common employed moment-to-moment tools are the *feelings*- and *warmth*-monitor, as well as the online scrolling bar MediaAnalyzer (cf. Baumgartner, Sujan, and Padgett (1997), Aaker, Stayman, and Hagerty (1986), and Egner and Agüeras-Netz (2008) respectively).

These methods can all be utilized to infer a general level of valence from respondents: The feelings- and warmth-monitor each ask a person to judge their experienced degree of either feeling (strong positive to strong negative) or warmth (complete absence to extreme existence), while warmth can be associated with a feeling of *happiness* or *pride* (Aaker et al. 1986, 366). MediaAnalyzer makes use of red and green background colors framing a commercial while being broadcast to inform an individual of their current state of emotion (with the former hue indicating negative and the latter one implying positive emotions (Egner and Agüeras-Netz 2008, 24)).

Poels and Dewitte praise moment-to-moment instruments for their user-friendliness and *versatility*, as the scholars conclude them to be not only practicable for the aforementioned valence determination; based on a study conducted by Rossiter and Thornton (2004), who applied an amended moment-to-moment measurement to track continuous fear-relief shifts in antispeeding TV-advertisements, the researchers also deduce these tools to be feasible for the trace of specific emotions like fear or hope (2006, 23). However, except for the MediaAnalyzer, which can be made available online, moment-to-moment measurements have to be done in *un*natural, laboratory viewing environments (e.g. Baumgartner et al. 1997; Egner and Agüeras-Netz 2008); hence, the recorded

affective emotional responses obtained may be affect traces which “do not reflect subjects’ pure responses to each stimulus section [A/N: of the TV ad] but actually their overall emotional reaction up to that point” (Baumgartner et al. 1997, 231), which, as Micu and Plummer (2010, 140) discern, involves a *cognitive bias*.

5 Conclusion/summarizing remarks

As Scherer (2005, 709) sums it up, a *comprehensive, single gold standard* emotion measurement instrument being able to capture all components of emotion (cf. page 10) is yet to be found and unlikely to become reality in the near future. For the time being, Kroeber-Riel et al. (2009, 132) predict verbal and visual self-report measurements to remain the most prevalent tool employed in emotion measurement. Except for the GAQ, which aims at providing deeper insights into an individual’s cognitive appraisal process – and hence the first of Scherer’s components –, though, these self-report tools only capture the subjective experience/feelings component of emotion.

Neurophysiological and facial expression measurements enable researchers to closely follow the real-time development of human emotions and thus prove to be of particular value as regards the examination of *commercials*. While SC, HRT and fEMG measurements are only able to keep track of a person’s *valence* and *arousal* level, the FACS, albeit being a cumbersome and expensive method that requires painstaking analysis and evaluation of AUs, can be used to examine *distinctive emotions*. Moment-to-moment measurements provide a cheaper and more user-friendly alternative for a continuous emotion measurement, but lack independence from *cognitive bias*.

In *intercultural* contexts, the usage of non-verbal measurements is principally less problematic, as the definition of *cross-cultural* emotion labels (e.g. by means of the discussed semantic grid profile delineated on page 17f.) can be dispensed with.

Appendix

Geneva Appraisal Questionnaire (GAQ)
Assessment of Emotion-Eliciting Events

Version 3.0 – August 2002

Instructions

In this questionnaire, we ask you to recall moments when you experienced an intense emotion, either positive or negative. It could have been something that really happened or that you expected to happen (whether it finally happened or not). The events might have been brought about by you, by someone else, or by natural causes.

Now try to remember some of the strongest emotional experiences that you have had in recent times (for example, during the last year). Of those, please select X episodes that you thought of spontaneously. Try to recall as many details as possible that are pertinent to the chosen emotion episode.

Please respond to the questions on the following pages by placing a check mark in the appropriate space for the respective scale. If a particular question does not make sense in a specific situation, please mark the circle "does not apply". **It is extremely important that you answer all the questions and that you select only one alternative for each question.**

Event X

Please describe the event that produced your emotional experience in a few sentences, mentioning what happened and the consequences this had for you.

_____

_____

_____

_____

Occurrence of the emotional experience

1. **How long ago** did this emotional experience occur?

Some…
hours | days | weeks | months | years ... ago

2. **Where** were you when you experienced this emotion?

- In my own home
- In the home of friends or acquaintances
- At work
- In a public building or in a stranger's home
- On a (motor)bike, in a car, bus, train, or plane
- In the street or another public space
- In a natural setting

3. **Who was present** when you experienced the emotion?

- Nobody, I was alone
- A partner or friend
- Another person (acquaintance or colleague)
- Several friends or acquaintances
- One or more persons unknown to me
- A large crowd

General evaluation of the event

How would you evaluate this type of event **in general**, independent of your specific needs and desires in the situation you reported above? *(**Note:** To allow assessing ambivalent situations, we ask you to respond to both scales.)*

not at all | moderately | extremely | does not apply

4. **pleasant** ○

5. **unpleasant** ○

Characteristics of the event

At the time of experiencing the emotion, did you think that ...

		not at all	moderately	extremely	does not apply
6.	the event happened very **suddenly and abruptly**?				○
7.	you could have **predicted** the occurrence of the event?				○
8.	you were **familiar** with this type of event?				○
9.	the event would have **very important consequences** for you?				○
10.	the actions that produced the event were **morally and ethically acceptable**?				○
11.	the actions that produced the event **violated laws or social norms**?				○

Causation of the event *(Please note that, in many cases, several causes can be involved.)*

At the time of the event, to what extent did you think that one or more of the following factors caused the event?

		not at all	moderately	extremely	does not apply
12.	**chance**, **special circumstances**, or **natural forces**				○
13.	**your own** behavior				○
14.	– If so, did you cause the event **intentionally**?				○
15.	– If so, was your behavior **consistent with the image you have of yourself**?				○
16.	the behavior of **one or more other person(s)**				○
17.	– If so, did (this) these other person(s) cause the event **intentionally**?				○

Consequences of the event

At the time of experiencing the emotion, did you think that the real or potential consequences of the event ...

		not at all	moderately	extremely	does not apply
18.	had already been **felt** by you or were **completely predictable**?				○
19.	had been **expected** to occur at **that** time and in **that** specific form?				○
20.	could be **clearly envisaged** and might occur in the **near future** (with a fairly **high** probability)?				○
21.	were **rather unpredictable** but might occur in the **distant future** (with **uncertain** probability)?				○

Continued...At the time of experiencing the emotion, did you think that real or potential consequences of the event ...

not at all moderately extremely does not apply

22. did or would bring about **positive, desirable outcomes** for you (e.g., helping you to reach a goal, giving pleasure, or terminating an unpleasant situation)?  ○

23. did or would bring about **negative, undesirable outcomes** for you (e.g., preventing you from reaching a goal or satisfying a need, resulting in bodily harm, or producing unpleasant feelings)?  ○

24. were or would be **unjust** or **unfair**?  ○

25. could have been or could still be **avoided** or **modified** by **appropriate human action**?  ○

Reactions with respect to the real or expected consequences

After you had a good idea of what the probable consequences of the event would be, did you think ...

not at all moderately extremely does not apply

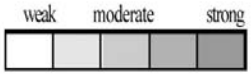
26. that it was **urgent** to act immediately?  ○

27. that you would be able to **avoid the consequences** or **modify** them to **your advantage** (through your own power or helped by others)?  ○

28. that you could **live with,** and **adjust to**, the consequences of the event that could not be avoided or modified?  ○

Intensity and duration of the emotional experience

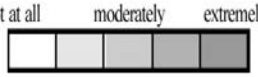
weak moderate strong

29. How **intense** was the feeling that you experienced during the emotional episode described above? 

Several...
seconds minutes hours days weeks

30. How **long** did the emotional experience last? 

not at all moderately extremely

31. To what extent did you try to **reduce the intensity** of your emotional experience and to **shorten its duration**? 

not at all moderately extremely

32. To what extent did you try to **control** or **mask the expression** of your feelings to keep them from being observed by others? 

Verbal description of the emotional experience

33. How would you describe this emotional experience **in your own words**? Please write a word or a short expression in the box provided to the right.

34. Please decide which of the emotion terms listed below **corresponds best** to the emotional experience you reported above. Identify the term that comes closest to what you felt with a check mark. If you experienced an **"emotion blend",** or two different emotions simultaneously, you can check two of the terms. In this case, please identify the stronger of the two emotions with two check marks.

Sadness	
Joy	
Rage	
Anxiety	
Surprise	
Fear	
Irritation	
Shame	
Contempt	
Guilt	
Disgust	
Pleasure	
Despair	
Pride	
None of the emotion terms above corresponds to what I felt during this emotion episode	

Appendix 1: Geneva Appraisal Questionnaire (GAQ)
Source: http://www.affective-sciences.org/system/files/page/2636/GAQ_English.PDF

Representative items for a grid to profile the semantic fields of different affect labels

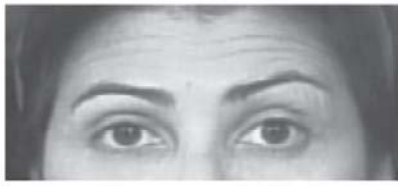
Appraisal of the eliciting event (E)	Physiological symptoms	Motor expression	Action tendencies	Feelings
How suddenly and abruptly did E occur?	Feeling cold shivers (neck, chest)	Smiling	Moving attention towards E	Intensity
How familiar was the person with E?	Weak limbs	Mouth opening	Moving attention away from E	Duration
How probable is the occurrence of E in general?	Getting pale	Mouth closing	Information search	Valence
How pleasant is E in general, independently of the current situation?	Lump in throat	Mouth tensing	Attention self-centered	Arousal
How unpleasant is E in general, independently of the current situation?	Stomach troubles	Frown	Attention directed towards others	Tension
How important/relevant is E to the person's current goals or needs?	Heart beat slowing down	Eyes closing	Physically moving towards E	
How likely is it that E was mostly caused by chance or natural causes?	Heart beat getting faster	Eyes opening	Physically moving away from E	
How likely is it that E was mostly caused by the person's own behavior?	Muscles relaxing, restful (whole body)	Tears		
How likely is it that E was mostly caused by someone else's behavior?	Muscles tensing, trembling (whole body)	Other changes in face		
If E is caused by a behavior, how likely is it that E was caused intentionally?	Breathing slowing down	Voice volume increasing		
Are the potential consequences of E clearly envisaged and may they occur in the near future?	Breathing getting faster	Voice volume decreasing		
	Feeling warm, pleasant (whole body)	Voice trembling		
	Perspiring, moist hands	Voice being assertive		
	Sweating (whole body)	Other changes in voice		
	Feeling hot, puff of heat (cheeks, chest)	Abrupt bodily movements		

How different is E from what the person expected at this moment?	Blushing	Moving towards people or things
How likely will the consequences of E bring positive, desirable outcomes to the person (i.e. helping the person to achieve a goal)?	Sweating	Withdrawing from people or things
How likely will the consequences of E bring negative undesirable outcomes to the person (i.e. preventing the person from achieving a goal)?		Moving against people or things
Did E require the person to react immediately (urgently)?		Other changes in gesture
Would the consequences of E be ineluctable or still be avoidable and modifiable?		Silence
Could the consequences of E still be avoided or modified to the person's advantage (through his/her own power or helped by others)?		Short utterance
Would the person be able to live with, and adjust to, the consequences of E?		Long utterance
How likely is it that E would not be consistent with the person's image of him-herself?		Speech melody change
How likely is it that E violated laws or social norms?		Speech disturbance
		Speech tempo changes

Note: E = event.

Appendix 2: Representative items for a grid to profile the semantic fields of different affect labels

Source: Scherer (2005), pp. 710f.

AU	Description	Facial muscle	Example image
1	Inner Brow Raiser	*Frontalis, pars medialis*	
2	Outer Brow Raiser	*Frontalis, pars lateralis*	
4	Brow Lowerer	*Corrugator supercilii, Depressor supercilii*	
5	Upper Lid Raiser	*Levator palpebrae superioris*	
6	Cheek Raiser	*Orbicularis oculi, pars orbitalis*	
7	Lid Tightener	*Orbicularis oculi, pars palpebralis*	
9	Nose Wrinkler	*Levator labii superioris alaquae nasi*	
10	Upper Lip Raiser	*Levator labii superioris*	
11	Nasolabial Deepener	*Zygomaticus minor*	
12	Lip Corner Puller	*Zygomaticus major*	

AU	Description	Facial muscle	Example image
13	Cheek Puffer	*Levator anguli oris* (a.k.a. *Caninus)*	
14	Dimpler	*Buccinator*	
15	Lip Corner Depressor	*Depressor anguli oris (*a.k.a. *Triangularis)*	
16	Lower Lip Depressor	*Depressor labii inferioris*	
17	Chin Raiser	*Mentalis*	
18	Lip Puckerer	*Incisivii labii superioris* and *Incisivii labii inferioris*	
20	Lip stretcher	*Risorius* with *platysma*	
22	Lip Funneler	*Orbicularis oris*	
23	Lip Tightener	*Orbicularis oris*	
24	Lip Pressor	*Orbicularis oris*	
25	Lips parted	*Depressor labii inferioris* or relaxation of *Mentalis,* or	

AU	Description	Facial muscle	Example image
		Orbicularis oris	
26	Jaw Drop	*Masseter,* relaxed *Temporalis* and *internal Pterygoid*	
27	Mouth Stretch	*Pterygoids, Digastric*	
28	Lip Suck	*Orbicularis oris*	
41	Lid droop	Relaxation of *Levator palpebrae superioris*	
42	Slit	*Orbicularis oculi*	
43	Eyes Closed	Relaxation of *Levator palpebrae superioris; Orbicularis oculi, pars palpebralis*	
44	Squint	*Orbicularis oculi, pars palpebralis*	
45	Blink	Relaxation of *Levator palpebrae superioris; Orbicularis oculi, pars palpebralis*	
46	Wink	Relaxation of *Levator palpebrae superioris; Orbicularis oculi, pars palpebralis*	
51	Head turn left	---	

Appendix 3: AUs employed in the FACS with respective demonstration images
Source: Cohn et al. (2007), pp. 207-210.

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I herewith declare this work to be entirely my own, that I have acknowledged all the sources I have consulted in the assignment itself and not only in the bibliography, that all wording unaccompanied by a reference is my own, and that no part of this assignment has been directly sourced from the internet without providing the necessary recognition.

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Bayreuth, 09/05/2012

Christian Wolterink

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