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The Role of Cultural Differences in Consumer Emotions: Neuroscientific Evidence

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INTRODUCTION

"*Most people believe the mind to be a mirror, more or less accurately reflecting the world outside them, not realizing on the contrary that the mind is itself the principal element of creation."* Rabindranath Tagore

The present research lays its foundations on the fusion between two fields that stayed well distinct until the recent past: neuroscience and economics. From such a contamination disruptive results and innovations are springing up continuously, bringing augmented benefits to both the medical and economic branches and merging into the raise of neuroeconomics. As defined by Zak (2004), neuroeconomics is a transdisciplinary field, which uses neuroscientific technologies and methodologies to identify the neural substrates associated with economic decision making. Within the large umbrella of neuroeconomics, consumer neuroscience and neuromarketing assume dominant relevance to the purpose of our studies, providing with theoretical input and practitioner application of consumer decision making and related processes (Reimann, Schilke, Weber, Neuhaus, and Zaichkowsky, 2011). Observing the phenomenon, a duplex inner drive inspired our research; on the one hand, it seemed favorable to explore a new-born learning opportunity, on the other hand, it appeared appropriate to experience and foster a renovate holistic approach to human knowledge, highlighting how diverse blends and influences are able to enrich and push further the accessible achievements.

As argued by the title of the work "The Role Of Cultural Differences in Consumer Emotions: Neuroscientific Evidence", the research project in question is aimed to investigate and enlighten, through neuroscientific tools and techniques, whether there would be any cultural influence on consumer emotions' perception, with the ultimate purpose to improve marketing communication mediated by a potentiated use of emotional advertising. Anyway, this directly refers to the extreme synthesis of the final goal and output of the project. The long path that we walked through before getting to draw some conclusions could be depicted, for sake of simplicity, as a journey into the consumer mind, enabled and brightened by the new advances made by neuroscience.

Expressly, the latest understandings from neurobiology and cognitive psychophysiology highlighted the mechanisms through which the thought comes to be shaped, basing on a constant two-way flow elaboration between central and peripheral nervous system. As it will be fairly discussed below, human mind, and therefore consumer mind, turned out to be an extremely powerful entity. Traditionally, it has been considered as the centre of elaboration for external information, and the main responsible for the formulation of adaptive responses to environmental inputs. Let us call it a pro-active reader, in the sense that it could read the surrounding reality and shape positive responses accordingly. Instead, it resulted to be a co-writer. That is to say, not only the mind would be able to receive external stimuli and encode their perception, but it would be also able to alter the named perception or even auto-produce its own one, thanks to the activation of largely unconscious and dormant mental models and memory systems, somehow participating to the creating process of what human lastly recognize as reality. It is in the above-mentioned theoretical framework that we set our work, examining specific mental processes in the perspective that they are influential and activated in perception encoding, rather than passive. Indeed, they are *principal elements of creation*.

Once that the premises and the orientation of the research are settled, it is suitable to move to the structure and goals of the project, illustrated step by step below. Before going inside the core of the present achievements, it appeared necessary to offer an overview of the current marketing paradigm, in order to individuate the pillars among which the new disciplines, namely consumer neuroscience and neuromarketing, arose. In Chapter 1, a summarizing review of epochs in marketing literature is provided; special attention has been addressed to the latest one, identified by Vargo and Lusch (2004) as "*Marketing as a social and economic process"*. Its salient traits have been discussed, with a focus on the recent trends of relational and consumer-centered marketing. Laying on the renowned assumption according to which *"value creation is only possible when a good or service is consumed"* (Gummesson, 1998), it became clear as day that the consumer was much more than the target of companies' supply; indeed, he/she was both a fundamental value co-creator and an essential resource.

Marketing function has progressively gone through a redesign course and gained the crucial responsibility for achieving the inseparability between who offer and the consumer, in order to attain the so-called *"balanced centricity"* assessment of the market (Gummesson, 2002). Thus, entering the mind of the consumer became the primary objective, in a renovate perspective: not to convince him/her to buy, but to produce what he/she would be willing to own, shifting from a persuading marketing viewpoint to an encompassing one. In pursuing the named aim, the most influential variable in shaping consumer behavior and building company-consumer relationships appeared to be the need for self and collective identity (C.B. Bhattacharya and Sankar, 2003). The present globalized environment came to be characterized by the increasing raise of global mediascapes and transnational capital flows, together with the exponential growth of market made commodities and desire induced marketing symbols (Eric J. Arnould and Craig J. Thompson, 2005). In such a context, the consumer ended up being surrounded by heterogeneous systems of meanings and overlapping cultural grouping phenomena, facing the need to re-define his/her individual self in relation to a fluid, plural and hybrid reality. This existential goal ultimately resulted to be the inner driver of consumer purchase behavior and decision making processes. In order to understand and re-act consistently to such intimate reasons, marketing research had to evolve. Quantitative methods turned out to be insufficient to the scope, and the qualitative ones had to be improved.

Laying on transdisciplinary contributions (e.g. from psychology, anthropology, sociology), new techniques and approaches have gained a foothold in consumer insight, the most iconic of which could be identified with the Zaltman Metaphor Elicitation Techinque (Zaltman, 1997). It is in the above described framework that neuroscience started to rise up as a priceless source, for its potential to unveil the patterns of human though and behavior through the understanding of the underlying neural activity.In Chapter 2 consumer neuroscience and neuromarketing have been introduced and described in terms of major tools and techniques, together with a literature review of their acknowledged achievements.

Great emphasis has been reserved to the evidence concerning human emotions, since neuroscientific progress brought revolutionary findings on the subject, almost discarding the neoclassical economic theories.

All the models derived from the theoretical construct of the *homo economicus* originally designed by John Stuart Mill, lay on the assumption of rationality. To tell it in other words, humans would be rational economic agents making their choices driven by the will to maximize their utility function, in the attempt to reach for the highest possible value in the market, consistently with their personal rating of benefits and costs. Disclosures coming from advanced studies of the nervous systems revealed that rationality itself, as a defined entity, does not exist. Indeed, cognition comes to work as a comprehensive system relying on the interconnection of all the information travelling across the neural networks, including experiential, emotional, and evocative one.

Specifically, emotions have been the object of a strong revaluation as a crucial determinant in mental processing. After having been portrayed as the traditional counter part of reason, emotion turned out to be its foundation and complement. First of all, neuroimaging studies revealed that deliberative decision making processes primary depend on emotional brain systems (Venkatraman et al., 2009). Moreover, there is wide evidence that emotional stimuli would benefit from increased brain activity in terms of attention, cognition and memory, with respect to other elicitation systems (McGaugh and Benno Roozendal, 2002; LeDoux 1986a, 1986b, Li et al., 1996; Cacioppo, Berntson, Klein, Poehlmann, 1997; Cacioppo, Berntson, Larsen, Poehlmann, Ito, 2000).

Such a privilege finds its reason of being in the neural substrate of emotional processing; precisely, a fundamental role would be played by the activation of adrenal stress hormones, namely glucocorticoids and epinephrine, characterizing the emotional arousal, together with the patterns triggered in the amygdala-hipothalamus complex. Thus, after having analyzed and discussed the evidence supporting the new perspective, we turned our attention to the implications that such discoveries entailed to marketing communication, within a managerial viewpoint.

In virtue of what had been previously highlighted in Chapter 1, concerning the importance of building a relational-consumer focused marketing function, aimed to provide consumers with self and collective defining attributes and design a consumer-company social identity, emotional communication came as a not to be missed opportunity.

Therefore, in Chapter 3 emotions have been deeply analyzed through the lengths of consumer neuroscience literature and findings, in order to bring to light their strengths as a resource in shaping successful marketing strategies. It has to be remarked that the field of study is still in its early stage of life, being in constant development and improvement though leaving many questions to be answered yet.

Our purpose was to contribute to the progress, adding value to the current knowledge about emotional advertising management, with an international viewpoint. Our effort was channeled to outline the settings of actionable emotional communication in a globalized context, taking advantage of consumer neuroscience's techniques. We focused on how cultural variables could affect emotions perception in different target countries, starting from the following observations. From the neuroscientific literature on emotions exposed in our review, it emerges that emotions relay on physiological neural processes that, given their biological basis, result to be universal- therefore transnational- to great extent. It might then go without saying that emotional elicitation would appear to be an extremely powerful means of communication, especially to the marketing of multinational and globalized companies; there would be the opportunity to design effective international campaigns with minimum costs of adaptation. Unfortunately, it is not as obvious as it may sound. Indeed, caution is required while dealing with emotional communications in a transnational context. The cultural filter is turning out to exert a significant influence on emotions processing in human brain, mainly because culture itself is entrenched in the neural substrate of the thought, shaping neural patterns and influencing brain's representations (Berry, 1976; Diamond, 1997; Georgas and Berry, 1995; McElreath et al. 2003; Shinobu Kitayama and Ayse K. Uskul, 2011).

Emotional stimuli, though being biologically absorbed and elaborated, are not said to be equally perceived all around the world; there might be a relevant dependency on cultural features' intervention. For instance, to simple empirical observation, it can be noticed that non-conventional communication, from emotional till shocking advertising, is becoming a major trend in Anglophones countries, whereas is still struggling to gain acceptance in others, such as Italy - we reported the famous case of Oliviero Toscani campaigns as a symbolic example.

We attempted to provide with neuroscientic evidence to explain the above mentioned phenomenon, trying to understand whether such a reluctance in receiving non-conventional messages in Italy could be attributable to socio-political norms' issues, or to a deeper embedded neural-based mental model.
The latest goal of the research was to highlight whether some kind of emotional communication would be ultimately efficient and effective in terms of attention, cognition, and memory, despite the criticism coming from the public opinion because of social acceptability, or the arousal would end up impairing cognitive processing, in virtue of a refusal originated by culturally shaped neural patterns and mental models. In order to achieve our purpose we designed our experiment and implemented it with the fundamental support and cooperation of GTechnology Foundation.

In Chapter 4, the whole experience has been illustrated in methodology, implementation, and results. We tested 36 volunteers with an Italian cultural basis on two target video stimuli:

- "Think! Live with it" video on road safety from the social marketing campaign run in the UK by the Department of Transport.
- "Sulla buona strada" video on road safety from the social marketing campaign run in Italy by *Ministero delle Infrastrutture e dei Trasporti*[1].

We have chosen to focus on social marketing campaigns considering that social marketing itself results to be the field where non-conventional communication has gained more popularity, since its main purpose is fostering a certain behavioral conduct rather than promoting a product/service, therefore implying a greater need for emotional elicitation on order to reach for the audience's engagement.

Moreover, this allowed us to focus on the communicative process, while minimizing biases deriving from brand image or consumer-company relationships that could have arose in using commercials. We tested the reactions of the participants through the Eyetracker and the EEG-Biofeedback as neuroimaging tools. As relevant metrics, we monitored Attention, Focus, Learning, Evocative, Simplicity, Relax, Awareness, Novelty, and Persuasion, during the display of the videos.

[1] It is the correspondent Italian name of the Department of Transports.

Our main hypothesis was to register major anxiety during the UK video; what we wanted to verify was whether such negative emotions provoked an impairment of other mental processing, therefore invalidating the effectiveness of the communication or, conversely, an enhancement particularly in terms of Attention, Learning and Evocative.
At the end of the experiment every subject was asked to fill in a survey, to double check whether their spontaneous declarations about the videos matched the neuroimaging tools' results or there were distorting biases. We reported our results' discussion after having detailed illustrated our experiment.

It might be proper to clarify that our final output has no claim of setting forth any absolute statement. The work has been empirically conducted with the purpose of enriching the growing literature of a young as promising discipline, and testing our theoretical hypothesis through neuroscientific evidence. Such evidence needs to be interpreted in the frame of a broader context and complemented by further findings, before constituting a widely-accepted matter. Nonetheless, we are confident to have brought forward a significant contribution to the actual consumer neuroscience knowledge, in the bright hope to participate to the future progress.

CHAPTER 1

Consumer insight: the new frontiers in consumer analysis enabled by technologies

Understanding the latest consumer-focused paradigm in marketing communication and its instruments of analysis

There are no doubts about the fact that the world is changing and, as a matter of fact, marketing is coming to be revolutionized too. Accordingly to an evolutionary perspective, in marketing historical pattern there can be distinguished different eras, each of which has been characterized by specific frameworks, methodologies and tools that well fitted the socio-environmental features of the times. For the purpose of the research in question, brand new neuroscientific techniques will be discussed and implemented. Before going in depth in analyzing some of the most extreme and breaking news concerning neuromarketing and consumer neuroscience, it is worthy to highlight the pillars of the actual paradigm in range of which the latest perspectives are arising. Therefore, the distinctive and salient traits of the current marketing identity will be discussed in the chapter. A special focus will be driven to the central and dynamic role of the consumer in marketing architechture, to raising value of intangible resources and relationships and ultimately, to the new instruments and theories addressed to deal with a changed environment, such as Consumer Culture Theory and ZMET model.

The new paradigm in Marketing and the Consumer Culture Theory

"The historical marketing management function, based on the microeconomic maximization paradigm, must be critically examined for its relevance to marketing theory and practice" (Webster, 1992). Webster's statement turns to be fairly iconic of the trends in marketing evolution along the past three decades. Marketing has gone through a period of radical changes, modifying its core function, its research tools and methods, together with its ultimate goals and purposes. Vargo and Lusch accurately collected and summarized the authoritative schools of thought that dominated the sequential epochs in marketing literature over time, in order to highlight the cornerstones of each period and provide a deep understanding of the present one. An abstract from Vargo and Lusch' s work is reported below; for brevity and completeness, their framework results to be the one that best fits the needs of the research in question[2]:

1900–1950: Early/Formative Marketing

• Commodities (Copeland, 1923)

• Institutions (Nystrom, 1915; Weld, 1916)

• Functional (Cherington, 1920; Weld, 1917)

1950–1980: Marketing Management

• Business should be customer focused (Drucker, 1954; McKitterick, 1957)

• Value "determined" in marketplace (Levitt, 1960)

• Marketing is a decision-making and problem solving function (Kotler, 1967; McCarthy, 1960)

[2] Lusch, S. L. (2004, January). Evolving to a New Dominant Logic. *Journal of Marketing*, pp. 1-17.

1980–2000 and Forward: Marketing as a Social and Economic Process

• Market orientation (Kohli and Jaworski, 1990; Narver and Slater, 1990)

• Services marketing (Gronroos, 1984; Zeithaml, Parasuraman, and Berry 1985)

• Relationship marketing (Berry 1983; Duncan and Moriarty, 1998; Gummesson, 1994, 2002; Sheth and Parvatiyar, 2000)

• Quality management (Hauser and Clausing, 1988; Parasuraman, Zeithaml, and Berry 1988)

• Value and supply chain management (Normann and Ramirez, 1993; Srivastava, Shervani, and Fahey 1999)

• Resource management (Constantin and Lusch, 1994; Day 1994; Dickson, 1992; Hunt, 2000; Hunt and Morgan, 1995)

• Network analysis (Achrol, 1991; Achrol and Kotler, 1999; Webster, 1992)

The definition itself - Marketing as a Social and Economic Process - addressed to the current era, tells a lot about the features characterizing the function. There is no reference to product nor output, which were the keywords dominating the dawning of the mass market economy. Instead, the term "process" well delivers the ideas of dynamicity and intangibility that have overtaken the global market. First of all, consistently with resource advantage theories (Conner and Prahalad, 1996; Hunt, 2000; Srivastava, Fahey, and Christensen, 2001) and core competency theory (Day, 1994; Prahalad and Hamel, 1990), a shift has been registered from a physical asset-centered economy to an intangible-processes based one. After the experience of the descending parabola of the industrial revolution, it became clear that tangible resources are finite, whereas intangible ones are those which make surviving possible through change and adaptability, when scarcity starts to threaten the environment. This logic began to dominate business disciplines, bringing to light the value of cross-functional, intra-organizational processes, deep-knowledge and peculiar know-how, rather than material plants and assets which, now more than ever, are exposed to constant obsolescence risks due to the high speed of IT advancements.

Such a shift from a discreet logic to a continuous one, is not only applicable to firms' life-cycle, but also to consumer dimension. As highlighted by Gutman, products are "means" to reach "end states" and "valued states of being" (Gutman, 1982); in this perspective, consumers do not buy for the sake of owing items, they do it in order to reach for specific aims, that happen to be ultimately re-comprised in the on-going process of surviving, according to the survival thresholds set by different epochs. The renowned distinction between goods and services slightly disappeared over time, leaving room for a more comprehensive service-focused viewpoint. Goods result to be intermediate passages in a constant value-creating flow of services, directed to let people execute their long-life activities. It might sound obvious to observe that marketing had to follow the pace of changes. It is worthy to discuss some of the main features that characterize the new logic in marketing, according to the relevance they have with respect to the purpose of the research. Considerable significance is attached to the change in consumer perspective and, as a consequence, in consumer analysis. The consumer is no more the target of a pre-constructed value proposition but, according to Constantin and Lusch definition (1994), an *operant resource*: that is to say a pro-active resource able to produce effects and results. It seems agreeable to state that consumers are possibly the most important *operant resource* in the modern services economy (Shugan, 1994), laying on the basic assumption that "if the consumer is the focal point of marketing, value creation is only possible when a good or service is consumed. An unsold good has no value, and a service provider without customers cannot produce anything" (Gummesson, 1998). Firms cannot provide with a value proposition, they can only propose such, but it is consumer's opinion the one that determines whether some value is actually attached. No products come to be realized with their own embedded utility, they are endowed with potential utility that turns into real only if recognized by consumers as a needed service provider or facilitator. Consistently with this framework, consumers are now acknowledged to be fundamental co-creators and co-producers in firms' value chain, since from their needs and wants determine the eventual success of firms' offer arises. The production flow has been redesigned, in order to abandon the old and unsustainable perspective that considered the market as the final destination of the value creating efforts, in favor of a circular dynamic model that starts from the market, lives through the market, and ends in the market.

The new focus is consumer-centered and based on the assumptions of inseparability between who offers and the consumer, and balanced centricity of the market (Gummesson, 2002). Marketing itself has gained a crucial position among the organizational functions and it has been rethought to be consumer-focused and relational. Given the centrality of the consumer, the approach towards him has been transformed, in order to foster and facilitate the execution of his co-creating potential, and relationships became a key tool. Let alone the advantages that come from relationships concerning consumers' fidelity and retention, and consumers' promotion, even singular discrete transactions assume a relational significance. In the perspective that market's functioning lays on exchanges, driven by the individual consumer's perceived benefits from potential exchange partners' offerings, every single success does not stem from transactions themselves, thus from a dynamic mutual exchange of a service perceived as valuable by the parties.

Such a revolutionized approach implies great changes in a two-way communicative flow involving both consumers and firms. On the one side, it is necessary to understand and highlight what kind of attitude the consumers assume towards firms, companies and brands, and which are their expectations and perceptions. On the other side, it is relevant to underline how marketing can provide with a deep insight of consumers' behaviors and needs through consumer research and analysis, given consumers' importance as *operant* value creating resources. The main purpose of the present overview is to outline the latest drivers in marketing research and implementation, consistently with the mutated market paradigm.

On the consumer side, the first thing that might prompt to the attention of any diligent observer, is that consumers themselves seem to be aware of performing an active role that is highly distinct from the simple function of buyers. Indeed, the Consumer Culture Theory (CCT) refers directly to such a phenomenon[3]. The exogenous variables that set the ground for a new theoretical body having as core focus the concept of Consumer Culture, are worthy to be mentioned to clarify the conceptual framework the current research is being developed in.

[3] Thompson, E. J. (2005, March). Consumer Culture Theory (CCT): Twenty Years of Research. *Journal of Consumer Research*, pp. 868-882.

The globalization and the consequent creation of global mediascapes, together with the increasing flows of transnational capital, led to a more heterogeneous system of meanings and to an overlapping cultural grouping.

Simultaneously, the dominance of market made commodities and desire inducing marketing symbols shaped new frontiers for consumers' horizons. The current scenario comes to be characterized by fragmentation, plurality, and hybridization of practices, identities and meanings in consumption tradition, and it has been re-comprised and summarized in the theoretical construct of distributed view of cultural meaning (Hannerz, 1992). The Consumer Culture Theory aims at generating new insights in experiential, social, and cultural dimensions of consumption in context, through the investigation of consumers' personal and collective identities and sociological categories, across which consumers' cultures arise. The main contribution coming from CCT is the analysis of how consumers perceive and rework the meanings embedded in marketing communication, in order to assimilate them consistently with their personal and social circumstances, life style and life goals. The milestone of CCT concerns the process of identity construction and self-representation enacted by consumers in the marketplace. The classical concept of market as a *locus* to meet demand and supply has been largely overtaken by the new transcendent perspective, according to which the market would be a meanings-creating entity where all the actors co-operate, in order to constantly redefine the sense of self and collectivity consistently with the fast-changing external environment (Belk, 1988; McCracken, 1986).

To a managerial point of view, the reconstruction of the market as a source of symbolic meanings causes crucial implications. The firms have to go far beyond the material offer of goods and services, indeed, to align their position to the market dynamics and norms, they have to be able to provide for what consumers are primarily looking for: narratives of identity (Hill and Stamey, 1990; Holt, 2002). This is the starting point for the undisputed need for brand building. The brand recently became the core unit base to achieve for relational bonds with consumers, which are now considered to be the primary source of competitive advantage.

C.B. Bhattacharya and Sankar Sen[4] outlined some of the main conditions that enable companies to enter into committed and meaningful relationships with consumers; the authors identified the laying foundations of their research in social identity (Brewer, 1991; Tajfel and Turner, 1985) and organizational identification theories (Bergami and Bagozzi, 2000; Dutton, Dukerich, and Harquail, 1994; Mael and Ashforth, 1992; Whetten and Godfrey, 1998).

The key assumption is strongly consistent with the discussion conducted above, outlining the deep core of consumers-companies relationships in consumers need for self-definition and identification. What results to be striking relevant is the consumers' seeking process of self-defining attributes in companies' image; the relationships' determinants appear to lay in consumers' perceptions and beliefs about companies' essence, together with companies' related moods and emotions. The authors rate the attractiveness of a company as a self-construction provider, in terms of identity similarity, distinctiveness, prestige, knowledge, coherence, and salience. For brevity reasons and consistency to the purpose of the current research, it is not convenient to analyze the latter factors in details (for further insights see Consumer-Company Identification: A Framework for Understanding Consumers' Relationships with Companies, C.B. Bhattacharya, Sankar Sen, Journal of Marketing, Vol. 67, April 2003); instead, it is worthy to consider them as the spark for the following reflection.

To segment and target the actual and potential consumers, it is no more sufficient to point out their practical/contingent needs and wants; it is required to understand their existential necessities in order to provide with a solid position they would fill in. To engage and retain, it is no more possible to relay on appealing campaigns and promotions; since the consumer makes his choices not only as a buyer, but in the first place as a person, a deeper match should be built, working on a shared value system.

To achieve for long-term sustainability, it became fundamental to propose an acknowledged, similar, distinctive, prestigious, coherent and salient image, which might be able to satisfy self-continuity and self-enhancement needs, resisting to a world that is coming to be characterized by fluidity and fragmentation. The challenge is growing everyday harder, but it is clear as day that both questions and answers can be found in consumers.

[4] C.B. Bhattacharya, S. S. (2003, April). Consumer-Company Identification: A Framework for Understanding Consumers' Relationships with Companies. *Journal of Marketing*, pp. 76-88.

In companies' perspective, the main goal for achieving survival and eventual success results to be reaching for the deepest knowledge of their consumers, and progressively engaging in effective communication to enter their minds and stay.
The marketing function happens to be the greatest responsible in accomplishing such a task. It will be discussed below how marketing instruments and approaches have been changing, in order to fulfill the assignments and follow the pace of times.

Latest methodologies in Consumer Insight

Marketing has been going through deep changes both in purpose and strategies; in order to best fit the mutated environment and the innovative aims, it had to come across the re-design of its main resource: marketing research. In fact, it is through marketing research and consumer insight that it is possible to seek out for valuable propositions in consumer mind, and build companies' strategy and communication accordingly. Variations in scientific procedures, techniques, validity, and reliability thresholds set the ground for innovations in research methodologies; however, these are not the only variables that exert an influence on research activity. Actually, what most should shape research itself, it is the phenomenon object of study; that is to say, the thought and behavior of consumers. As argued by Gerald Zalman in one of his breaking through works[5], "*improving statistical and mathematical tools, field and laboratory experimental designs, survey designs, sampling techniques, and research reporting techniques, when they neglect the nature of human thought and behavior, leaves researchers overly prominent in the research process. Researchers must engage managers and customers more actively in the research undertaking by enabling them to represent fully their thinking. This requires using knowledge about cognitive and others processes to improve how managers and customers are studied*".
Great part of research history has been based on quantitative analysis, consistently with the neoclassical economic framework. In a context dominated by the assumptions of rationality and utility maximization in order to reach for first -and eventually- second best, it was agreeable to attribute major relevance on quantitative statistics and metrics.

[5] Zaltman, G. (1997, November). Rethinking Market Research: Putting People Back In. *Journal of Marketing Research*, pp. 424-437.

Quantitative results, given their characteristics of measurability, universality and objectivity, appeared to be reliable, actionable and understandable, therefore constituting a strong reference point in most of the aspects of the managerial reality.
Furthermore, with the arrival of big data enabled by the unstoppable progress of IT, quantitative research gained more and more significance and authority. Such approach ultimately ended up in lacking completeness and accuracy, in relation to the changed environment presented in the previous paragraph.
This does not mean that quantitative analysis instruments have been deprived of their relevance; instead, it became evident that they had to be complemented with qualitative research, in order to improve the substantiality of the information.
As far as consumer insight is concerned, quality methods got a strong foothold in the past decades, demonstrating their capability to go beyond the surface and reveal in depth aspects of consumer preferences and behavior. Among the several qualitative tools in research disposal, it is worthy to mention the most renowned and classical ones, such that an overview of the qualitative approach can be clearly available. The Kelly Repertory Grid[6] represents a well-known model for various interview techniques. It was first presented in 1955 by psychologist George Kelly, relaying on his Theory of Personal Constructs. The principal aim of the Grid is to elicit and bring to light the internal representations that people use to interpret the environment around them and inform their decision making process. The whole technique is strongly linked to the belief that humans forge peculiar constructs starting from their personal experience, and use them to read and predict the reality. Each system of constructs has a bipolar dimension, since everything comes to be defined by its contrary (Marsden and Littler, 1998). The Grid is built such that it has all the elements, defined as the objects of analysis, listed horizontally, and all the constructs listed vertically. In practice, the constructs are the dimensions that are supposed to be attributed to the elements under analysis; they are bipolar, so that any element can be associated to different shades of a given construct, going from an opposite pole to the other. In the middle of the Grid, the linkages can be found; the linkages are the ways in which each element is described in term of a construct (in simple grids, they take the form of a tick or cross, and they are usually ratings, e.g. from 1 to 5).

6 Fay Fransella, R. B. (2004). *A Manual for Repertory Grid Technique.* Chichester: Wiley & Sons.

On a large scale, it is common practice to have constructs provided by the interviewers; it is the case of most of on-line surveys characterizing on-web research. However, to ensure a higher significance of the results and to be consistent with the original structure and purpose of the Kelly Repertory Grid, it would be appropriate to elicit constructs from the interviewee. During the elicitation of interviewees' constructs, it is common to conduct triading as well. The triading is a further tool, based on compare and contrast method: interviewees are asked to expose similarities and differences between three elements randomly chosen, in order to extract new and deeper information from the bipolar comparison of juxtaposed objects. Additionally, another popular technique is known as laddering. The laddering consists of an interview where a seemingly simple response to a question is pushed by the interviewer in order to find subconscious motives (e.g. "Why x?", "Because z", "Why z?", etc.). The laddering is used in marketing with the objective to unveil the entrenched, ultimate values that underlie consumption and consumer purchase behavior.

Noticeably, the above mentioned examples may make it clear that qualitative research is addressed to accomplish the task of highlighting in depth aspects of thought and behavior that might be still unknown to consumers themselves. This assignment appears to be of extreme importance, especially in the light of the early discoveries concerning the mechanisms of human thought. Such advances, with all the related consequences, have been brightly drawn and summed up by Zaltman, to whom goes the credit of having set up an improved and renovated qualitative framework, aimed at taking the most of consumers' mind, by *"putting people back in"*. His model, known as Zaltman Metaphor Elicitation Technique (ZMET), together with the theoretical premises that laid the foundations for his work, will be introduced below, in virtue of its significance as a starting point for the following discussion on consumer neuroscience, which happens to be the real core of the present research. The ZMET springs up from the recent theoretical ground concerning brain functioning and human mental processing, lately uncovered by neuroscience progress. Such progress will be discussed in details in the following chapters, with the provision of specific examples about the early discoveries enabled by the new instruments and methods; for the moment, a general overview of the actual knowledge about human thought is offered, with the purpose of understanding the implications and consequences on marketing research.

The present overview relays on the nine premises around which Zaltman forged his research method, and they are highly worthy to be mentioned for their clarity and precision.

Table 1

Premises	References	Highlights	Implications
Thought Is Image Based, Not Word Based	Kosslyn et al. 1990; Kosslyn and Koeing 1992; Damasio 1994; Kosslyn 1994;	Conceptual capabilities develop before speech. The human thought comes from topographically organized neural representations that take form in the sensory cortex.	Imagic activity, both visual and nonvisual sensory based, should be monitored in order to have more complete representations of thought.
Most Communicatio n Is Nonverbal	Weiser 1988; Howe 1991; Patterson 1991; Marks 1978	Approximately 80% of human meaning is shared nonverbally (including haptics, vocalics, proexemics, chronemics, oculesics).	It is crucial to integrate verbocentric methologies with techniques able to accommodate the tacit nonverbal processing.
Metaphor Is Central To Thought	Lakoff and Johnson 1980; Johnson 1987; Gibbs 1992; Allbritton 1995; Honeck 1996	Metaphors express the capability to experience one thing in terms of another. They reflect the conceptualizations ruling the long-term memory. They are the basic unit of attentional and perceptual processes, creation of thought and imagination.	The analysis of metaphors can elicit the production of implicit information, even when it was not in the communicator intention. It provides with augmented knowledge with respect to literal meanings.
Metaphors Are Important in Eliciting Hidden Knowledge	Shlain 1991; Glucksberg 1995; Kopp 1995; Burgess and Chiarello 1996	Metaphors are able to surface hidden knowledge and make uncouscious experiences progressively more communicable	It is useful to develop skilled questioning able to unveil the hidden knowledge behind a metaphor. Standard interviews and focus groups are not suitable for the purpose.
Cognition Is Embodied	Marks and Bornstein 1987; McAdams and Bigand 1993; Howe and Classen 1991; Classen and Howe 1996	The deep cognition hidden by metaphors has a physiologically-based image schema. The abstract thought is organized through the projection of sensory experiences. It all appears to originate in neurological sensory-motor-affective systems. Every sensory order correlates to a broader social order; metaphors systems have a cultural basis.	It would be convenient to drive the attention to the sensory perceptual systems Research methods could gain a better understanding of the abstract thought, starting from decoding the underlying sensory orders systems. Moreover, there could be commonalities of metaphors within cultures to be exploited.

Table 1.1 (continued)

Premises	References	Highlights	Implications
Emotion and Reason Are Equally Important and Commingle in Decision Making	De Sousa 1987; Isen 1993; Bottini et al. 1994; Damasio 1994; Kahneman 1994; LeDoux 1996	Multiple systems of emotions influence decision making. Reason and emotions share underlying neural patterns. Emotions are the basis for the tacit metaphorizing process of reasoning.	Emotions should be taken in high account by research methodologies. Most methods are biased towards reason. Instead, reason and emotions should be processed as two complementary categories represented by multiple systems.
Most Thought, Emotion, and Learning Occur Without Awareness	Janiszewski 1988; Park, Iyer and Smith 1989; Russo, Johnson and Stephens 1989; LeDoux 1996; Braun 1997	Consciousness results to be the final output of a largely unconscious neural process. Most emotions and cognitive functions have a biological basis handled by different neural systems and occur without awareness. Memory itself, it is the creative and re-elaborated product of experience, beliefs, and pre-conscious plans; as such, it can be distorted.	Caution must be used while analyzing verbal reports about mind's introspection, since the information is likely to be incomplete and/or distorted. It might be crucial to study unconscious, but accessible, events and processes in consumer insight.
Mental Models Guide the Selection and Processing of Stimuli	Bargh 1990; Kosslyn and Koenig 1992; Weiser 1993; Scheper and Faber 1994; Cole 1996	Thought comes to be structured along time by topographically organized network of neural patterns. Sets of connected neural patterns origin mental models, that once settled are largely dormant and come to be activated so rapidly that there is seldom conscious awareness in the process. Mental models can result to be socially distributed and culturally shared.	Research methods need to go beyond the identification of relevant constructs. The connections among the constructs and the organizational mental models should be highlighted, especially at a cultural macro lever, in order to provide with a clearer and deeper understanding of consumers mind. Quantitative tools alone are not sufficient to the purpose.
Different Mental Models May Interact	Edelman 1992; Schacter 1996; Millgram 1997	Mental models are not independent and static, they are fluid and connected. Each construct constituting any mental model arises from a neural cluster that is interconnected to other clusters. The more a particular cluster in operative among different models, the more it can be considered central to thought.	It would be advantageous to individuate the core constructs that belong to socially shared mental models. It could be possible to identify constructs involved in kindred mental models that may influence one another.

As understandable from the nine premises formulated by Zaltman, there would be a world behind the so called rational thought, that was once considered to be the main engine of decision making and human behavior. Such a theoretical hypothesis has been progressively deconstructed by the advances made in neuroscienfic studies. The deeper knowledge about the structure and functioning of the nervous systems, and specifically of its constituting neural groups and pathways, made it clear that the rational thought was closer to be a myth than an existing entity[7]. Indeed, that would not be any dichotomy between rationality and emotion, nor between consciousness and unconsciousness. Instead, human thought arises from a fluid, plastic, and connected net of representations, having their origin in the neural substrate of the nervous system. The brain itself, that has been classically depicted as physiologically divided into several areas entitled to different functions, turned out to work slightly differently. It is still known to be constituted by various aggregates appointed to specific roles, anyway, it does not rely on a semi-independent components system as it was current opinion. A clear example of human brain's misconception is the traditional representation in two well-distinct hemispheres, with opposing "souls", where the left would be responsible for the logic-analytic thought, and the right for the imaginative-synthetic one, as metaphorically summarized by the pictures below:

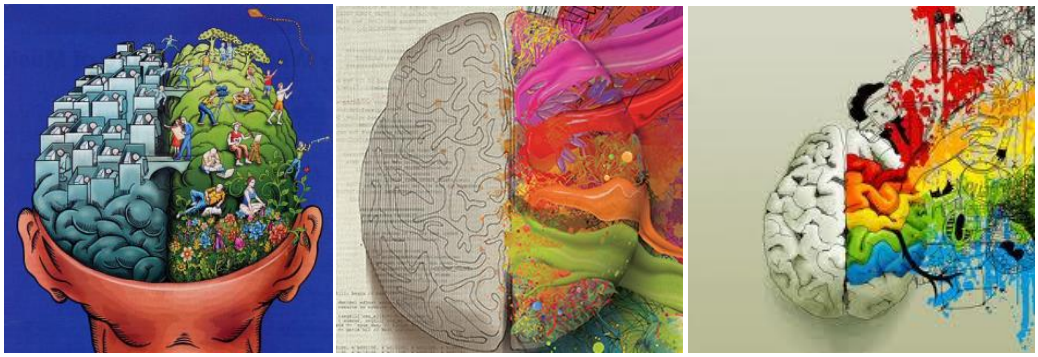


FIGURE 1.1: Iconic collage. The collage is made of three symbolic representations of the human brain. The images embody the yet surpassed famous theory according to which the brain would be divided in two different hemispheres responsible for opposing functions.

The evidence coming from the studies summarized in Table 1, and from the ones that will be further discussed in the following chapters, suggests a different framework.

[7] All the specific evidence and theories about the statement will be discussed in details in the following chapters.

The human brain would shape the thought on the basis of an integrated management of the information elaborated and transmitted by the wide networks of neural conglomerates, forging abstract mental models and previsions on the sensory experience, and influencing the latter through the already processed models, in a continuous flow of synaptic input and output.

It may sound obvious to state that such a breakthrough in thought knowledge should imply a radical change in all the fields where human though and behavior represent a core variable, including for sure marketing research methods. Zaltman proposed his own programmatic response to the mutated theoretical paradigm, designing the abovementioned ZMET. The ZMET could be described as a comprehensive research technique primary aimed to provide with consumer and manager insights. It gleans elements from principles of verbal and nonverbal communication, visual sociology, visual anthropology, literary criticism, semiotics, mental imagery, cognitive neuroscience, and phototerapy[8]. It is based on personal, in depth interviews structured around visual images selected by the interviewee, rather than researcher-provided. Specifically, participants are asked to bring visual material that express meanings to them, concerning a related topic, a week/ten days before the interview is settled. Such approach offers the advantage of empowering the interviewees to choose the materials that are richer in relevance to them and, consequently, to the purpose of the research. The interview's flow is articulated in eight steps:

- Storytelling: participants are invited to describe the meanings and contents of the selected material. Since human memory and communication are story based (Shank, 1990), the process facilitates the flow of the information, and foster the elicitation of broader contents embedded in the pictures.
- Missed images: participants are asked to describe the images that would have liked to find but could not, if there were any.
- Sorting: if a participant brought more than 15 images, he or she is invited to operate a further selection over a relevant set.

[8] Robin A. Coulter, G. Z. (2001). Interpreting Consumer Perceptions of Advertising: An Application of the Zaltman Metaphor Elicitation Technique. *Journal of Advertising*, 1-21.

- Construct elicitation: participants are stimulated through triading and/or laddering, in order to surface the deeper constructs that shape the categorization of their personal experience concerning the topic (Rosch, 1978; Lakoff, 1987). Once the constructs have been pointed out, the Kelly Repertory Grid is applied.
- Metaphor Elaboration: this step relies on procedures from art therapy. Participants are asked to imagine how they would alter two or three pictures, and guided by the interviewer through a set of related questions defined in advanced by the research team, consistently with the research topic.
- Sensory images: participants are asked to use nonvisual senses to express what images do or do not represent. This specific technique is used to bring the unconscious thought to a level of awareness at which verbal articulation can occur (Lakoff, 1994; Turner, 1994). Usually, patterns emerge across participants.
- The vignette: participants are invited to imagine a short movie that conveys their thoughts and feelings about the topic. This task is performed relying on the fact that different areas of the brain are active when engaging moving rather than static images (Hubel, 1988; Zeki, 1993), therefore new constructs and associations might be elicited.
- The digital image: each participant creates his or her own montage of a summary image that symbolizes the topic under analysis, with the help of a specialist in digital imaging techniques. The process of recreation through distortion might intensify feelings and deepen insights (Leyton, 1992). Moreover it brings forth assumptions, frameworks and decision rules.

At the end of the interviews, the data must aggregated; all the output coming from the interviewing process is examined for constructs and constructs pair, in order to create a consensus map that includes and sums up the most important and widely shared constructs and the connections among them.

The ZMET has several strength points; first of all, as summarized by the author himself in a synthetic as clear table, it takes into account all the nine premises listed by Zaltman. It tries to challenge all the dark points and weaknesses of the previous research approach, in the light of the current theoretical framework about thought architecture and functioning.

Table 1.2[9]

Premises									
Steps	1	2	3	4	5	6	7	8	9
Storytelling	x	x	x	x				x	
Missed Images	x								
Sorting	x			x					
Construct elicitation	x			x		x	x	x	x
Metaphor Elaboration			x	x		x	x		x
Sensory images	x	x		x	x	x	x	x	
Vignettes	X	x		x	x	x	x	x	
Digital Image	x	x	x	x	x	x	x	x	

Premises:

1 Thought Is Image Based, Not Word Based

2 Most Communication Is Nonverbal

3 Metaphor Is Central To Thought

4 Metaphors Are Important in Eliciting Hidden Knowledge

5Cognition Is Embodied

6 Emotion and Reason Are Equally Important and Commingle in Decision Making

7 Most Thought, Emotion, and Learning Occur Without Awareness

8 Mental Models Guide the Selection and Processing of Stimuli

9 Different Mental Models May Interact

Moreover, the ZMET guarantees data reliability even on a small champion of interviews, providing with financial sustainability of the method itself.

[9] Zaltman, G. (1997, November). Rethinking Market Research: Putting People Back In. *Journal of Marketing Research*, p. 34.

In fact, as pointed out by Zaltman and Coulter (1995), results from four/five participants, randomly chosen, would be sufficient to build a representative consensus map. This stems from the fact that the analysis is focused on neural based mental processes, which do not own an high degree of subjectivity and individuality. Conversely, mental processes come to be the result of a biological substrate, together with interpersonal associations and interactions within a given socio-cultural context (Bargh, 1990; Resnick, 1991; Gergen, 1994; Sperber, 1994; McClamrock, 1995). That is why there happen to be socially shared meaning, associations, and constructs, whose existence enables a small champion to be representative for a way larger population (Clemen and Winkler, 1985; Morrison and Schmittlein, 1991).

The model is yet imperfect, as considered by Zalman himself. Indeed, a major challenge is to improve the results gathering and analysis, with the purpose to gain efficiency without lose effectiveness. Nonetheless, ZMET stands for one of the first steps ahead in research methods revolution, especially considered the fact that it takes rise from the latest acknowledgements in scientific fields. The typical trait of modern information lays in cross-disciplinary and integrated research efforts, and that is exactly the starting point of recent methodologies such as ZMET is. One of the greater marketing goals, namely discovering consumer's mind, thoughts and behaviors, is becoming more achievable thanks to the advances progressively made by scientists, with special regard to neuroscientific branches. Outstanding findings are coming from the first contaminations of originally different worlds, as it is being testified by the emergence of research fields known as neuroeconomics, neuromarketing and consumer neuroscience.

CHAPTER 2

The contribution of Neuroscience to Consumer Analysis and Applied Marketing

How neuroscientific methodologies and techniques added a new dimension to marketing models

Everyday more human knowledge is broadening its horizons, not only by pushing forward research goals and technological progress, but also by operating an interdisciplinary fusion among scientific branches, aimed to provide a fertile cooperation. Great results of such a phenomenon are observable in the brand new cohesion reached by neurology and marketing, that gave birth to consumer neuroscience and neuromarketing.

On the one hand there is marketing, focused on understanding consumer mind with its decision making process, preferential scales, evaluation methods and engagement mechanisms; on the other one there is neuroscience, intended to analyze the nervous system in all its functions and displays. Once it came clear that most – if not all- the mind processes depend on the neural activity underlying the nervous system operation, it goes without saying that a collaboration among the fields can lead to enlightening outputs. Through an *ad hoc* use of neuroscientific tools and techniques, a lot about consumer has been recently discovered. Neural evidence is giving a hint both for dismantling theoretical constructions that have been ruling the doctrine for a long, and for starting to benefit from still unexploited realities, such as the emotional sphere.

The Neurocultural Revolution: laying the foundations of Consumer Neuroscience and Neuromarketing

Neuroscience is intended to be the wide scientific field that has as core focus of its investigation the nervous system, under a broaden multi-aspects analysis including molecular, cellular, developmental, structural, functional, computational, and medical approaches. Recently, neuroscientific technologies and methodologies have raised a growing interest in the scientific community. Several disciplines have engendered and developed their correspondent neurodisciplines, premising on the search of underlying neural associations. This newborn large domain of scientific fields adopting the neuro prefix has been often addressed as neuroculture, when not neuromania, as some detractors critically refers to. For the sake of the research in question, special attention should be turned to neuromarketing, as a sub-brunch of neuroeconomics.

Neuroeconomics is a transdisciplinary field which uses neuroscientific technologies and methodologies to identify the neural substrates associated with economic decision making (Zak, 2004). Within the framework, neuromarketing is the discipline appointed to the application of the findings coming from the research in consumer neuroscience, concerning customer decision making and related processes.
Consumer neuroscience provides with the theoretical inputs, comprising the academic research in consumer psychology and neuroscience, while neuromarketing includes practitioner and commercial interest in neurophysiological tools within a managerial scope (Reimann, Schilke , Weber, Neuhaus, and Zaichkowsky, 2011). To ensure a deep understanding of the neuromarketing discipline, an overview of the major tools is provided below:

Neuroscientific tools:

- Functional Magnetic Resonance (fMRI): it is useful to highlight the brain function. It gives information about various metrics, the most important of which is the BOLD[10] contrast. It has an excellent spatial resolution, so that it can detect specific and circumscribed brain's areas activity, but it has poor temporal resolution.

[10] BOLD stands for Blood Oxygenation Level Dependent.

- Magnetoencephalography (MEG): it measures electromagnetic neural activity. Its spatial resolution it is not as good as the fMRI one, but the temporal resultion is excellent. Therefore, it is particularly suitable for detecting sequences in cortical activities related to decision making.
- Electroencephalography (EEG): it detects voltage differences due to neural activity in the brain. Its special resolution does not allow for an acceptable display of deep areas of the brain, but the temporal one is high and enables to identify the chronological course of neural patterns.
- Positron Emission Tomography (PET): it is a nuclear medicine imagine technique based of the injection of radioactive isotopes. It is excellent in sensitivity and spatial resolution, though being poor in the temporal one.
- Transcranial Magnetic Stimulation (TMS): it relies on local brain stimulation through electromagnetic impulses. It is characterized by great quality both in spatial and temporal resolution, as far as cortical areas close to the skull are concerned.

Behavioral-peripheral techniques and tools:

- Facial Coding: it links emotions to body language, specifically to facial expression. It is not effective if used alone, because it presents an high risk of bias.
- Eye Tracking: in its latest versions it has reached for high sophistication. It reveals and records what people see, what they don't, and whic are the main attention's drivers, typically in logo and advertisement analysis. It lacks in giving information about mental processing, therefore it is usually combined with EEG tracking.
- Galvanic Skin Response (GSR): it detects electro dermal responses to external stimuli, enabling to understand the links between the physical and physiological state. Like for facial coding and eye tracking, it should be used together with other neuroscientific tools, in order to offer reliability and precision.

Pointedly, each one of the presented technologies has its own strengths and weaknesses; combining them together, it is possible to overcome many of the singular limitations in order to obtain greater accuracy. Neuromarketing take advantage of such approach to help marketers tap into potential customers, or people's unarticulated needs, drivers and desires, as defined in The Sun Link 2004 (Dahlberg, 2004).

It is still a young discipline, and only in the next few years a clear picture of both its results and boundaries will be available; nonetheless, some strong points about its actual contribution are already observable. For many years customers' mind have been considered by marketers as a black box; with neuroimaging it may looks not so dark anymore. The article "Consumer Neuroscience: Applications, Challenges, and Possible Solutions"[11] lists five main concrete applications of neuroscientific tools in consumer behavior theories' improvement:

1) Identifying Mechanisms
2) Measuring Implicit Processes
3) Dissociating Between Psychological Processes
4) Understanding Individual Differences
5) Improving Predictions of Behavior

It goes without saying that an insight of the neural activity underlying brain functions offers a crucial opportunity in terms of understanding decision-making and behavioral processes. For instance, the use of neuroimaging shed light on a major misconception regarding precisely emotions.

Information processing wide speaking, the literature used to advert to the dual system framework, according to which there would be an emotional processing system entitled to lead to rapid, intuitive and suboptimal choices, whereas the rational system would be responsible for deliberative and compensatory decisions.
Such a belief would support the assumption that deliberative decision-making would always require the activation of customers' high order brain system, deeply depending on cognitive reasoning. Conversely, neuroimaging studies revealed that exactly deliberative choices were associated with lower-order, emotional brain systems (Venkatraman et al., 2009), while cognitive brain systems were involved in choices based on heuristic short cuts. This is just one of the several exemplifying cases that could be discussed to show how scientific evidence would be required, in order to complement and eventually validate theoretical speculation, and to avoid misleading oversimplifications.

[11] 2015, American Marketing Association (Preprint, still unedited). Authors: Plassmann, Venkatraman, Huettel and Yoon.

Another viable way to check neuroscience's contribution is through the model proposed by Solnais et al. 2013. It is a conceptual framework based on the categorization of neuroscientific studies. The framework consists of four core categories, ordered like following: decision-making, rewards, emotions and memory. For each category an empirical collection of research is presented. Such a scientific review has the purpose to answer to four core investigations, each of them paired to a correspondent category, by means of neuroscientific findings. The stimuli under analysis are: product, advertising, branding, and pricing. The first category questions consumer preferences' building and the prediction power of neural activity. The second category focus on the attractiveness and perception of marketing stimuli under the lens of the brain's reward system. The third category embraces all the motivational and emotional neural responses to marketing stimuli.

The fourth category investigates the neural foundations of attention and memory and their influence on consumer behavior.

Decision making, rewards, emotions and memory, are not analyzed as strictly differentiated compartments; on the contrary, the framework offers an orderly classification of interdependent and interrelated results.

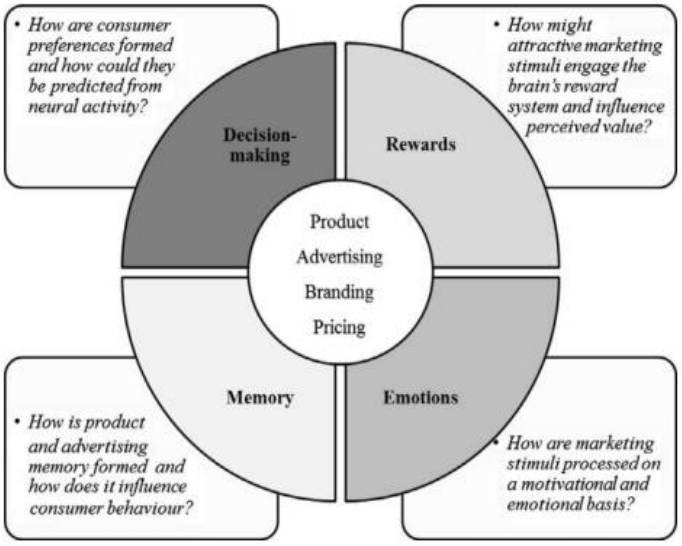


FIGURE 2.3
Conceptual framework for assessing the contribution of neuroscience to consumer research (Solnais, Andreu-Perez, Sánchez-Fernández, & Andréu-Abela, 2013). The marketing stimuli are presented in the centre, the four categories with their related core researches are displayed around.

Solnais' framework provides with converging evidence that once again neuroscience' support ends up deconstructing great part of the dominant literature.

According to the modern economic theory, the consumer model is based on the existence of the so called *homo economicus*, who is supposed to undertake his decisions through a rational process based on the maximization of his own utility function. Pursuant to such a theory, rationality would be the main actor in decision making process. Neuromarketing stands on an opposite position. Bechara and Damasio (2005) came to the conclusion that the major factor ruling decision-making processes would be identified with emotions; they were lately sustained by Keinner and Linzmajer' studies (2010) that pointed out how central would be the role of emotions and unconscious thought in influencing behavior. This would change the whole perspective, reconsidering the validity of most of the assumptions that have settled the doctrine until now.

It could appear obvious to observe that the implications are not only theoretical: the revolutionary findings will change the practical approach in the analytical phase, rethinking the drivers of buying behaviors and the discovery process of unexpressed needs and wants, and also the action plan in terms of value proposition and communication. Even if it seems too early to identify the new phenomenon with a commonly accepted paradigm, it is already possible to see that the change has come. Just thinking about commercials, it is noticeable that more and more brands are abandoning the "old-school" communicative way.

The trend is no more convincing people through rational statements, e.g. the product is the best in category, it has the greater quality/price ratio, the post-sale service is the most reliable etc. It is becoming common to find advertisings that tell a moving story or communicate a moral value, without even showing a logo if not in the end. The challenge is now to touch the heart of the customer. Or better said, in the light of the above, to touch his brain, where emotions' perceptions and responses are processed.

Moreover, when it comes to consumer engagement, emotions seems to largely overtake rationality also in terms of gaining attention and memory, as it will be deeply analyzed below. Hence, it is reasonable to state that new resources, if not also a new world, have been highlighted thanks to the neuroscience contribution to consumer neuroscience and neuromarketing.

Despite the undeniable advantages of the use of tools able to dismantle or validate historically settled theories lacking in practical evidence, not all the community is pleased with the neurotrend.

Critics heavily question the ethics of the neuroapproach, in the name of the fear that one day scientists will be able to find the "buy button" in consumer brain and manipulate decision-making processes, as forecasted in the movie The Hidden Persuaders by Vance Packard. Anyway, even if messages could become more efficient in stimulating consumer reaction, the ultimate word is up to neurons themselves.

According to studies conducted by Camillo Padoa-Schioppa and John A Assad[12] at Harvard Medical School, it would be orbitofrontal cortex's neurons the ones responsible for taking decision between alternatives. Getting to know their path would not necessarily imply having the chance to practically alter such a path. At least, for the moment.

Nevertheless, the evil never lays in science itself, it hides behind the use that could be made of it. As long as customer neuroscience and neuromarketing will be pushed further, specific regulation and laws will be required in order to protect consumers' category. For the moment it seems reasonable to focus on the bright side, turning the attention to how recent discoveries are broadening science's horizons.

Consumer neuroscience achievements and future challenges

It seems appropriate to conduct a more detailed discussion about some of consumer neuroscience proved achievements, with the objective of giving practical examples concerning the work of such a field. Even though being still in its infancy, the discipline has already focused its research on a broad range of marketing related topic. Among the collected outstanding results, particular interest is raised by the ones regarding price fixation strategies. It is widely accepted in marketing management that price has a psychological value, a part from the obvious monetary one. This intangible connotation of the price makes it, to all intensions and purposes, part of the communication process between firms and consumers and a salient brand-marking trait.

[12] C. Padoa-Schioppa and J.A. Assad. Neurons in the Orbifrontal Cortex Encode Economic Value, *Nature*, n.441, 2006

To sum it up in a few words everybody would agree on, a Porsche would not be a Porsche if it didn't cost what it costs. The psychological price phenomenon has been largely observed in practice through empirical tests.

Anyway, once it came clear that the price tag tells something more to consumers and does influence buying behavior, the underlying reason and the functioning of the mechanism remained nothing more that the object of theoretical speculation for a while.

Plassman et al. (2008) brought major truth about the mystery of the psychological price while carrying on consumer neuroscientific studies, relying on the help of fMRI technology[13]. Again, not only the study reveled the causes of the happening, it also deconstructed a misleading, though largely shared, theoretical assumption. In economics is acknowledged that the experienced pleasantness from goods' consumption depends only on the intrinsic properties of the good and on the individual state of the consumer. This came out not to be true. Specifically, Plassman observed that price plays an active role in pleasure perception, through a wine tasting experiment. The project of the test started from the hypothesis according to which quality is commonly known to be positively linked to high prices. Therefore, in wine tasting activity, the taster is expected to attach premium quality attributes to the wines he knows to be higher-priced on the market.

Plassman et al. wanted to go forward and showed that, not only price was able to provide with heuristic evaluations about the product, but it was actually able to change the consumption experience. They did so by using fMRI support. Given that medial orbitofrontal cortex (mOFC) is recognized to be responsible for pleasantness encoding, researchers focused their attention on its activity, and the results they got were exactly aligned to their expectations. They scanned 20 human subjects while having a wine tasting; participants were told to taste many different wines, but they ignored the fact that there were only three wines, and two of them were administered twice at different prices. Statistically relevant results showed that an increase in price changed both the subjective reports of flavor pleasantness and the blood oxygen level dependent (BOLD) signal in mOFC.

13 Hilke Plassmann, J. O. (2008, January 22). Marketing actions can modulate neural representations of experienced pleasantness. *PNAS*, pp. 1050-1054.

To tell it other words, participants said the same wine to be better when matched to an higher price not just because they thought so, they actually felt so. They recorded a greater pleasure in experiential brain encoding for the very same product while in presence of higher prices.

It is intuitive to realize the explosive power of such findings in marketing application. First of all it has become possible to correct and redesign by now obsolete models, whose most invalidating weakness was relying on abstract assumptions with a substantial bias risk, given the lack of any evidence. Moreover, beyond the theoretical contribution, clear unexploited chances are now revealed in practical marketing application. To follow the presented case, getting to know the real influence of the price variable in consumption experience will open new ways to a more focused and targeted fixation strategy. The same, or even greater potential will be found in all the other effective components of human judging and decision-making processes that are being or have to be discovered yet.

Another result that presents similarities with the previous case has been outlined in studies concerning celebrity endorsements in advertising[14]. Traditional consumer research (Friedman, 1979; Kamins et al., 1989; Petty et al., 1983) had already recorded that using celebrities in advertising usually brings advantages in terms of recognition and brand-name enhancement; anyway, despite having noticed that it did happen, there was no concrete explanation about why it happened. Some major guesses regarded the fact that expert figures could stimulate more reliability, and famous faces were somehow guarantee of trustworthiness[15], which sounds fairly logic and sharable. Again, this ended up to be a not exact nor complete conclusion.

To the experiment conducted by Klucharev and Stallen (2010) goes the credit for the success of consumer neuroscience in clarifying the topic. The scientists planned a visual-memory task on female participants. They showed images of shoes paired to both celebrity figures and non-famous one, which had been previously rated and resulted equally attractive in order to avoid biases.

14 Mirre Stallen, A. S. (2010, October). Celebrities and Shoes on the Female Brain:The Neural Correlates of Product Evaluation in the Context of Fame . *Journal of Economic Psychology*.
Mirre Stallen, Ale Smidts, Mark Rijpkemab, Gitty Smit, Vasily Klucharev, Guillén Fernándezb.

15 Rossiter, J. &. (2012). Print advertising: Celebrity presenters. *Journal of Business Research*, pp. 874-879.

The choice of shoes as a testing item was a strategic one; first of all, it is an everyday item with a normal degree of consumer involvement in purchasing process, so that there were no distortions in the experiment given by exogenous variables.
Secondly, women are thought to be more than familiar with choosing shoes, thing that allows to exclude any correlation between famous faces and expertise guarantee effect; participants were expert enough not to need further securities in testimonials. By means of such precautions, researcher made sure to focus the attention on the pure underlying mechanism of celebrities' influence on consumers. The whole task was accompanied by fMRI scanning with the purpose to highlight neural activity patterns. While viewing shoes paired to celebrities, an increase in mOFC activity was recorded, whereas the same did not happen when the famous faces were initially presented alone.

This difference suggests an interesting remark; as anticipated above, mOFC is associated with subjective liking of stimuli and positive emotions (such as experienced pleasantness), the fact that celebrities alone did not elicit any relevant activation of it leads to the conclusion that are not famous people themselves to be responsible for positive halo effects. Instead, since the mOFC was working during the celebrity-shoes paired display, it might be that the key element lays exactly in pairing. There is high likelihood that a transfer of positive affect from celebrity to product takes place, and it would be the cause of the advantages in promoting with famous faces. Moreover, subjects showed higher recognition memory performance in celebrity-shoes pairing.
Interestingly, fMRI tracked greater activity in brain areas responsible for the retrieval of episodic knowledge[16]in presence of famous figures standing alone, while cues from mOFC during the encoding of celebrity-shoes pairings testified also the involvement of implicit knowledge[17]. These records would suggest that celebrities themselves, even though being present in the evocative recalling process of participants, were not responsible for affective activation. Implicit neural pattern took place only when there where items presented in a context of fame, supporting the hypothesis of an affective transfer. It goes without saying that such information may enable a more efficient and successful implementation of ad resources management.

[16] The angular gyrus, precuneus and medial prefrontal cortex (Maguire 2001; Wagner et al., 2005).
[17] The kind of memory entitled to associate neutral and valenced stimuli.

Another notable advance in consumer neuroscience research came in 2013, thanks to the work of Stallen, Smidts and Sanfey[18]. They investigated the neural fundamental mechanisms of peer influence, focusing on the phenomenon of in-group conformity. By combining a manipulated decision-making paradigm with neuroimaging methods they enlightened the neural patterns underlying in-group dynamics, offering a new perspective in approaching social norm campaigns. They found out that brain areas that registered increased activity during the in-group conformity task were right caudate, subgenual anterior cingulated cortex (subACC), right hippocampus, and the intersection of the right posterior insula and the posterior superior temporal sulcus (pSTS). The salience of these findings lays in the functions addressed by the involved areas; it is required to briefly review each of them. The caudate nucleus, together with the putamen, constitute the striatum, which is known to work as a primary input station for dopamine neurons. It is active in reward processing, starting from the satisfaction of vital stimuli till more abstract ones (such as reputation). This attaches a rewarding effect to in-group activity and also supports the thesis that striatum would play a role in social influence codification (Klucharev et al. 2009; Campbell-Meiklejohn et al., 2010; Zaki et al., 2011).

The subACC is active in the experience of affective states, and its intervention would probably reveal a positive affective charge linked to social inclusion experiences.

The hippocampus is the main responsible for spatial memory, therefore its implication suggests that in-group conformity is mediated by brain superior value signals. Finally, the pSTS is appointed to cognitive perspective taking, usually known as Theory of Mind (Frith and Frith, 2006); the Theory of Mind concerns the cognition of individuals that others may have singular and different perspectives on the world. Consequently, the activation on pSTS lays solid foundations about the possibility that, in in-group dynamics, people tend to give major importance to others' point of view and may be more incline to adopt in-group rather than personal perspectives. "These results may provide an integral step in developing more effective campaigns using group conformity as a tool for behavioral change", as pointed out by the authors of the research.

[18] Peer influence: neural mechanisms underlying in-group conformity, Mirre Stallen, Ale Smidts and Alan G. Sanfey, Frontier in Human Neuroscience, March 2013, Volume 7, Article 50

The above stated review represents just a sample of all the work that is being produced in the framework of neuroscience approach, with the aim of offering a hint about the innovative potential of consumer neuroscience' s findings and the subsequent practical implementation chances.

Additionally, it has to be said that, although being itself a new frontier, consumer neuroscience is already projected to further evolutions, in a forward looking perspective. If it could sound like fantasy to some to use instruments like fMRI or PET in consumer analysis, this is only the beginning; the new step will be towards genetics and molecular neuroscience. Regardless of the harsh diatribes that dominated the past of scientific community, there is now wide acceptance about the fact that genes and behavior are somehow related.

This is not to say that human behavior is irreversibly pre-determined by genetic codes but, adopting a less radical perspective, it is true that genes constitutes the very first basis and the fertile environment for molecular relations development, which ultimately results in brain functioning and behavioral output. Observable links between genetics and behavior have been already indentified in financial risk taking (Cesarini et al., 2008) and prosocial behavior and empathy (Knafo and Plomin, 2006); moreover, in investigations on heritability, these traits scored between 0.2 and 0.5, which would lead to the conclusion that they are moderately heritable.

In the near future, not only neural components of decision-making and choices are likely to be revealed, but also neural predictors. Thanks to the the advances both in tools and analytic methodologies, it will be probably possible to elaborate computational methods and algorithms able to forecast multivariate patterns of brain activity related to future behavior. The pace of the progress will depend on several factors, including data access as well as ethical issues; by the way, the first steps have been made and already offer the spark for deep reflection and further elaboration.

Neuroscientific evidence unearths the importance of emotional communication: emotions' influence on memory, attention and cognition

As anticipated above, one of the most revolutionary disclosures coming from neuroscientific evidence concerns the crucial importance of emotions.

All the economic models based on the fundamental assumptions of rationality and utility maximization seem to waver in front of the new scientific findings. Emotions appear to represent a preferential input in reaching for people's attention and later conquering a stable position in the long-lasting memory. In a managerial perspective the research is offering an outstanding opportunity, considering the fact that the ultimate goal of marketing communication is to engage consumers and engagement can't be gained without being more than well remembered.

In a world dominated by over-communication, spreading information and unbridled production, the consumer stands in the middle of millions alternatives, bombed by options and substitutes, with no chance to evaluate them all.

In fact, conversely to what argued by theories laying on pure rationality, humans are not able to retain and take into consideration an infinite number of possibilities, they are forced to use their finite physical resources to choose, depending on brain working constraints and selection processes. Therefore, not all the information will break through mind's barriers; marketers must find the way convey their message such that they can be recognized and retained among the ocean of unprocessed and inactivated data. Emotions resulted to be exactly what is needed.

In the attempt to provide a deep understanding of the role played by emotions in cognitive mechanisms, it is necessary to go through an overview of some of the brain functions and they seem to be emotions-responsive. First of all, attention should be driven to the amygdala-hippocampal complex that has got known to be the central site of memory. Both the components, namely amygdala and hippocampus, are involved in memory functioning, although they are responsible for two different, and potentially independent, memory activities. The amygdala complex is entitled to the unconscious memory, as pointed out by the studies conducted by LeDoux and Phelps about fear conditioning.

The unconscious memory is the one appointed to the attribution of specific emotional properties to a neutral stimulus, when the latter had been paired with peculiar perceptions in the past. A clear evidence from experiments conducted on rats could be able to exemplify the mechanism underlying amygdala's memory: the rats were exposed simultaneously to a conditioned stimulus- an auditory one- and to an unconditioned stimulus, a footshock. Rats' major autonomic response to this kind of double stimulation was freezing. Then, rats were lately exposed to the auditory stimulus only, and they exhibited freezing responses again. This is because amygdala recorded the past experience and linked a neutral stimulus, like a sound, to the eventual footshock. The same principle rules human brain.

Instead, what we intuitively call proper memory, let us say the voluntary recall of events and situations- also known as declarative or evocative memory- depends on the hippocampus.

Even if it is not exactly clear yet how memory practically works, most of the recent theories[19] agree on the workspace model. There might be a working memory that collects and mixes information coming both from sensory stimuli and declarative memory, in order to provide with unified, temporary activated representations able to control mental activity and behavior. The working memory seems to rely on interactions between sensory system, prefrontal cortical areas and hippocampal complex. Of course memory does not count on an infinite storage capacity, that is why the working memory operates an accurate selection process to retain information in its space.

It seems possible to infer that emotional stimuli, by carrying a wide variety of inputs during their processing, may elicit greater activity in the working memory, gaining some kind of predominance in the long-term storage with respect to other kinds of stimuli. Leaving to further research the validation of such hypothesis, it appears to be true that something specific happens to memory in presence of emotions. Scientific evidence shows that emotional stimuli seem to force both amygdala and hippocampus to cooperate in forming lasting memories.

[19] For brevity reasons it seemed appropriate to mention the dominant opinion in literature, without discussing the topic in details. For further insights on the subject, the following authors are recommended: JohnsonLaird, 1988; Kihlstrom, 1984; Schacter, 1989; Shallice, 1988; Baars, 1997, 2005; Dehaene & Naccache, 2001; Dehaene, Kerszberg, & Changeux, 1998; Dehaene, Changeux, Naccache, Sackur, & Sergent, 2006.

Emotionally arousing experiences tend to be more remembered and this is attributable to the related release of adrenal stress hormones, namely epinephrine and glucocorticoids. As far as the epinephrine is concerned, it starts a real signaling cascade mechaninsm. The epinephrine activates the release of norephinefrine, taht consequently initiates β-adrenoceptors in the basolateral amygdala (BLA). β-adrenoceptors on vagal afferents elicit noradrogenic cell groups situated in the nucleus of the solitary tract (NTS). The noradrogenic group further projects to many forebrain regions, including amygdala and hippocampus. This stimulation is proved to result in memory consolidation.

The role of glucocorticoids is more controversial. It is demonstrated that hippocampus' activity is compatible with low levels of glucocorticoids, which should constitute an issue in memory processing of emotional experiences given that, as said before, emotions come with an increase of corticosterone in plasma level.
In fact, the impairment of spatial memory can actually take place in presence of social stress; it is typically the case of shocks and trauma. High levels of glucocordicoids enhance amygdala's performance, and consequently unconscious conditioning, but inhibit the hippocampus' functions and therefore declarative memory; as a results the subjects do not show tracks of the experience in the evocative memory. Anyway, this does not appear to be the golden rule.
Experiments on glucocorticoids activation and blockade show that they actually contribute to retention enhancement. How can it be possible that hormones with inhibitive potential on declarative memory result to be active in memory consolidation? The answer might be in the basolateral amygdala (BLA).
What happens is that glucocordicoids bind with receptors (GRs) on noradrogenic cells group in the NTS and potentiate norephrine release in the BLA, activating the signal cascade analyzed before.
Great evidence from experiments and empirical work allow to draw some major conclusions. First of all, there are clear proves that amygdala is a central node in elaborating and modulating emotions. Moreover BLA is a critical locus of action in mediating memory consolidation. At last, but not least, emotions do benefit from a special priority position in the long lasting memory.

Studies on the effects of adrenal stress hormones[20] pointed out that emotions arousal, by means of spreading epinephrine and glucocorticoids, ultimately causes retention enhancement and memory consolidation.

Not only emotions are empowered to influence memory, they are also able to enhance attention. As easily observed both in labs and everyday life, human attention is not limitless. It is subjected to some constraints depending on several factors, such as the time-horizons, stimuli's characteristics, external environment etc. Similarly to memory, attention is a finite space and, given its nature, it cannot collect all the information it receives along life, it has to operate a constant selection.

Emotional stimuli might carry a preferential pass for this selection process. A famous demonstration comes from the use of the attentional blink paradigm, relying on the temporal limitations of attention (Raymond, Shapiro and Arnell, 1996). In this paradigm, participants are asked to attend two target stimuli, presented in a short temporal window, within a flow of rapidly displayed stimuli. When the second target stimulus is presented right after the first one, it is missed according to statistically relevant records. However, in a specific case this trend does not stand. Indeed, when the second target stimulus is arousing, such as a dirty word, it is likely to be correctly identified. Such attentional activation might be related to the peculiar perceptual patterns induced by emotions. In fact perception itself results to be amplified during emotional events. A good example of the mechanisms underlying this phenomenon is provided by functional magnetic resonance imaging (fMRI) studies concerning the modulation of visual processing regions.

It seems that amygdala would receive information of the emotional significance of a stimulus early in stimulus processing and, through feedback procedures, could increase later perception, causing an enhanced perceptual encoding.

fMRI monitoring showed that during the observation of fearful versus neutral faces, not only an increase in amygdala activity was observed in the first case, as predictable from what discussed above, but also the visual cortex itself experienced a similar enhancement (Morris et al., 1998). Just as if sensory encoding was reinforced in presence of emotions.

[20] Roozenda, J. L. (2002, February). Role of adrenal stress hormones in forming lasting memory in the brain. *Current Opinion in Neurobiology*, pp. 205-2010.

Recent research (Phelps, Ling and Carrasco, 2006) went in depth getting to specific, consistent evidence: it was also demonstrated that the vision of a fearful face also boost the detection of early perceptual features such as sensitivity to contrast.
The latter findings are complementary with the previous analysis; it is highly likely that amygdala's influence on perception and attention might alter the declarative memory attended by the hippocampal complex, such that emotional events receive priority.

As anticipated before, amygdala does not work alone in emotions processing. It cooperates both with hippocampus, according to the path depicted above, and with neocortical areas. Among neocortical areas, a relevant position is attributable to the medial prefrontal cortex (mPFC) in elaborating emotionally salient sensory information and encoding learned associations. According to the empirical evidence, mPFC shows significant increase in response to contextual cues charged with predictive recalls, as if it was a site of emotional learning. mPFC neurons' working is dividable in two major firing patterns: a baseline regular firing mode, and a bursting one. The latter is object of particular interest in the current analysys. Neuronal bursting is likely to characterize reward-related learning, memory activity, decision-making and behavioral flexibility. Trains of spikes should be paired to discrete events (Connors and Gutnick, 1990; Baeg et al., 2001). Specific evidence comes from a study conducted in a pavlonian odor fear-conditioning procedure, where neural bursting has been tracked and examined before and after conditioning[21].
mPFC neurons showed a significantly enhanced response to postconditioning presentation of the odor stimulus previously paired to a footshock during the experiment. A spontaneous increase in spikes, with respect to baseline levels, was registered in presence of the paired stimulus. The main deductible result is that emotions would also be able to elicit some kind of neural learning, let us call it a synaptic memory responsible for emotional learning-specific neural patterns.

[21] Steven R. Laviolette, W. J. (2005, June 29). Subpopulation of Neurons in the Medial Prefrontal Cortex Encodes Emotional Learning with Burst and Frequency Codes through a Dopamine D4 Receptor-Dependent Basolateral Amygdala Input. *The Journal of Neuroscience*.

Providing with more details, it must be noticed that even the acquisition of emotional associative learning in the mPFC neurons is driven by the BLA, whose position is being constantly highlighted by in-progress research. Emotional learning appears to be related to dopamine signaling; the DAD4 receptor subtype is highly concentrated in the mammalian prefrontal cortex and it is entitled to many emotional processing relevant tasks. It is involved in fear-related behavior, it is active in the potentiation of mPFC neural excitability, it is critical in signaling cascades responsible for synaptic plasticity and further learning and memory processes. In the specific case of association learning in the prefrontal cortex neurons, it has been demonstrated that emotional learning was impaired when the D4 receptor was blocked by the injection of its antagonist, thus revealing a direct dependency. Moreover, not all the mPFC neurons displayed such a reactions, but only the BLA responsive ones.
The evidence drives to the conclusion that emotional learning does take place also at neural level; specifically, it is encoded through the stimulation of DAD4 receptor in a subpopulation of mPFC neurons, thanks to functional inputs received from the BLA.

The collected samples of recent discoveries aim at offering an insight of the progress that is being achieved in the field. A lot of issues remain unquestioned, and many paths have to be explored yet, but emotions are being revealed to be highly influential in mental processes, such as learning, cognition and memory. The amygdala-hippocampal complex, together with the prefrontal cortex, has been acknowledged as one of the core centers in emotions' processing and emotions themselves, they have been shown to represent a key element in cognition and memorization.

CHAPTER 3

Emotions' guidebook: from the universal biological basis to the peculiar cultural influence

Shedding some light on what has been a dark smoky world for too long

Emotions have always been there. They are part of the "being process", just like the need for food or sleep.

Nevertheless, though representing an objective reality in everyone's daily life, emotions have been regarded as an intimate, subjective and fuzzy phenomenon for a long time. This is mainly due to fact that they have been mostly presented as the opposite counterpart of reason. They have been linked, when not straightly matched, with passions and with the motes of the soul sphere. They have been often portrayed as components of pure irrationality, highly distant from the light of the conscious thought. Today, still, there is no unique widely accepted picture of emotions. Several theories are being constantly formulated and revised, research is being carried on and there is a lot to agree on yet. Anyway, the huge advances made by neuroscience in the recent past allow for some measurable data and concrete evidence about such a mysterious entity. It appears to be that emotions are not so far from reason. They are not hiding somewhere in the soul; indeed, they are processed in the brain just like the conscious thought. The thing is they are somehow quicker. And most of the times they constitute the basis for that famous, well respected rational answer.

Emotions Theory: from the etymology of emotion to Cognitive Psychophysiology's results

"What Is An Emotion?". This is the title of a masterpiece among emotions' literature, written by the psychologist William James (1884). The word emotion did not even exist in English before 17th century; it entered as a translation of the French word *émotion*, which was used at that time referring to a physical movement and, according to a less literal meaning, to riots. For many centuries, the words passions and affections were the ones designated to express those alterations of a quiet mental state that we now refer to by saying emotions. So far, passions have been disregarded for a while, being considered just something to be suppressed by reason by the whole Stoic and Rationalist school of thought. Some of these unlucky feelings faced a subsequent revaluation thanks to Christian theologians, namely Thomas Aquinas and Augustine of Hippo, who selected a separate category of positive, virtuous feelings, called affections, opposing to miserable passions such as lust and rage. The first to propose emotion as a theoretical category appears to be the Scottish philosopher Thomas Brown, in the early 19th century. Little confusion is still attached to the word, which seems hard to be matched to a specific object. Nonetheless, even if it's not clear what emotions exactly are, a lot around them is being pointed out.

One of the most well-known emotions' taxonomy has been provided by Plutchik, with his wheel of emotions. As Pluchik himself argues "Over the centuries, from Descartes to the present, philosophers and psychologists have proposed anywhere from 3 to 11 emotions as primary or basic. All the lists include *fear*, *anger* and *sadness*; most include *joy*, *love* and *surprise*. There is no unequivocal way to settle on a precise number, although factor-analytic studies, similarity-scaling studies, child-development studies and cross-cultural studies are useful. But in the final analysis, this is a theoretical decision (…)"[22].

He presented an evolutionary, dimensional model of emotions. It is said to be evolutionary from the belief that there exist basic biologically primitive emotions able to trigger behavioral responses with high survival value, such as the way fear inspires the fight-or-flight response.

[22] Plutchick, R. (2001, July-August). The Nature of Emotions. *American Scientist*, pp. 344-350.

The dimensional attribute is referred to the conceptualized grouping of emotions based on three dimensions: polarity, intensity and similarity. He suggested 8 primary bipolar emotions: joy versus sadness; anger versus fear; trust versus disgust; and surprise versus anticipation. His circumflex model makes connections between the idea of an emotion circle and a color wheel. Like colors, primary emotions can be expressed at different intensities and can mix with one another to form different emotions, viewed as secondary emotions[23].

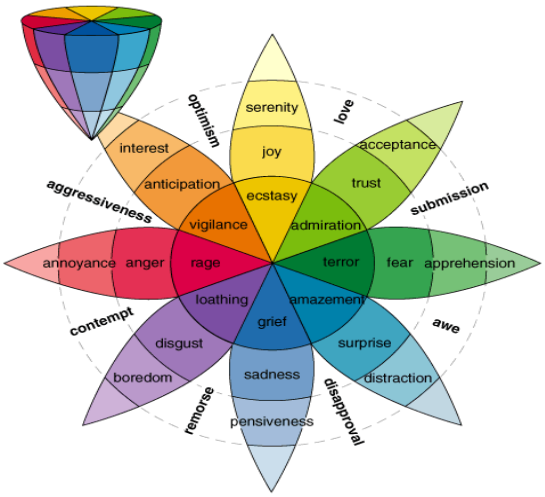


FIGURE 2.1 Plutchik's wheel of emotions.
The circumflex model represents a taxonomy of emotions.
There are 8 primary emotions (Joy, Trust, Fear, Surprise, Sadness, A nticipation, Anger, and Disgust) each of one has a polar opposite; they are depicted in the upward circular basis of the solidy. The intensity of the emotions increases moving towards the wheel's centre and decreases moving outward; the darker the shade, the more intense the emotion. Emotions can mix with one another to form different emotions.

Despite the unquestioned usefulness of a clear pattern of emotions, little do we know from such a categorization about emotions' functioning. Such a goal has been recently addressed by the scientific community; different branches are now cooperating in order to reach for an holistic view of the topic, relying on the brand new progress that research is experiencing in the field.

The dominant theoretical force developed in the late 20th century is commonly known as Cognitive Psychophysiology. The core focus of its research is the human thought, together with the mechanisms of knowing, and whether and how the mental processes stand in a causal relationship to human actions.

[23] Specifically, the first set of secondary emotions, also known as primary dyads, is generated by the mix of adjacent pair of primary emotions; secondary dyads are made of primary emotions that are two positions apart; tertiary dyads mix the primary emotions that are three positions apart.

The tangible evidence coming from physiology provides with concrete objectivity what was committed to speculation once upon a time.
Major contribution to emotions' discovery, especially in terms of scientific disclosures, comes from Neuroscience, whose methods and techniques will be further discussed in the following paragraph.

Two major opposing paradigms ruled the emotions' literature before Cognitive Psychophysiology gained its current position in the field, and their fathers are: the abovementioned William James (1884) and Walter Bradford Cannon (1927). James, often identified as a founder of functional psychology[24] even if he wouldn't consider himself such, contented that somatovisceral activity is responsible for the production of different emotions. That is to say that someone would feel ashamed because his cheek are flushing red, and not the other way around. Emotions would be merely caused by the elaboration of peripheral stimuli; there would be a correspondence code between a sensory input and the consequent activation of emotions. According to Cannon, the process is inverse. Emotions would be responsible for their dependent somatovisceral responses. Specific peripheral changes would be the results of the experience of peculiar feelings. What seems to be a polarized debate is not so unsolvable in practice. Indeed, Psychophysiology validates both positions. As known by anatomy, the central nervous system (brain and spinal cord) and the peripheral nervous system (smooth muscles and skeletal muscles) carry on a constant reciprocal two ways communication. The fact that the peripheral nervous system sends afferents to the central one could support James's conviction, acknowledging that peripheral changes might contribute to the experience of emotions. On the other hand, brain sending efferents to the periphery justifies Cannon belief that emotions provoke somatovisceral responses. What remains unclear is if there would be a one to one association between a discrete emotion and a set of somatovisceral changes.

In this case the controversy is related to the extent of an hypothesized correspondence between discrete emotions and related autonomic responses, focusing on the patterns of the autonomic nervous system (sympathetic and parasympathetic) appointed to innerve smooth muscles.

[24] Functional psychology or functionalism refers to a psychological philosophy that considers mental life and behavior in terms of active adaptation to the person's environment.

Based on empirical findings, Ekman, Leverson and Friensen (1990) took a stand in favor of the existence of such a correspondence. Ekman et al. (1983) produced an experiment in which participants were asked to reproduce a specific facial expression associated to each of the following emotions: anger, fear, sadness, happiness, surprise, disgust. The metrics he measured during the task were heart rate, finger temperature, skin resistance and forearm flexor muscle tension. Relevant data concerning the autonomic response showed that not only there were differentiating positive and negative emotions, but also differences between some negative emotions and others arose. For instance, anger and fear where characterized by increased heart rate with respect to happiness, but while fear also recorded increased in skin temperature, fear faced a decrease in it. Furthermore, Leverson pointed out that sadness is displayed together with a more intense heart rate acceleration than anger and fear, while disgust appears to cause decelerations. This does not make a proof to Zajonc and McIntosh (1992), who noticed that autonomic patterns were not strictly dependent on the emotion avocation, but they varied according to the kind of stimuli's inductions (e.g., imaginary tasks versus facial action tasks).

Still, there is no accepted true about the specificity of emotion-autonomic responding, but empirical work testifies a certain degree of correlation. A meta-analysis of all published studies matching discrete emotions to autonomic metrics (Cacioppo, Berntson, Klein, Poehlmann, 1997; Cacioppo, Berntson, Larsen, Poehlmann, Ito, 2000) shows that:

- Negative emotions can elicit greater autonomic activity in terms of diastolic blood pressure, blood volume, cardiac output, left ventricular ejection time, preejection period, pulse transit time and heart rate than positive ones. There is no evidence of the contrary.
- No straight reciprocity between visceral activity and discrete emotions has been detected. Therefore, visceral activity signals are not enough to define and emotion.
- Both top-down and bottom up processes can take place in emotion-autonomic response patterns.
- Situational conditions influence such patterns.

To conclude, both theoretical and empirical research highlight the presence of a two ways influential relationship between emotions and peripheral autonomic activity. Specifically, negative emotions trigger greater activity with respect to positive ones.

Attention has also been addressed to the link between emotions and somatic responses. One of the most popular set of results comes again from Ekman's contribution. He implemented a facial action task-based experiment on a cross-cultural basis (Ekman, 1973). He interviewed people in U.S., Chile, Argentina, and Brazil asking them to match pictures with faces showing different expressions to the same six emotions (anger, fear, sadness, happiness, surprise, disgust). It turned out to be a wide agreement in matching (e.g., furrow-browed, tight-lipped faces with anger). Then, to get rid of any possible cultural bias, he went to Papua New Guinea and even there he observed a statistically relevant compliance in the choice of the expected emotion[25]. Some could criticize the validity of such a research, questioning the reliability of overt facial expressions coding. Indeed, several disturbing elements might interfere, starting from the possible individuals' will to hide feelings to eventual misunderstandings in observers' elaboration.

Once again, progress made it easier: with facial electromyography (EMG) it has become possible to index muscle activity even in the absence of visible facial expressions. Further studies by Schwartz, Fair, Salt, Mandel and Klerman (1976) revealed that different emotional images actually stimulate different EMG activity patterns. Taking together all the recent discoveries, it is possible to get to similar deductions with respect to the conclusions concerning autonomic responses. Even the somatic reactions seems to be sensitive to affective stimulation. No straight statement can be provided about discrete emotions yet, nevertheless there is a spontaneous observable difference in EMG activity between negative and positive emotional states. EMG is lower over the cheek and higher over the brow during negative than positive emotions. All the evidence stands in favor of a displayed correlation between emotional states and the peripheral neural activity. It is right and proper to verify what happens in the central nervous system.

[25] Between 28% and 100% of the time participants chose the expected emotion. The lowest pick of 28% occurred when people had to choose between fear, surprise, and sadness. The next lowest rate was 48%.

After having acknowledged the signs of emotional processing and conditioning in the peripheral nervous system, the attention must be turned to the core of the central one: the brain. To individuate the so called emotional brain is not an easy task, though scientific findings might have disclosed the right candidate. According to what emerged from studies of the Kluver-Bucy syndrome[26] and lesions on the temporal lobe structures, the amygdala showed up to have a key role in the processing of emotions. It is appointed to determine the motivational significance and the reward value to stimuli, and it is involved in the elicitation of autonomic responses typical of emotional reactions. LeDoux proposed the reference model concerning emotional elaborations based on two different neural pathways, both involving the amygdala (LeDoux 1986a, 1986b, Li et al., 1996). When the emotional stimulus comes to be perceived, it first enters the sensory thalamus, then it takes two different ways, for the sake of simplicity let us say a quick road and a slower one.

The quick road is the thalamo-amygdala pathway. The information goes straightly from the sensory thalamus to the amygdala, providing with the initial processing of the emotional response. The first representation is rapid and approximate and goes through a priming function: the thalamo-amigdala way is the one that makes us alert when we see a shade in the dark besides us, even if we have no idea whether the shade could be a danger or not. That is the moment when the thalamo-cortico-amygdala way plays its role. The same emotional stimulus, after having been through the sensory thalamus, reaches for the sensory cortex; here it is checked and specifically determined in the nature and extent. If the shade in the dark was a quiet lady walking on his own we can relax, if it was a figure wearing a hood and heading suspiciously towards us, our thalamo-cordical-amygdala system could tell us to run. Both sub-cortical and cortical pathways end in the lateral nucleus (LA) of the amygdala, where the integration of information take place. Subsequently, the processed information travels via intra-amygdala to be completed with inputs from other areas and further transmitted to the central nucleus. The central nucleus is the main responsible for the final emotional response.

[26] Klüver–Bucy syndrome is a syndrome resulting from bilateral lesions of the anterior temporal lobe (including amygdaloidnucleus)

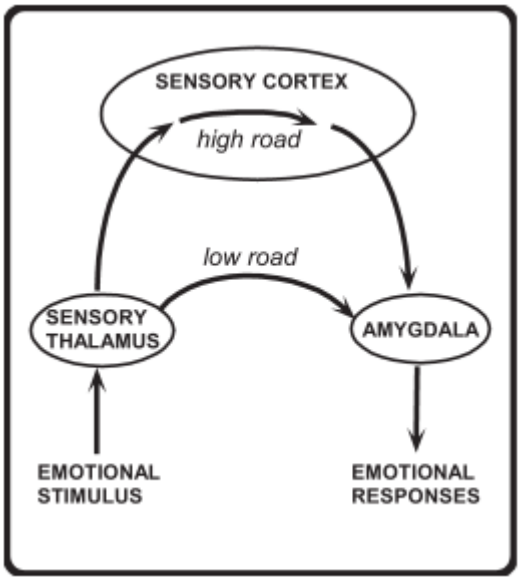


FIGURE 2.2 Pathways to amygdala.
The low road represents the sub-cortical pathway. It is responsible for priming functions. It provides with quick and imprecise information.
The high road is the thalamo-cortico-amygdala way. It is slower but elaborate. It completes the coding of the emotional stimulus.

Emotions stimuli come to be subjected to a double check and the overall analysis operated by the two circuits is built up together in the LA. This proves the crucial importance the amygdala has in processing emotions. Anyway, it is not alone in accomplishing its task. With all likelihood the abovementioned procedure stands for the unconscious elaboration. To reach for conscious awareness and emotions' contextualization the intervention of hippocampus and neocortical areas, specially medial prefrontal cortex, is required, as largely illustrated and discussed in the previous chapter.

The cultural influence on emotions' perception

So far, emotions strongly rely on a biological basis. Brain processing of emotions would seem to confer them a universal trait; given that the architecture of the nervous system comes to be shared by all the human beings, it may sound logical to conclude that emotions themselves might be widely shared all around the world. Therefore, managerial implications would be extremely strong and disruptive: marketers would have found the way to communicate efficiently around the global market place, getting rid of all the cultural bias risk, let alone the strategic cost savings coming from the reduction of local adaptation need. Unfortunately, the real picture is not so bright; emotional communication is not totally limitless and beyond any boundaries.

Once it came clear that emotions do have a strong power on human brain, especially in terms of attention, cognition and memory, and that this stems from the biological structure of the human species, it is appropriate to define the extent of such a communicative impact and examine other influential variables. Even if it is proved that emotional stimulation is able to elicit universally experienced reactions, some of which are known to foster species' survival like the fight-or-flight response to fear[27], it is not possible to infer that similar correspondence can be extendedly applied under any conditions and circumstances.

Indeed, a major influence on emotions perceptions comes from culture. Culture is commonly intended to be a set of beliefs, norms, moral values and ethics acknowledged and shared by a group of people and implemented in the daily development of their social life. It goes without saying that it is the priming background for personal identity development and therefore an affecting force in behavioral output, both in individual and collective reality. Despite the fact that globalization brought great chances for cultural convergence, cultures still represent a cornerstone of people's lives and this is not that likely to change over time for several reasons.

First of all, it must be noticed that culture is a complex entity that can be portrayed as made of both soul and body: its intangible part lays on abstract meanings and beliefs, whereas its tangible product is embodied in all the behavioral patterns recognized as practices, tasks and conventions, through which meanings find their icons (Kitayama et al. 2009, Kitayama and Park 2010). The latter are the ones actively involved in convergence dynamics; because of their nature, they are typically observable, imitable and horizontally transmittable. They vary in depth degree, going from fashions, extremely easy to imitate, to more peculiar practices, namely familiar rituals and habits.

[27]The fight-or-flight response is a physiological reaction that occurs in response to a perceived harmful event, attack, or threat to survival. It was first described by Walter Bradford Cannon, whose findings show evidence that animals react to threats with a general discharge of the sympathetic nervous system, priming the animal itself for fighting or fleeing, in order to survive.

To a certain extent, specifically referring to behavioral patterns, cultures are notably experiencing a convergent flow, which is clearly reflected in the economic environment as well; it may seem banal to recall the exemplifying contamination between East and West in the fashion industry.

Conversely, cultural values are intangible assets characterized by a strong level of psychological endorsement that makes them difficult to be understood and replicated on the outside. They are not just something that can be didactically pointed out, instead, they are the intimate product of a long-term socialization process that usually starts in the infancy. Research's evidence stands in favor of vertical and cross-generational transmission and stability of cultural values. Rice and Steele (2004) provided with a demonstration based on differences in European countries' life satisfaction rankings; they tested the same European ethnic groups in the United States and found out that the ranking chart was almost identical to the one pictured in Europe. Such a cross regional preservation adds value to the hypothesis that not only culture transmission would be the result of a vertical generational conveyance, but it also appears to be a phenomenon intensely resistant to radical space-time changes.

The previous consideration leads to a second crucial reason why culture is revealed to be extremely influential and deeply embedded in human history. Culture fulfills its role not only in virtue of its bounding power, that allows for coordination and cooperation in communities' social life, indeed it seems to own an extra-value. According to the evolutionary perspective, culture would be a collective solution to pursue long-term survival. It would appear to be the *ex post* product of the individual survival effort and the collective need for adaptation and species' evolution. Empirical evidence stands in favor of such approach; many academics[28] recorded a positive correlation between the territorial ecologic conditions and some of the most peculiar and renowned features that define cultures.

The classical distinctive trait that is used when it comes to define cultural specificities in literature is the degree of interdependence versus independence that rules communities.

[28] To mention some of the most authoritative in literature on the subject: Berry, 1976, Diamond 1997, Georgas and Berry 1995, McElreath et al. 2003.

The comparison refer to the extent to which, in certain cultures, group-based dynamics and social achievements are overvalued with respect to self-expressions and individual goals or vice versa. These orientations would be ultimately derived by the ecological framework people are settled in. Factors such as climate conditions, distribution of flora and fauna, availability of nutritional resources directly influence their inhabitants' life-style; cold and dry environments are not suitable for fixed establishments and are usually populated by nomadic and herding groups, while warm and humid conditions allow for permanent settlement. So far, nomad groups will stress the importance of independence as a value in order to achieve survival, since individuals will not have the chance to rely on a large number of long-term relationship, they will be trained to face frequent changes and temporarily exploit the available resources. On the other hand, warm and humid territories traditionally set the ground for the development of stable communities and the implementation of long-time oriented activities such as farming, therefore individuals will satisfy great part of their needs by means of social cooperation and achievements, fostering the degree of interdependence among the members. The above-mentioned contexts would consequently determine people's mindset and behavioral output; generally speaking, independent societies are characterized by analytic modes of thought, while interdependent communities show a more holistic and conceptualized perspective. This stems, again, from the animal instinct for adaptation; individuals shape themselves and their own means in order to best suit the environment, thus the community, they are living in. This was just an example for the sake of clarity of how culture is proved to be part of the evolutionary adaptive system, flourishing anthropological studies and literature offer the opportunity for further analysis. Moreover, the previous instance was presented as oversimplified; it could seem obvious to specify that the discussed correspondence between environment, social shape and cultural characteristics is not absolute nor straightforward and that singular individuals' contribution complicates the picture, leaving space for uncountable exceptions and different shades. Nevertheless, the evolutionary connotations of cultural roots are not under discussion, they are actually representing the starting point for brand new scientific research that is definitely worth to mention.

Once again, the latest frontier in cultures' analysis is settled by neuroscience. The adaptive path depicted above had been described in terms of a socio-anthropological approach, which cannot be abstracted from a complementary neuroscientific contribution. As said before, the superior site for behavioral output is the brain; it is then appropriate to understand how evolutionary-driven cultural influence on behavior is processed at nervous system level. Early evidence recognized culture to have major influence on cognition, emotion, and motivation, and the site where such a power comes to be exerted appears to be the brain.

The relationship that bundles brain and culture is a reciprocal one: on the one end, self-identity intervenes to help in selecting both values and practices that the individual is more prone to endorse from his culture, on the other hand once the self has embedded them, they will be somehow able to shape and direct his mind. This mechanism takes place thanks to a phenomenon called neuroplasticity: the brain's ability to reorganize itself by forming neural connections patterns throughout life, it refers to changes in neural pathways and synapses due to changes in behavior, environment, neural processes, thinking, emotions, as well as changes resulting from bodily injury. Letting alone the micro-specific reactions and mechanisms, the macro-functioning of neuroplasticity is fairly intuitive to understand and worthwhile to be discussed for the purpose of the research. When a stimulus enters the nervous system, synapses connect to each other in a personalized fashion according to the stimulus, in order to create the best way to let it go and be elaborated. Neural connections are like a tough forest, every time a stimulus passes by it draws a track running through synapses to reach its destination. It sounds logic to state that it is easier to take an already tracked root instead of shaping a new one from scratch, and neuroplasticity works accordingly to this simple principle. When a neural path happens to be more traveled than others, it becomes well-structured and faster to pass through and ends up representing a preferential way. So far, when individuals engage in recurring behavioral patterns, like cultural tasks and practices are, they forge neural pathways that will ultimately gain influential power over their modes of thought. That is to say that not only culture result to be a deeply-embedded collective phenomenon, it has also an individual brain-level nature.

The stated consideration lays the foundation for the neuro-culture interaction model by Shinobu Kitayama and Ayse K. Uskul, brightly presented in their article "Culture, Mind and the Brain: Current Evidence and Future Directions"[29]. The researchers summarized the models' pillars in a scheme that is reported below as a quotation; given its clarifying expressive force there would be no better way to report it if not letting it speak itself:

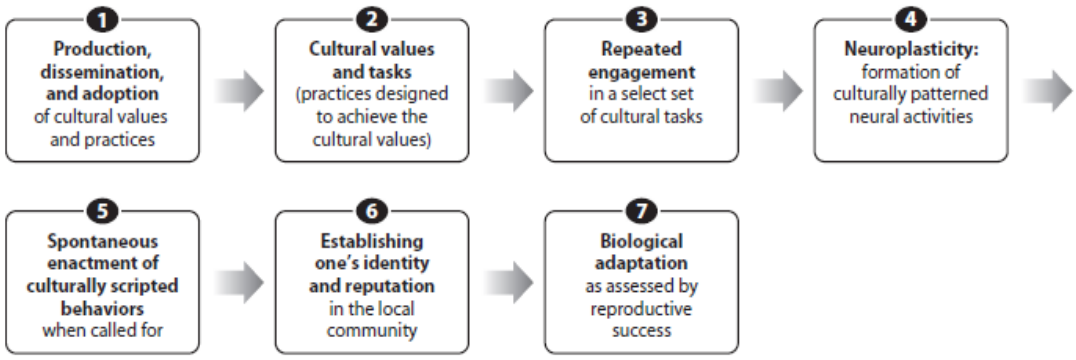


FIGURE 2.3: The neuro-culture interaction model by Shinobu Kitayama and Ayse K. Uskul.
The diagram shows seven steps through which cultural values result in a neural endorsement that ultimately serves as an evolutionary tool for individuals' biological adaptation to the environment

The model by Kitayama and Uskul is the output of the organic interrelation among the above-discussed reasons why culture would be so influential. According to the neuro-culture model, culture arises from a process of production, dissemination and adoption of values and practices which come to be originated in response to several factors' macro-categories: ecology, economic development and industrialization, socio-economic status, residential mobility, pathogen susceptibility, voluntary frontier settlement. Once the meanings and the correspondent practices have gained identification and recognition, individuals select the cultural sets that most suite their personalities and engage in repeated tasks. Consequently, neuroplasticity steps in to shape culturally patterned neural pathways, that will be spontaneously and quickly enacted every time the external conditions will require culturally scripted behavioral responses.

[29] Shinobu Kitayama and Ayse K. Uskul, A. R.–4. (2011). Culture, Mind, and the Brain: Current Evidence and Future Directions. *Annual Review of Psychology*, pp. 419-449.

It will then be available a semi-automatic activation system of behavioral responses that would help individuals to reach for self-identity and reputation establishment and, lately, for biological adaptation[30].

The latest studies add value to an even more leading-edge hypothesis: the existence of a genetic cultural component. It seems possible that genes that facilitate individuals in their cultural-based tasks' performance would be positively selected in the long run.

It is already widely tested and accepted that single nucleotide polymorphisms (SNPs) vary their frequencies in compliance with ecological and cultural conditions, with consequent impact on morphological and physiological processes. The exponential growth of population' size, environmental and social changes caused SNPs variations to become progressively and dramatically faster[31]. As a consequence, genetic variability itself expanded, and the number of cross-cultural and local SNPs' frequencies variation increased.

An iconic example is provided by the dopamine receptor gene 4 (DRD4), which is thought to be responsible for influencing certain affective traits in early experience; its long allelic version appears to be pretty common in Caucasian Americans but almost absent among Asians. According to Chen et. al (1999) this specific allelic version of DRD4 would be responsible for adaptation in new, challenging environments, since evidence showed its presence to be function of the distance covered by ethnic groups through immigration process along history.

Obviously, taking into account the early years of the research field, a lot remains unknown yet. Anyway, various evidence seems to converge to the conclusion that culture results to be an essential variable when it comes to human sciences, and it is not so likely to lose its dominant position as time passes by.

The implications for Neuromarketing are pretty consequential. After having uncovered the potential of previously marginal persuasive means, as it happened for the case of the flying out emotional marketing, it is equally important to define the limits in implementation.

[30] For further insights see the paragraph "Available evidence on Culture and Brain" from Shinobu Kitayama and Ayse K. Uskul, A. R.–4. (2011). Culture, Mind, and the Brain: Current Evidence and Future Directions. *Annual Review of Psychology*, pp. 419-449.

[31] The consideration lays on a time-framework of 10000 years.

As largely discussed, a clearly influential variable in communication is culture. Anyway, this does not come as a news; the widely renowned model designed by Hofstede and presented in his book Culture's Consequences (1980) already explained quite a lot about the role that cultural values have in communicational success among different ethnic groups. The innovative findings lay in the fact that not only conscious communication appears to be culture-affected – typically, non-verbal communication varies a lot among different cultures and represents a critical source of misunderstanding – but also unconscious neural patterns are cultural-driven to some extent. Thus, emotional stimuli, despite their biological elaboration, are not said to be equally perceived by the human species around the world.

They will, in most of the cases, be subjected to a cultural filter that happens to be entrenched not only in individuals' history and background, but also in their neural brain patterns. In light of the above, cultural influence cannot be ignored; it actually provides both with opportunities and boundaries. A practical example of what has been theoretically analyzed is provided below, in order to present a real case of how cultural elements can alter consumer's emotional perception in brand experience.

Empirical evidence of emotional driven marketing phenomena: Coca-Cola versus Pepsi

As a matter of fact, culture does have an influence over communication and marketers have to face the issue. As far as global markets are concerned, it is essential to find the right balance between standardization practices and cultural adaptation, because culture is much more entrenched and difficult to eradicate than what could seem at a superficial glance. Culture lays in consumer's history, in their background and genealogical tree, but above all, culture lays in people's brain. And when it comes to branding, it is not possible to ignore such a reality; in fact, in virtue of its power, culture may provide both with great opportunities and insuperable limitations. To have a concrete evidence of what may seem an extremely abstract phenomenon, it is useful to consider the evidence coming from an experiment carried out on the neural correlations of behavioral preferences for culturally familiar drinks[32].

[32] McClure, S. L. (2004, October). Neural correlates of behavioral preference for culturally familiar drinks. *Neuron*, pp. 379-387

During the experiment 67 subjects were tested in their preferences for two sugared worldwide famous drinks: Coke and Pepsi. The experiment was supported by fMRI scanning. The choice of Coke and Pepsi is extremely relevant to the purpose of the current research: the products are closely similar in composition by both being sugared soda-based drinks, but the two brands result to be well distinct in terms of cultural identity.

Coherently, to a first stated preference test, participants displayed strong and clearly marked opinions for Coke or Pepsi when they were asked which kind of soda they were used to drink; despite the proximity in products, the brand engagement made them stand for a defined position. Interesting results came from the tasting part of the experiment, which was monitored by fMRI and based on two conditions: an anonymous delivery of Coke and Pepsi and a brand-cued delivery of Coke and Pepsi. During the anonymous delivery, when only sensory information was available, fMRI recorded an equivalent activation of subjects' ventromedial prefrontal cortex (VMPFC) for both brands. This means that there was a fair elicitation of likeness, since the VMPFC is the brain area entitle to the encoding of rewarding given by sensory stimuli. What happened lately, in the brand-cued delivery, is highly remarkable: while VMPFC signals stayed unaltered with respect to the previous case, so that VMPFC was unaffected by brand knowledge, fMRI recorded something more. There was a significantly greater activation in dorsolateral prefrontal cortex (DLPFC), midbrain and hippocampus. The importance of the finding lays in the fact that DLPFC is thought to be responsible for cultural and affective charged behavioral responses and hippocampus plays a crucial role in spatial memory storage. The implicit meaning of fMRI records is that brand knowledge brings relevant additional information at brain level in product evaluation and experienced pleasure with respect to pure sensorial stimuli. What is even more noteworthy is that the increase in DLPFC activation was substantially appreciable only in Coke tasting; just as if the name Coke had a considerable extra value to the drinking experience that Pepsi did not own. It is highly likely that such a result stems from Coke's peculiar successful communication and brand-building, considering the fact that it does not result to be caused by its chemical composition and sensorial stimulation.

Coke appeared to have been a glorious champion in gaining a place in consumer's mind, literally. Its cultural legacy was so deep to turn on extra brain areas that are not necessarily involved in product evaluation. It provoked a reaction that Pepsi just could not. It triggered the emotional and cultural sphere of the consumer, simply by having its name shown off. It seems sharable to infer that entering the mind in such a way will bring to the brand an outstanding competitive advantage in terms of recognition, engagement and hopefully long-term established loyalty.

This is one of the main reasons why, everyday more, it is getting fundamental to use emotional communication, and above all to use it carefully. Once again, since research is still in its developing phase in the field, there are no *vade mecum* available, nor well-tested and widely accepted paradigms to guide firms in such operation. For the purpose of shedding some light on the actual limitations set by cultural boundaries in emotional marketing, in the framework of the present work, an *ad hoc* experiment has been elaborated and subsequently implemented, benefitting from the help of some of the exhibited neuroscientific technology. In the attempt to bring an active contribution to the current advances, the experiment, together with the collected results, is depicted in chapter 4.

The starting point for a new research challenge

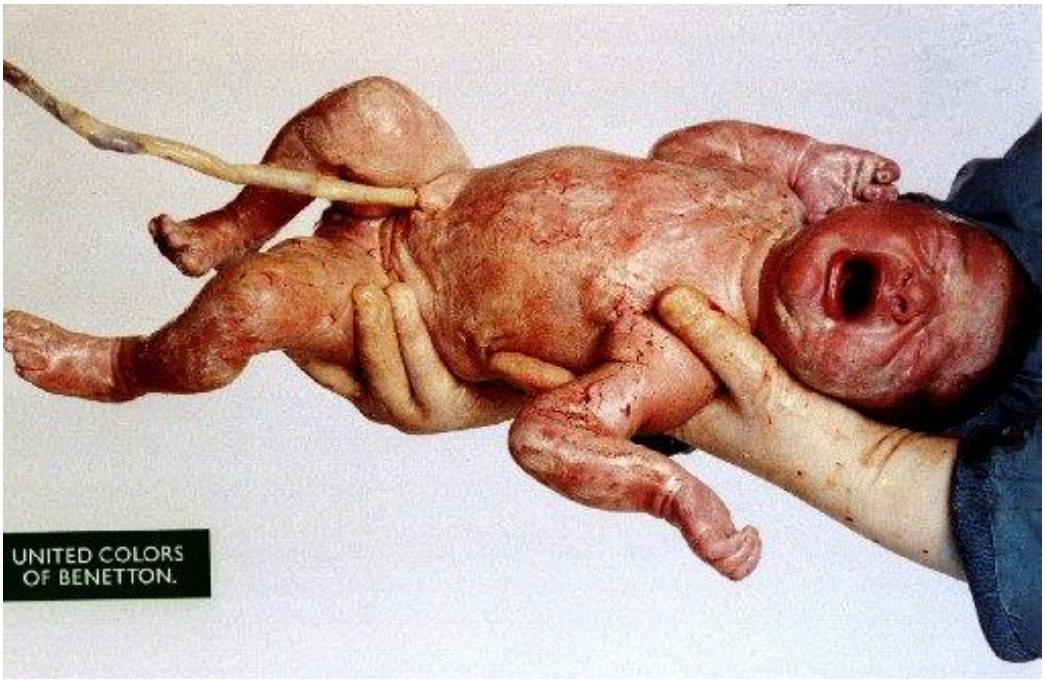
The ambitious aim of bringing to light some evidence of how culture could influence emotions' mental processing, found concrete implementation in a peculiar Italian situation. It is not hard to notice that, despite the general trend of exploiting new direct –almost shocking- emotional messages through all over the media, especially as far as Anglophone countries are concerned, Italy seems to stand a step back. It is not so common to find intrepid unconventional advertising around and, when it happens, this kind of unconventional messages are likely to be followed by harsh criticism from the public opinion. An iconic example of such a phenomenon can be easily found in the paradox of the renowned Oliviero Toscani.

Oliviero Toscani is fairly considered one of the fathers of the non-conventional emotional communication[33] and, though ironic it may sound, he is Italian.

He became famous worldwide for his revolutionary approach to photographic advertising, while working within the solid and long-lasting relationship with Benetton Group, which made of Toscani's art the flag of its brand image for 18 years.

As the photographer stated himself in more than one interview, talking about his campaigns for Benetton, he *was not there to sell pullovers, but to promote an image... Benetton's advertising draws public attention to universal themes like racial integration, the protection of the environment, Aids...*

Approximately all his works created great clamour and arose large debates, most of which took place in the photographer's home country; letting a part the claim to discuss them one by one, it is worthy to recall some of the "Toscani cases" for the purpose of the research.



This picture delivers one of the softest and less controversial messages by Toscani: it depicts a just born baby, exactly the way babies are, straight the way every human being is in that special moment of coming to life. It portrays the birth how it is, with no string attached. There would not seem to be much to debate about.

[33] Oliviero Toscani (born 1942 in Milan) is an Italian photographer, best-known worldwide for designing controversial advertising campaigns for Italian brand Benetton, from 1982 to 2000.

Nonetheless, in Italy the add was censured to some extent: it had no permission to appear in the main square of Milan[34] because the image was "too cruel".

The social campaign that Toscani shot for No-I-Ita with the sadly famous model Isabella Caro in order to raise awareness about anorexia, was a major throughout in Italy. In 2007 there were many to take a stand against the posters; according to Tiziana Maiolo, at that time council member in Milan, it was pornography, for Codacons[35] it was unethical to let sick people appear in advertising and the senator Mariella Burani Procaccini stated it was *vulgar*. To Toscani, and most of his international supporters, it was meant to be a Munch Scream against anorexia.

Among all the possible examples of how different is the perception of Toscani's works between the intents of the author himself, the critics abroad, and the public opinion in his home country, the emblem would surely be the campaign made for RA-RE. The gay friendly campaign not only was censured in Italy, but it also entailed a summons for outrage to the public decency to the photographer. In New York, the same campaign, was prized for creativity and consistency at the third edition of the Commercial Closet Award.

[34] Piazza Duomo.
[35] The Association born in 1986 to protect the environment and consumer's rights.

The considerations above are not aimed to underline how Toscani has been disregarded in his country; indeed, he received several acknowledgments in Italy as well, but mostly coming from the artistic community. It is not possible to deny that he has never been fully accepted as a communicator.

The Toscani case is well representative of a raising issue in Italian marketing development: certain typologies of unconventional communication appear to be perceived as harmful and shocking to the point to jeopardize the right delivery of the underlying message itself. The phenomenon is gaining growing relevance, especially considering the increasing trend in global marketing to enhance the importance of brand building over product selling, founding the brand identity on social activism and Corporate Social Responsibility. In a global market where social marketing is turning into a dominant paradigm not only for public corporations but also for private companies, it becomes crucial to understand how to address the communication to the target audience. It is clear that culture is a key element in segmenting the audience, not only when it comes to discuss moral, ethics and values, but also as far as communicational principles are concerned.

It is widespread opinion, taking into account the specific reactions recorded over time to unconventional campaigns, that is would not be advantageous to import the same format that it is being used in Anglophones countries – where the so called shocking advertising it is already accepted and absorbed - to Italy. Not to mention the issues related to some particular contents (e.g. homosexuality, abortion) that strictly depends on the value systems and historical background of a given country, it appears to be a real communicational barrier. Consistently with the assumption that the Italian culture would mostly lay on indirect communication, it can be noticed that the Italian language and communicative schemes are based on a major component of contextual elements. The message delivery is entrusted to several extra-textual elements, such as the physical context, implicit hypothesis and tacit norms, rather than explicit explanations. Moreover, the language itself, which is reach in vocabulary and million shades of meanings, shows a tendency to euphemistic constructions more than straightforward conversations. It is intuitive to observe that an advertising style characterized by strongly straight-to-the-point messages could easily provoke a destabilizing and disruptive effect and consequently negative reactions from the public.

However, referring to the discussion carried on in the previous chapters, neuroscience's improvements revealed that negative emotional responses would seem to enact positive peaks in terms of attention, cognition, and memory at brain activity level.

The scope of the research in question is to verify, through scientific and measurable evidence, to which extent the cultural filter influences the emotions' perception and furthermore, whether an eventual emotionally negative arousal would invalidate the communicational outcome or conversely foster it.

CHAPTER 4

The cultural perception of emotions through the lengths of neuroscience:

Italy VS UK

A new experimental work to discover how culture intervenes in the neural activity underlying emotions' perception

Summarizing the considerations largely discussed above, it is possible to make few unquestionable points:

- Neuromarketing recently brought to light the striking relevance that emotions have in decision making and mental processing.
- The early discoveries well fit the new dominant logic in marketing, based on brand building and consumer engagement through the identification between corporate and social values. Emotions appear to be one of the most effective communicational levers for the purpose.
- Given their universal biological basis, emotions well serve the need for global marketing campaigns.
- Emotions' universality is limited and shaped by several factors, the most important of which seems to lay in cultural features. Culture itself turned out to be well embedded in neural pathways and mental patters, and way more resistant to changes that what seemed to be when globalization processes started.
- Cultural barriers might ultimately damage a successful implementation of certain kind of emotional-stimuli based marketing campaign, especially regarding the growing social marketing field.

Taking into account these statements, the purpose of our research raised in order to fill the gap in empirical evidence concerning the consequences, in terms of neural activity, of culture's intervention in emotional advertising consumer perception.

Abstract

With the aim of analyzing the cultural impact in emotional processing of unconventional advertising, through a neuroscientific approach, we focused on the specific dichotomy between UK and Italian culture. The two countries well fit the purpose of the research given their clear differences in communicational cultures. As it will be detailed discussed below, UK culture is a low context one, opposing to Italy that is renowned to be an high context culture. The distinction is entrenched in distinctive communicational features. The English communicative style relies on explicit information delivery and minimum space left to ambiguity and contextual related misinterpretations; conversely, the Italian language leaves a lot to the implicit sphere and to conversational norms among the speakers. It goes without saying that such a diversity might be a significant variable affecting marketing strategies.

We tested 36 volunteers with an Italian cultural basis on two target video stimuli:

- "Think! Live with it" video on road safety from the social marketing campaign run in the UK by the Department of Transport.
- "Sulla buona strada" video on road safety from the social marketing campaign run in Italy by *Ministero delle Infrastrutture e dei Trasporti*[36].

The target stimuli were chosen for two main reasons. First of all, they are almost contemporary videos concerning the same topic and allow to point out clear differences in delivering the same message with two completely different communicative styles. Secondly, they both are from social marketing campaigns, which are known to be the ones where emotional elicitation is more used and needed, given the fact that they have the objective to foster a behavioral output, rather than sell a product/service.

The UK video it is extremely direct: there are no dialogues and audio, but the images are clear enough. It tells the story of a man who killed a kid while driving too fast, and keep on seeing the dead body of the kid in every moment of his daily life, the final message is "Kill your speed or live with it. It's 30 for a reason".

[36] It is the correspondent Italian name of the Department of Transports.

It is aligned with the English communicational norms. It uses the ultimate dramatic outcome of a dangerous drive to warn the audience.

The Italian video is very different. There are a mum and her son in the car, the kid ask to what speed the mother is driving (70 km/h) and all of a sudden the car stops and the mother says that she was going too fast. Meanwhile there is a piano music playing as soundtrack. It is informative, since it tells that the limit is 50 km/h at a certain point, but actually nothing happens. No crash, no accident, no injured. But it leaves to the audience the doubt that something might have happened. In the last frame of the video only the mother appears, as to suggest that something happened to the kid. To careful observers, this suspicious could be enhanced by the increasingly gloomy soundtrack. It actually permits various interpretation. It fairly reflects the Italian communicative standards.

Through the support of the EEG-Biofeedback as neuroscientific tool and the Eyetracker as behavioral tool, we monitored metrics such as attention, focus, learning, evocative, simplicity and anxiety/relax during the display of the videos.

From the EEG-Biofeedback we expected to register major anxiety during the UK video, what we wanted to verify was whether the negative emotions inspired by the sight of a dead child provoked an impairment of other mental processing, therefore invalidating the effectiveness of the communication or, conversely, an enhancement of attention, learning and evocative. To reach for further evidence from the Eyetracker, we aimed at checking whether the image of the dead child in the UK video was so disturbing to cause the deflection of subjects' gaze or it turned to be a focus point.

At the end of the experiment every subject was asked to fill in a survey, to enrich the analysis through a qualitative tool, and double check whether subjects' spontaneous declarations about the videos matched the neuroimaging tools' results or there were biases distorting their answers.

Methodology

The experiment has been implemented with the know-how and technical support of the GTechnology Fondazione Organismo di Ricerca[37]. GTechnology is a scientific foundation research organism that bases its work on the fertile activity of an applied neuroscience lab, with the purpose to carry out research about marketing and social sphere, making use of neuroscience. Together with the team of GTechnology, we tested the volunteers one at time, the experiment consisted of watching a video with the Eyetrackertracker and the EEG-Biofeedback connected, and answering a survey afterwards. The video was composed by six parts in total: a documentary, three commercials and two social marketing spots. The documentary was always showed at the beginning, with the purpose to record the EEG-biofeedback baseline track; it is a common practice to use documentaries for this scope, given their almost neutral and descriptive connotation. The three commercials, by Coca-Cola, Evian and Ikea were aimed to distract the subjects and to not let them focus on the two target stimuli; they were rearranged randomly in order to avoid any sequence-related bias and they were always alternate placed, such that the two target stimuli were not displayed subsequently.

The two target stimuli were represented by two social marketing spots regarding the same topic, the road safety: an emotional UK video by the Department of Transport, and an Italian video by the *Ministero delle Infrastrutture Trasporti Italiano*. They were rotated and rearranged randomly too, for the above mentioned reasons. The participants had no information about the ultimate purpose of the research, they only knew that it was for a marketing project.

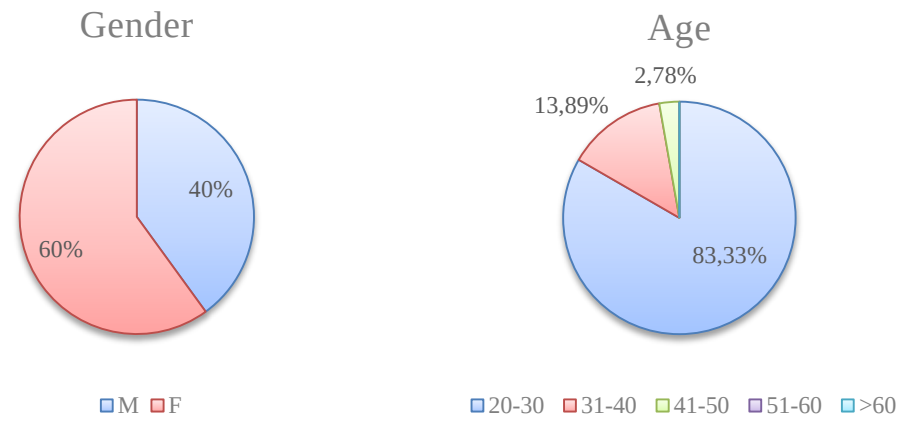
[37] Pier Paolo Pasolini Street, 15 Modena 41123 (Italy).
www.gtfondazione.org

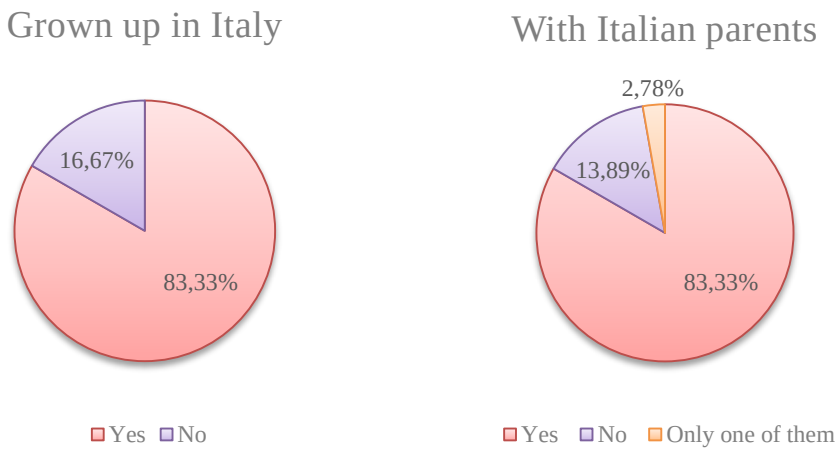
We conducted the experiment on a champion of 36 volunteers[38].

They were selected according to the following requirements:

- Men and women
- Aged between 20 and 50
- Italian nationality/ long-lasted permanence in Italy
- Basic knowledge of English language

The demographic information about the testers is summarized in the graphs below:



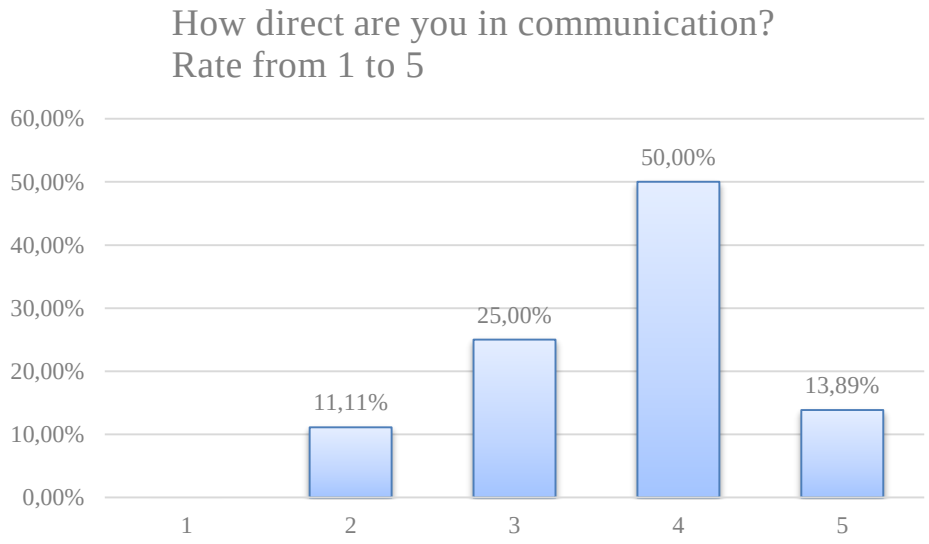


[38] We set 30 as a minimum threshold to produce statistically relevant results, according to the evidence from Sample Size Analysis for Brainwave Collection (EEG) Methodologies by Stephen F. Sands (October, 2009), according to which "*When the number of study participants is between 30 to 40 (per target demographic grouping), there is a less than 1% chance of error, and the associated Neuro-Engagement Factor™ (NEF) score portrays an accurate and significant rating for the media stimulus in question"*; we were then able to reach for 36.

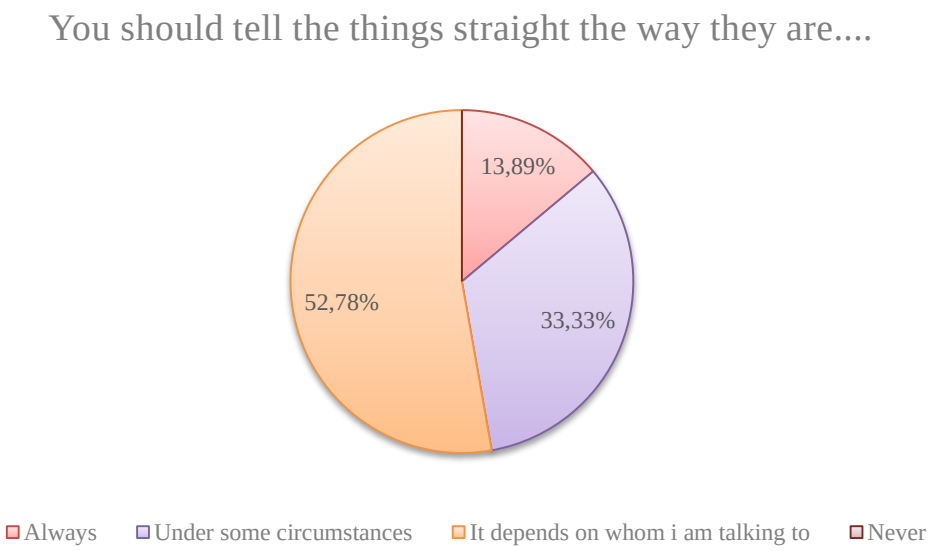
The fact that the 83,33% was grown up in Italy by Italian parents, and the other 16,67% of foreigners was constituted by people well settled in the country and perfect italian speakers, allowed us to assume that the sample was representetive of embodied Italian cultural elements.

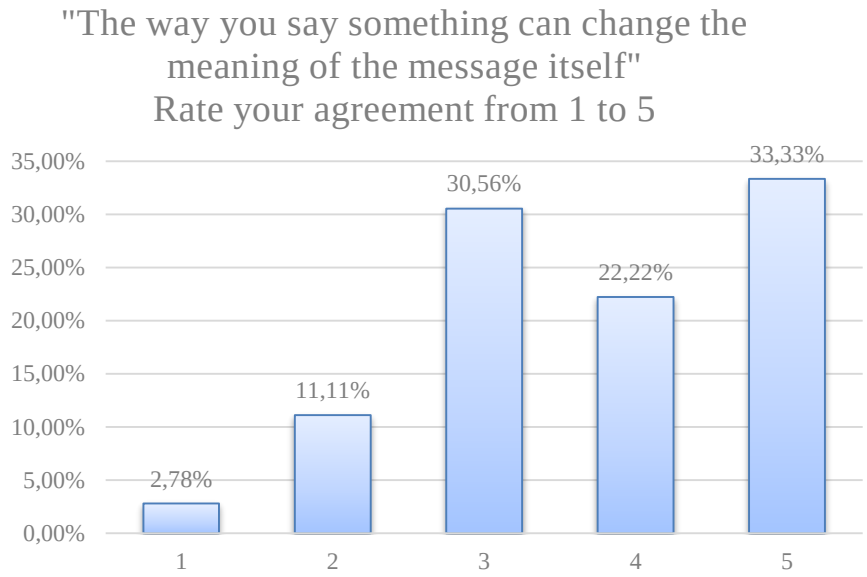
To provide with further evidence we tested the presence of those peculiar cultural traits that happen to influence communication, by means of a quick test through survey mode.

Following the widely accepted classification operated by the antrophologist Edward T. Hall, the Italian culture is supposed to be an high context (HC) one[39]; we double-checked such hyphotesis through three questions and got the results below:



[39] Edward T. Hall operated this macro categorization between high context (HC) and low context cultures (LC) relying on differential communicational features. In HC cultures great part of the communication does not happen through explicit messages, a lot stays embedded in the physical context or internalised in the speaker; conversely in LC cultures, the meanings are constructed in order to be linear, direct, and well stated, with small room for misunderstandings.





As clear by the graphs, the 86,11% of the participants argued that the extent to which a message can be delivered straightforward depends on the circumstances and the interlocutor, and that the manner and way through which meanings are communicated can somehow change the substance of the message (rate of agreement from 3 to 5). Nonetheless, the 88,89% claimed to be direct in communication – with a 50% stating that they are more than direct (rate of agreement >3).

It might sound as inconsistent, but it is not. It is just the sign that in the Italian culture the context is highly relevant, and it is totally shared to shape the communication accordingly; simply, giving contextual answers to specific interlocutors is not considered to be ambiguous. We have taken it as a further evidence of Italy being an HC country and our sample to be representative enough. This information is hugely significant to the purpose of the research; given that we are testing the influence of cultural issues in the perception of emotional messages- specifically of extremely direct social marketing messages- it is fundamental to check the relevance of such cultural influence. From our data it is reasonable to assume that Italian culture does have a strong contextual component that plays a role in communication.
Moreover, a basic knowledge of English language was required to participants, in order to ensure that they could easily understand the written message that appeared at the end of the English safety road spot.

As neuroscientific tools, we decided to use the Eyetracker and the EEG-Biofeedback combined together, since we considered the combination of both to be able to drive to better conclusions in terms of reliability. As discussed in chapter 2, the Eyetracker is extremely precise in detecting what people see, and what are the main attention's drivers on a screen, but it lacks in revealing details about the underlying mental processes; whereas the EEG is able to highlight specific neural activity, it is particularly suitable to detect the chronological course of neural patterns and, thanks to its high temporal resolution, it well fits a spot analysis based on rapid frames' changes. Additionally, both the eye tracking and the EEG-Biofeedback are not invasive techniques, they do not imply any chance of physical risk or damage for the subjects and they don't need dispersive setup times, nor enormous structures to work in. This made the experiment to be safer and the recruiting process to be easier. All the subjects participated as volunteers, as certificated by the releases they signed.

Insight on the EEG-Biofeedback

The implied use of the EEG-biofeedback allowed us to determine in substance when the subjects:

- were attentive
- were memorizing
- were referring to knowledge that was already present in memory
- were struggling to elaborate information

EEG-Biofeedback metrics:

- Attention: the user is ready to receive stirrings from the outside world, is open and receptive.
- Focus: measures the degree to focus on a detail of the stimulus. The subject is involved in a phase of selective attention.
- Learning: the user is ready to learn and memorize and it's a phase of upgrading existing knowledge. If learning and attention are activated at the same time the user perceives the stirring as New.
- Evocative: the user connects and compares the stirring with its previous experience (familiarity with the brand, with the site, habits, practices, influence of advertising).
- Simplicity: indicates that the communication stirring is comprehensible and immediacy. If it is off, the subject is in a state of cognitive fatigue, and the Decoding metrics is considered to be active.
- Relax: cognitively indicates that the subject is in a state of relaxation and willingness to interact effectively with the environment. If disabled, it generates a state of inhibition hindering the process of decision making, and the Anxiety metrics is on.

EEG-Biofeedback derived metrics:

- Awareness: it is built as the average between Attention and Evocative. In commercials' analysis, it represents the degree of brad's memorization. To the purpose of the present research, it is taken as a metrics that expresses the capability of remembering the inner message of the spot.
- Novelty: it is built as the average between Attention and Learning. It measures the capability of transferring new information.
- Persuasion: it is built as the average between Evocative and Learning. It measures the activation of high engagement levels in the subjects.

Neurometrics are expressed on a scale of 0-100. When the index is above the threshold L52, the related metrics is enabled; this means that the stirring has started significantly the metrics. If the index is between L52 and L48, the metrics is in the "Routine" state. Below the threshold L48, the metrics is off.

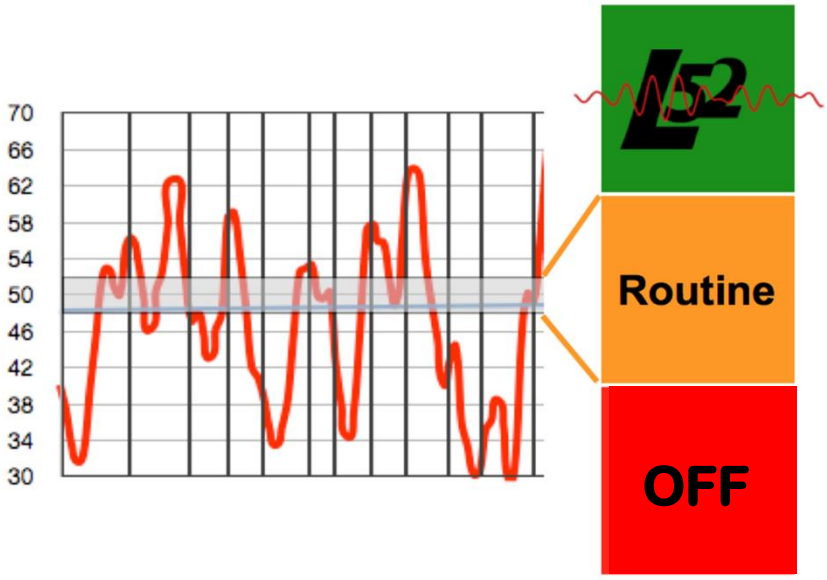


FIGURE 4.1: Screenshot from EEG-Biofeedback activity. It indicates the three states of activation (activation; routine; deactivation) related to neurometrics ratings. Picture from kind concession of GTechnology Foundation.

Insight on the Eyetracker

By measuring the corneal reflection through infrared light, the Eyetracker recorded information about:

- what the subject was looking any time
- how the subjects collected information to be elaborated by brain
- how many time the subjects were lingering on details

Eyetracker metrics

- The number of fixations: the number of times that gaze remains fixed on a target. During fixations information is collected and processed by the brain.
- Mean time to fixation: is the average time devoted to the observation of an object. If it is less than 200 ms is not effective, if it is higher than 500 ms indicates a difficulty in understanding.
- Time of Saccade: fast movements of the eye needed to switch from one fixation point to another. If this index is too high it means confusion and little usability of the stimulus.
- Visual attention - hotspot: the points in red are the ones that have a higher visual concentration, while those ones in green indicate less attractive areas
- Stochastic reading: represents the order in which information is read. Used to identify which parts obstruct the flow or benefit experiential flow.

FIGURE 4.2: Picture of the eye tracker during the calibration procedure.

FIGURE 4.3: Picture of the EEG-Biofeedback in function.

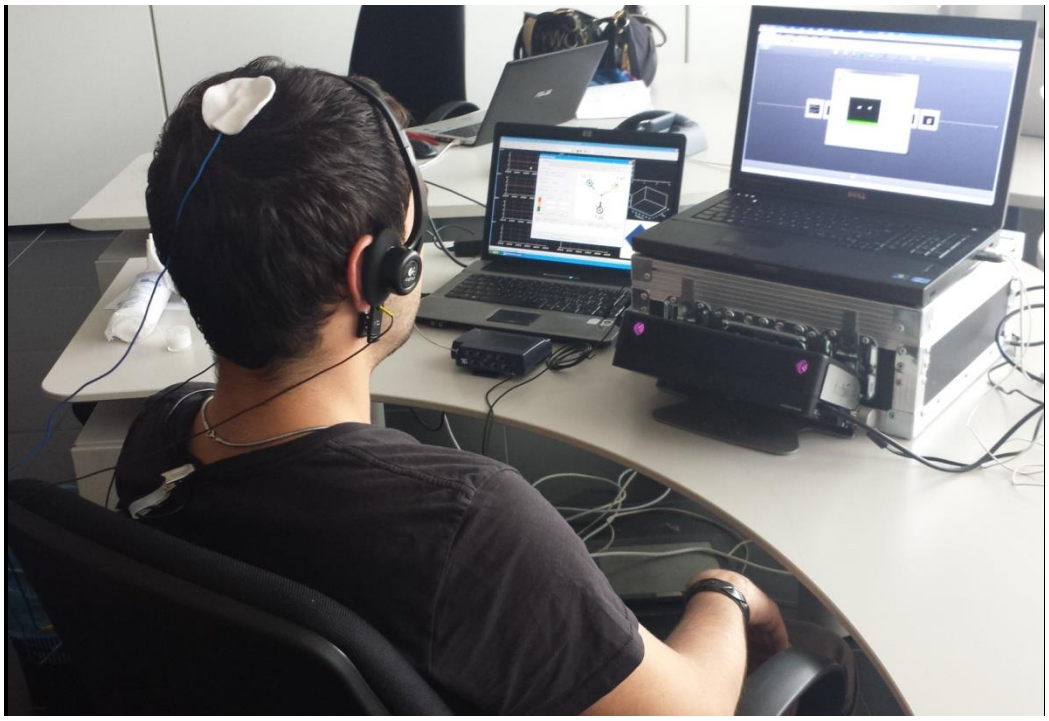


FIGURE 4.3: Picture of the subject 01 right before the experiment starting. Both the Eyetracker and the EEG-Biofeedback are turned on; the EEG-Bioffedback is connected to the subject through three sensors, two of which are placed on the earlobes and one on the head.

Results

The results of the experiment are collected below, organized as following:

- EEG-Biofeedback results

- Eyetracker results

- Survey results

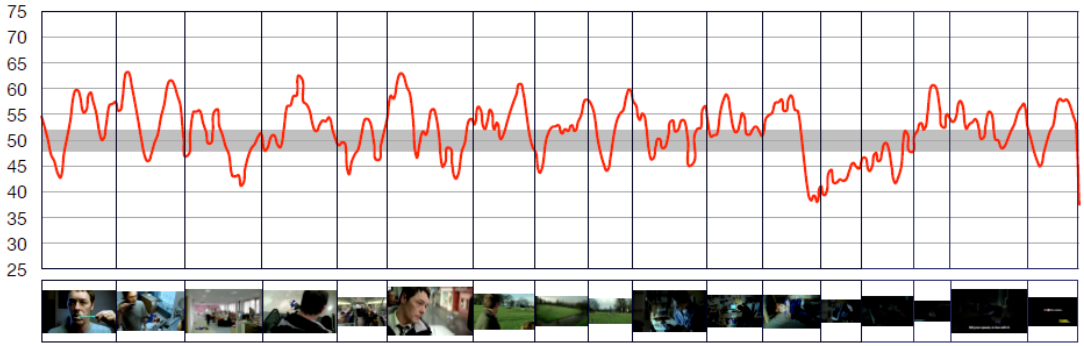
As far as the EEG-Biofeedback analysis is concerned, the results have been grouped both in graphic continuum representation mode and in table mode. The graphic continuum representation has been settled in order to provide with a direct comparison between the reaction to the UK road safety spot and the IT one, for each metrics.

The graphs show the trends of the metrics: attention, focus, learning, evocative, simplicity, relax, awareness, novelty, and persuasion. On the vertical axes there are the ratings of the metrics, that allow to understand whether the metrics are enabled ($x > 52$), in routine state ($52 > x > 48$), or turned off ($x < 48$). On the horizontal axes we have represented the frames of the spots divided in units of sense, in order to display the correlation between the trends of the metrics and the various moments of the visual experience. The pattern of each metrics has been briefly described in a commentary, while in-depth considerations have been reported in the results' Discussion, furtherly integrated with the information derived from the Eyetracker and Survey[40].

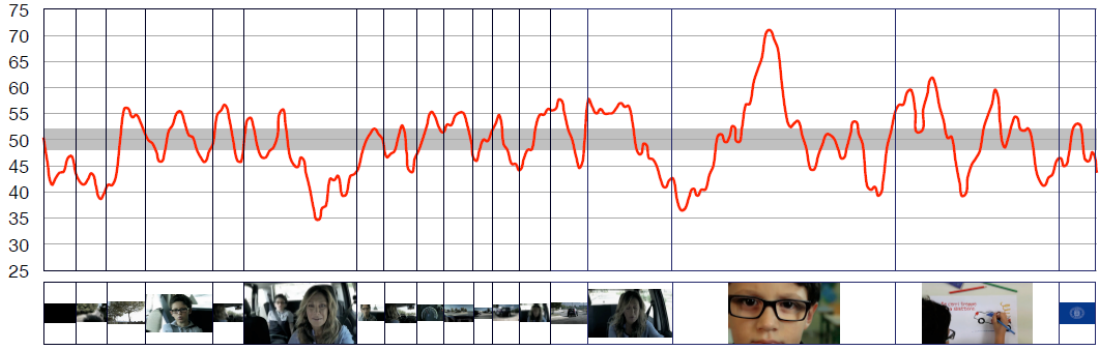
[40] See the following paragraph,

Attention

UK Road safety spot



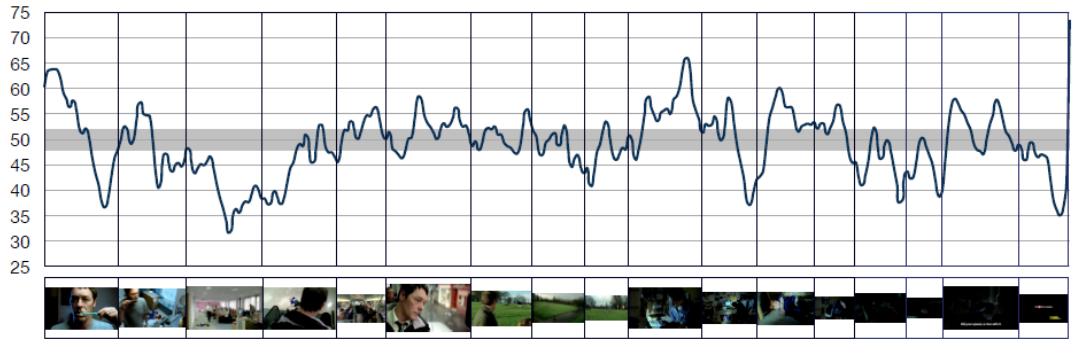
IT Road safety spot



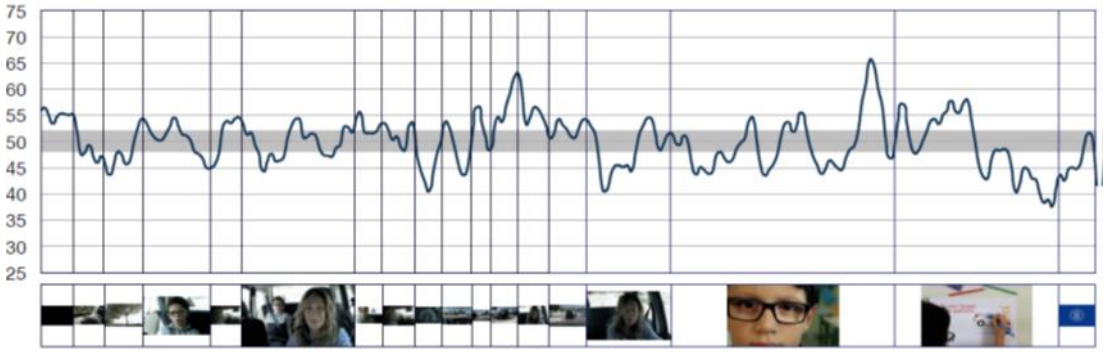
Commentary: in the UK road safety spot the Attention is higher on average. In the IT spot the highest positive pick is recorded in scene number 16.

Focus

UK Road safety spot



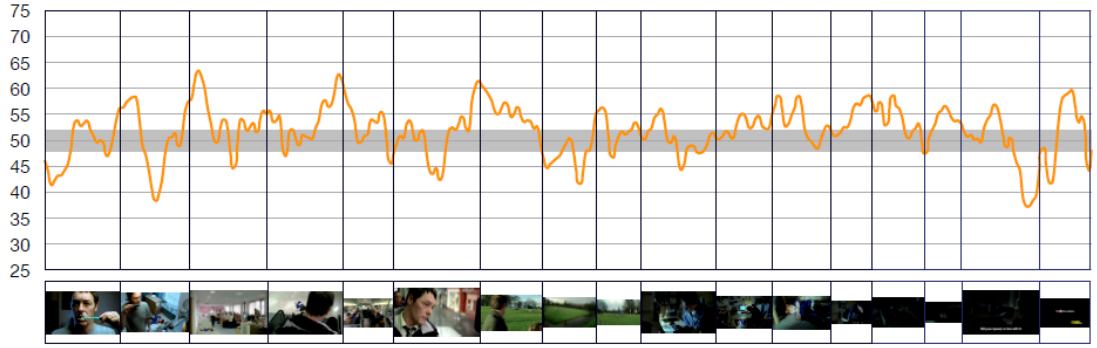
IT Road safety spot



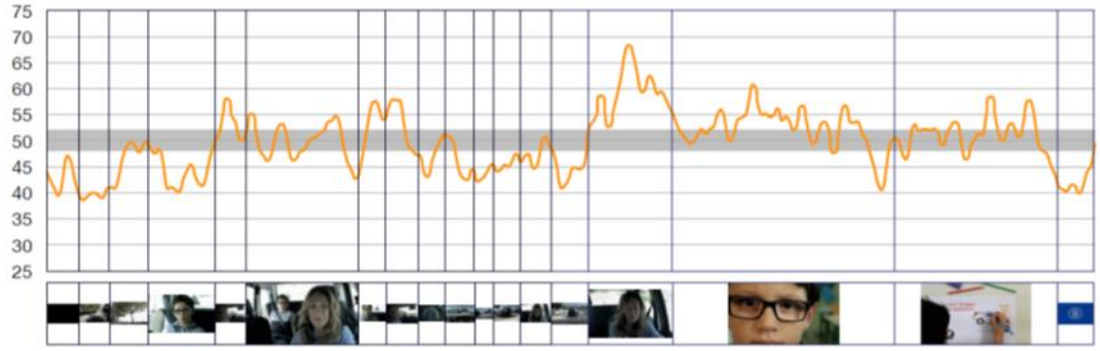
Commentary: Focus trend has a wider volatility in the UK spot, facing several peaks. A significant down peak is recorded correspondently to scenes number 3-4 and 12-13.

Learning

UK Road safety spot



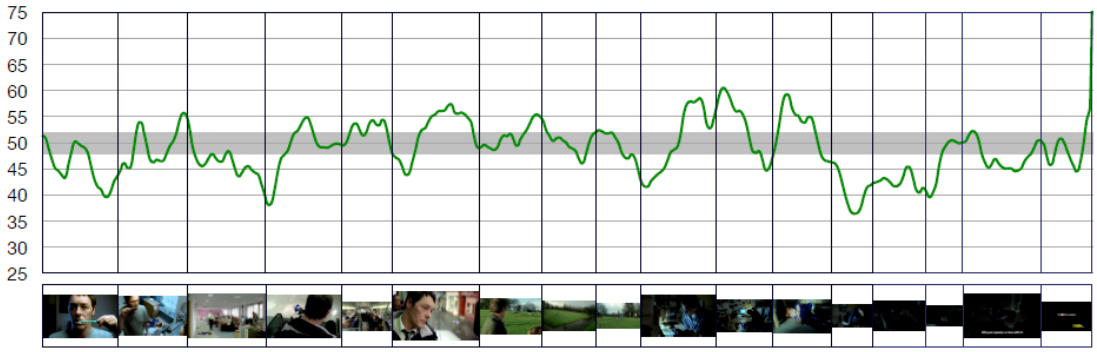
IT Road safety spot



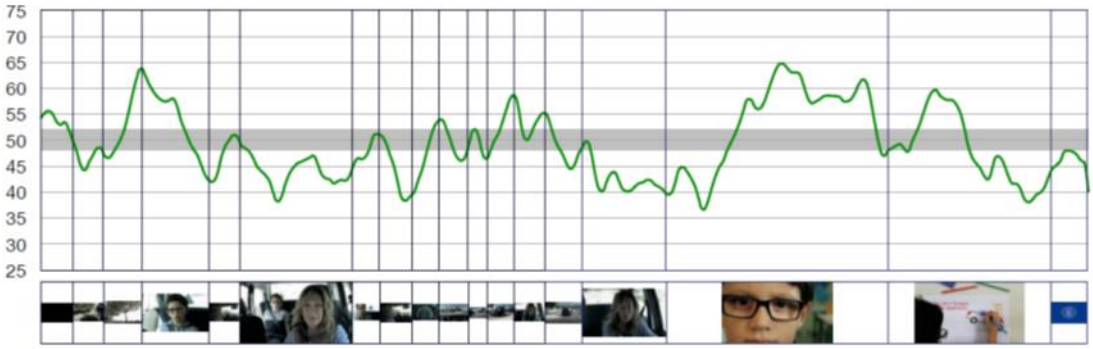
Commentary: Learning is higher on average in the UK spot. The trend is homogeneously distributed near the activation zone of the metrics, with few low peaks. The IT spot has greater variance; a significant positive peak is registered in correspondence of scene number 15.

Evocative

UK Road safety spot



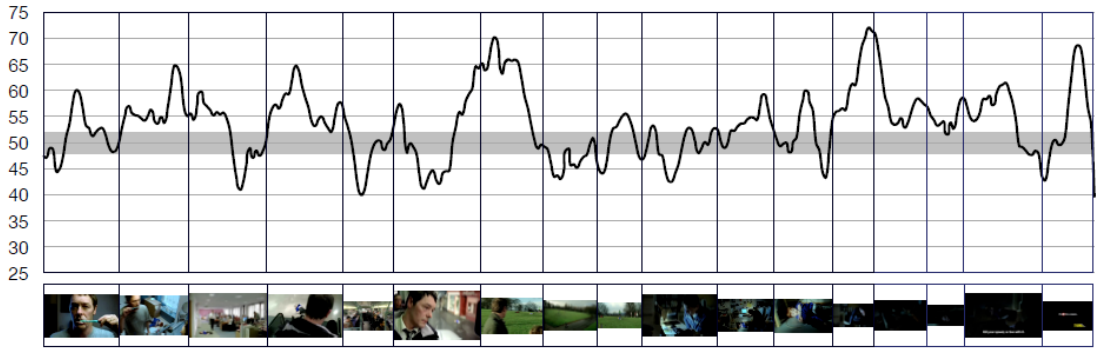
IT Road safety spot



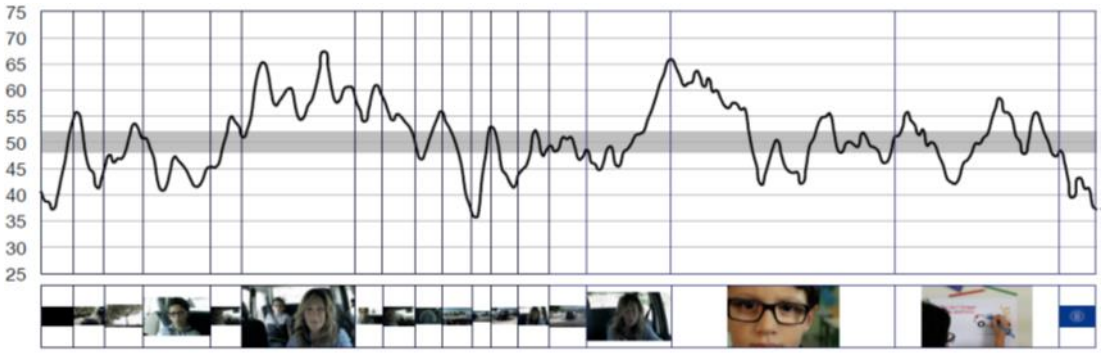
Commentary: the striking trait of the evocative trend is that it is much more dispersed during the IT spot; it is fairly visible from the waves' range.

Simplicity

UK Road safety spot



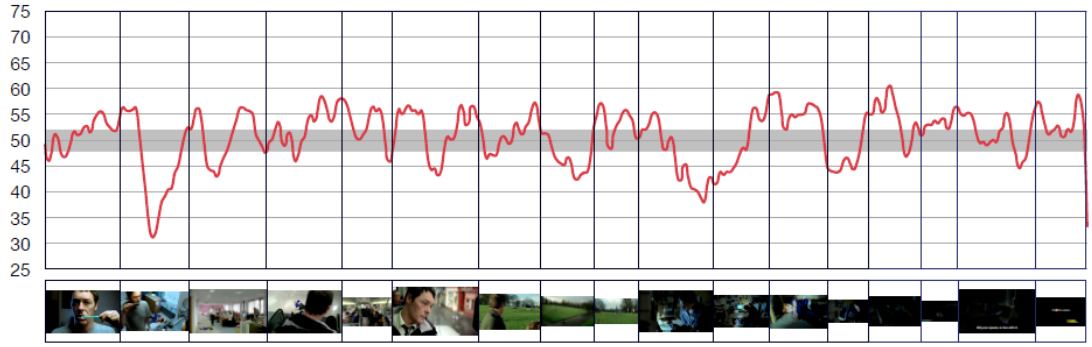
IT Road safety spot



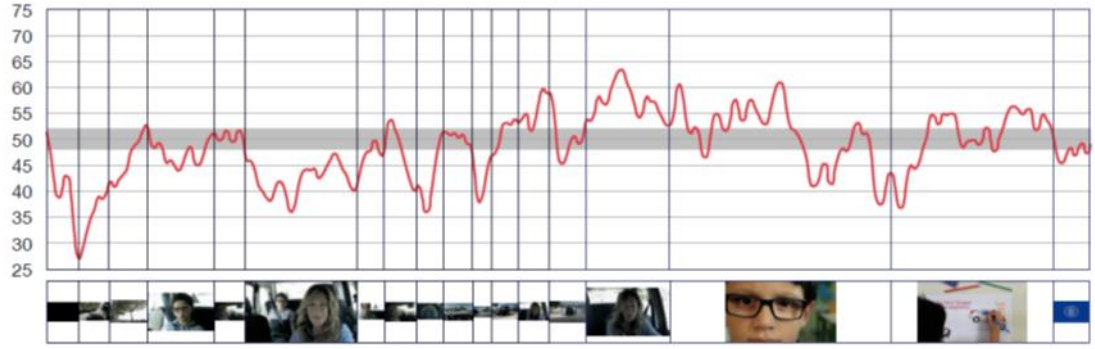
Commentary: Simplicity is pretty irregular during both videos. During the UK spot it is higher on average.

Relax

UK Road safety spot



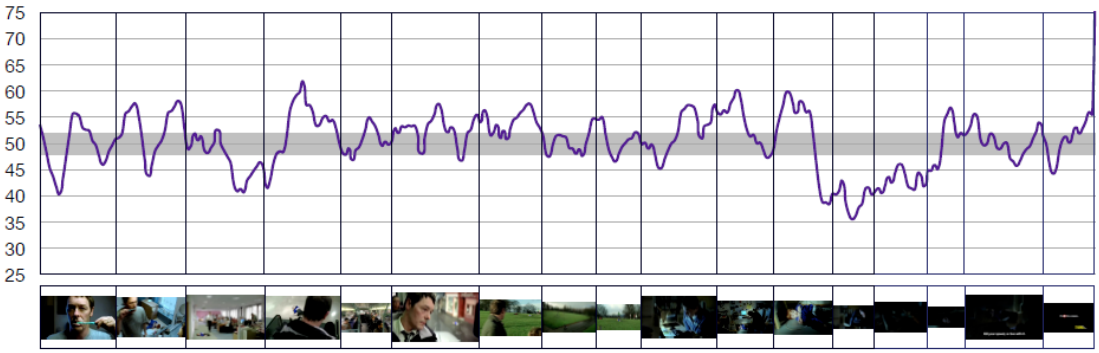
IT Road safety spot



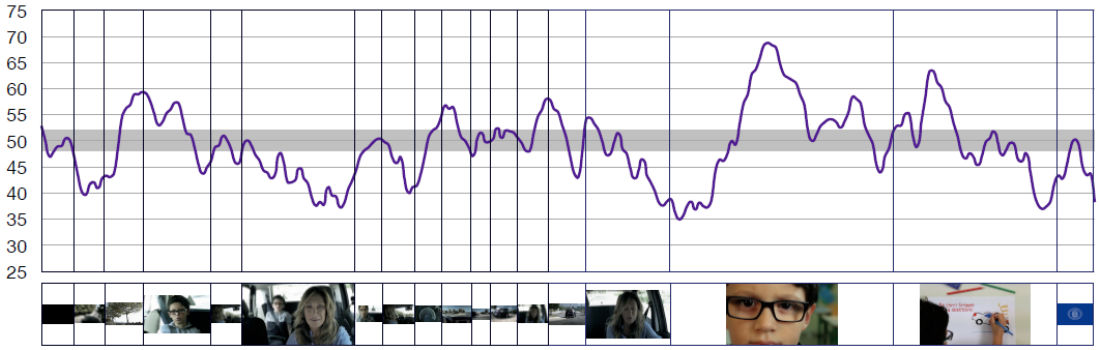
Commentary: During both videos, a relevant down pick in relax, with consequent anxiety activation, is recorded at the beginning: respectively, in scene number 2 in the UK spot, in scenes number 1-2-3 in the IT spot.

Awareness

UK Road safety spot



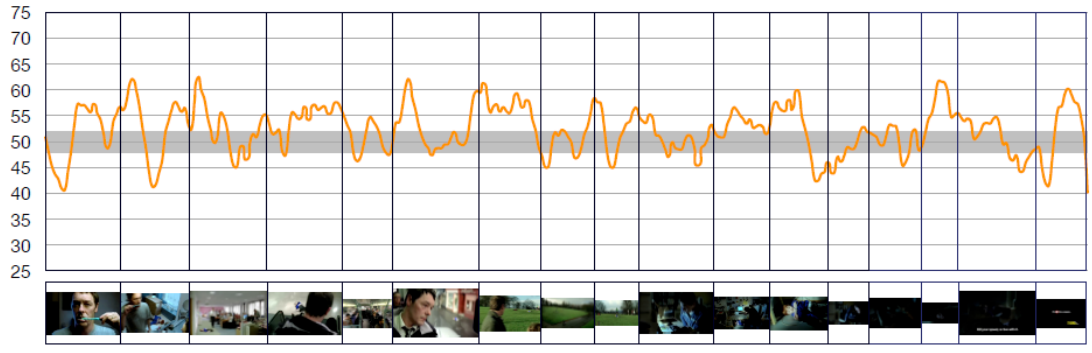
IT Road safety spot



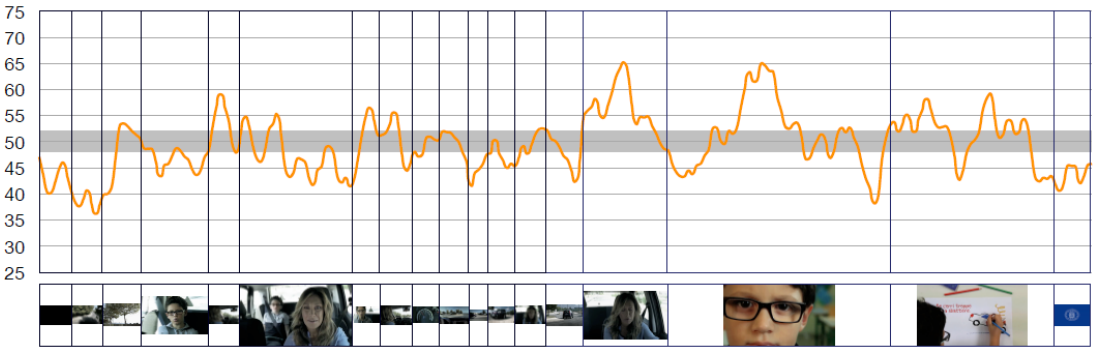
Commentary: Awareness faces a significant down peak in scenes number 13-14-15 during the UK video; whereas an outlining positive peak is observable in scene 16 of the IT road safety spot.

Novelty

UK Road safety spot



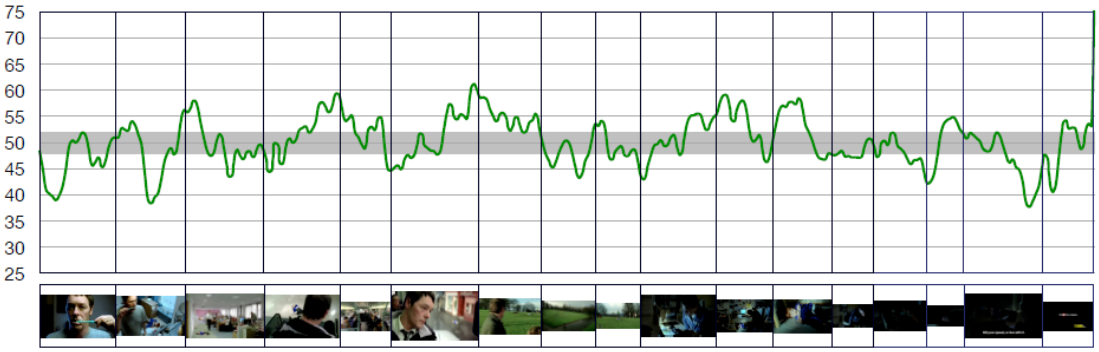
IT Road safety spot



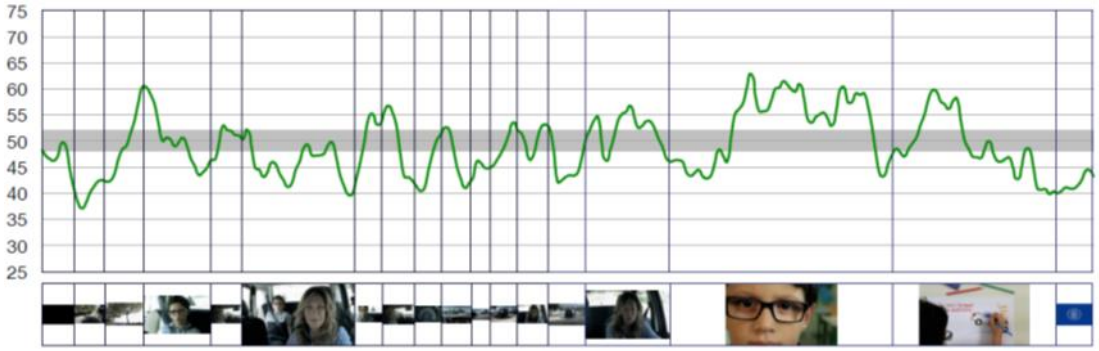
Commentary: Novelty is higher and displays a more concentrated distribution in the UK spot with respect to the IT one.

Persuasion

UK Road safety spot



IT Road safety spot



Commentary: during the IT spot Persuasion faces greater volatility and results to be lower on average with respect to the UK spot.

To make the patters even clearer, it suitable to refer to the tables collecting the aggregate metrics' values.

UK Road safety spot

Table 4.1

Shot	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Speech																	
Frame																	
Attention	52,8	55,7	49,7	53,6	49,5	52,5	54,9	50,8	52,1	52,2	53,6	52,9	41,7	46,1	54,4	53,0	52,8
Focus	52,6	49,0	40,9	44,2	51,8	51,9	50,1	49,8	46,8	55,3	51,2	51,3	53,3	46,2	45,0	51,1	45,2
Learning	48,3	50,1	54,1	53,2	54,5	49,9	56,5	47,1	52,0	50,3	52,4	53,6	53,6	55,2	53,1	49,7	50,1
Evocative	45,8	48,2	47,2	48,1	52,3	52,2	50,7	50,5	50,4	49,5	54,3	52,8	41,6	42,7	44,5	47,6	48,3
Simplicity	51,4	56,0	52,1	56,4	49,0	49,7	63,4	46,7	50,8	48,6	53,3	52,4	58,2	59,8	54,6	55,8	54,1
Relax	51,1	45,3	50,9	51,9	54,2	51,5	51,1	47,4	53,2	47,5	46,8	56,0	46,2	54,5	53,0	51,5	53,2

Shot	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Frame																	
Awareness	49,1	52,5	47,8	52,6	50,7	52,3	54,4	50,3	51,0	51,6	54,7	52,7	39,0	42,7	48,7	50,3	50,5
Novelty	50,6	53,2	52,5	54,3	51,6	52,0	57,6	49,6	52,2	51,0	53,3	53,4	47,0	50,5	55,8	51,4	51,7
Persuasion	46,0	47,8	50,3	51,3	53,6	50,3	55,5	48,1	49,9	50,2	54,8	53,0	47,6	49,0	48,7	47,9	47,7

IT road safety spot

Table 4.2

Shot	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Speech				Mamma, perché c'è scritto	cinquanta?	Perché le macchine non possono andare più veloci di 50	E tu a quanto vai?								Amore io stavo andando troppo veloce	Lo capisce anche un bambino che la velocità può distruggere una vita. La velocità troppo elevata	provoca 30000 incidenti l'anno, Non rischiare, resta sulla buona strada,	
Frame																		
Attention	44,9	42,5	48,5	50,3	51,8	45,2	48,1	49,2	50,1	53,4	48,4	50,2	49,3	52,6	51,6	49,7	51,3	48,3
Focus	55,2	50,0	46,6	51,3	49,7	49,9	52,8	51,2	46,5	48,6	52,7	53,7	57,5	52,2	48,6	49,7	48,8	45,4
Learning	43,2	39,8	45,4	44,4	52,7	50,1	50,7	55,1	46,3	47,2	43,1	45,0	47,1	44,6	58,8	52,5	51,3	41,5
Evocative	54,3	47,5	50,7	55,9	45,9	44,2	46,1	46,9	43,0	50,4	50,1	50,4	54,1	49,4	43,0	53,3	48,3	46,2
Simplicity	40,6	49,2	47,8	45,5	48,9	59,1	57,3	56,5	50,2	50,3	38,2	47,7	46,8	49,3	50,6	52,9	50,6	43,6
Relax	43,3	33,6	44,2	47,5	50,6	42,7	45,6	49,2	40,1	50,5	42,4	49,3	54,7	51,1	57,2	51,0	50,2	48,1

Shot	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Frame																		
Awareness	49,5	43,2	49,8	53,9	48,0	42,9	46,7	47,7	45,2	53,8	49,4	51,0	51,3	51,7	46,8	51,6	49,9	45,5
Novelty	43,5	39,2	46,5	47,0	53,0	47,5	48,9	52,3	47,8	50,6	44,1	47,2	48,5	48,3	56,2	50,9	51,6	43,2
Persuasion	47,8	40,3	46,7	51,5	49,4	46,0	47,9	52,2	43,0	48,0	44,2	47,2	50,5	45,8	52,1	53,1	49,2	41,4

Map Legend:

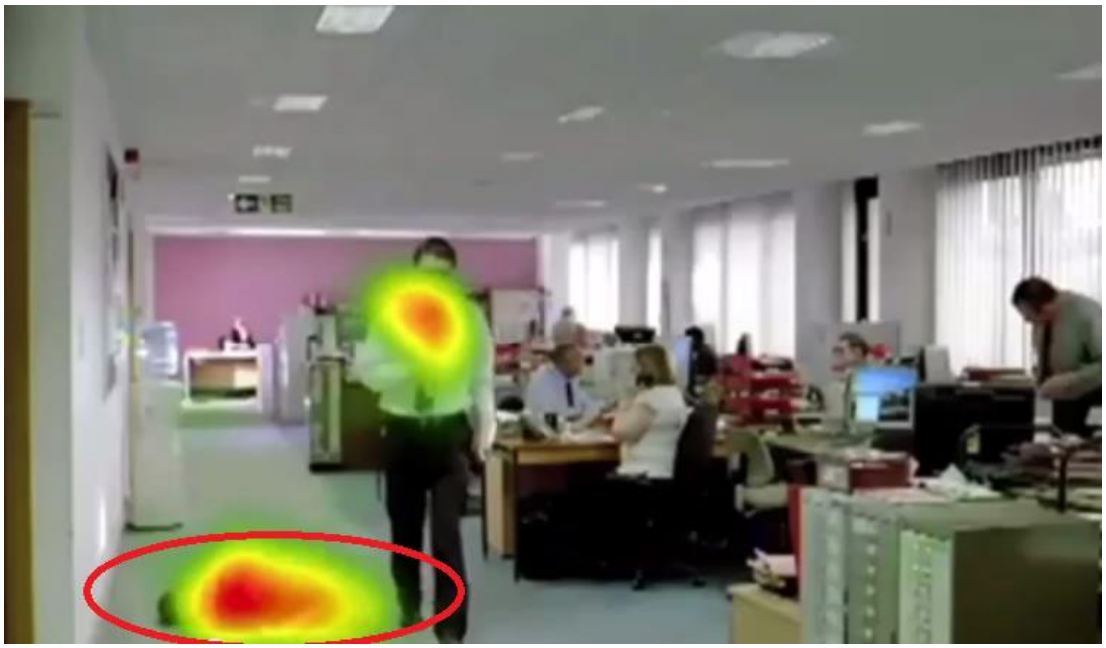
- Enabled metrics (x>52)
- Routine-state metrics (52>x>48)
- Disabled metrics (48>x)

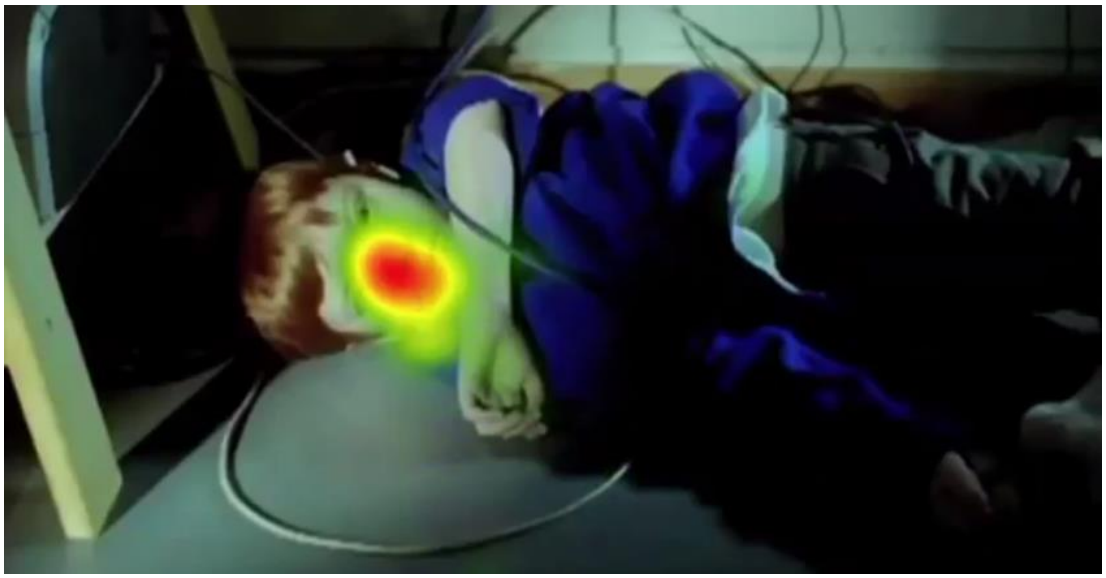
Even at first glance, it is clearly observable from the larger green zone, that the UK spot provokes a greater general activation of EEG-Biofeedback metrics, with respect to the IT one. The stronger activation is maximum and outstanding for Attention, Learning and Simplicity, it also visible for all the other metrics expect for one: Focus appears to be reinforced during the IT road safety spot. Furthermore, it is noticeable that in the UK spot, the activation pattern faces its overall positive peak during scenes number 11 and 12, with Relax as the only impaired metrics.

Concerning the Eyetracking results, we have selected and captured several screenshots from the Eyetracker records, according to the variables we set as relevant for the analysis:

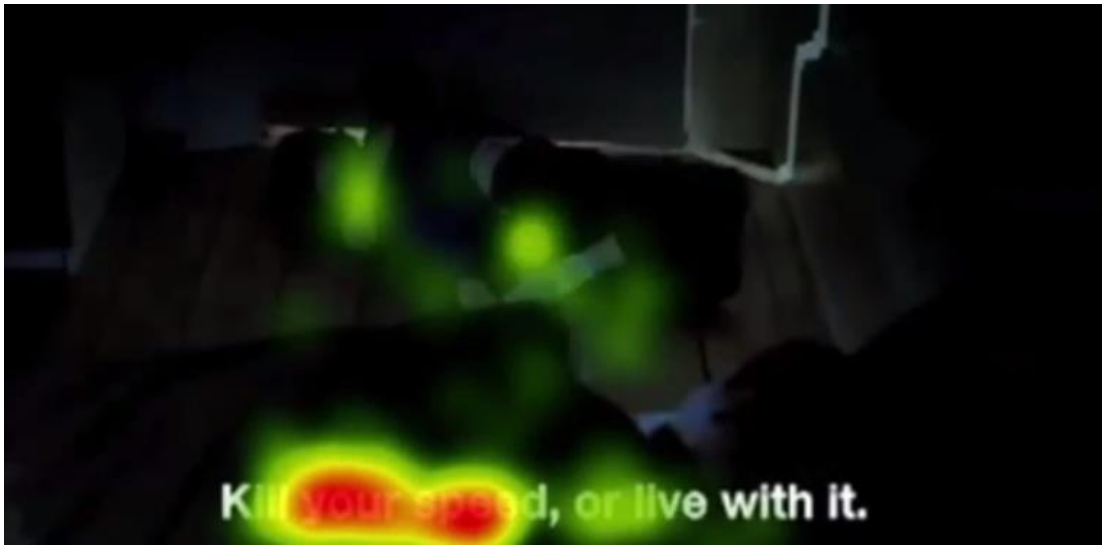
- In the UK spot, we were willing to highlight the reactions to the death child appearance; specifically, we wanted to check whether the image was so disturbing to imply a change in gaze's direction, or conversely, if it was a focus point.
- In both spots, we aimed to point out the focus on the final scenes, when messages about the dangers of speed limits are displayed.

Screenshots from UK road safety video's Eyetracker records:

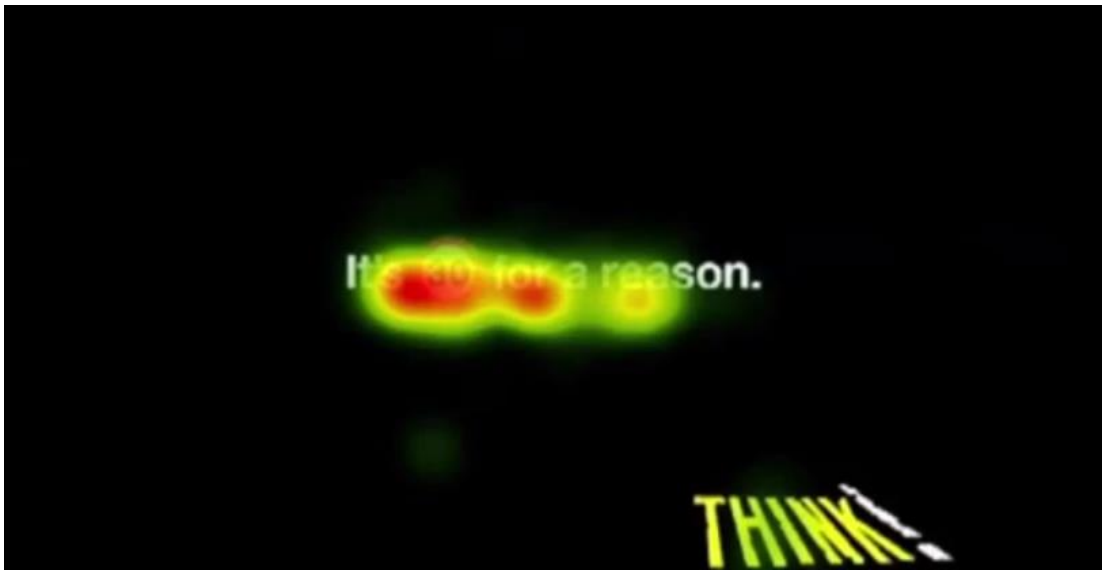





Kill your speed, or live with it.

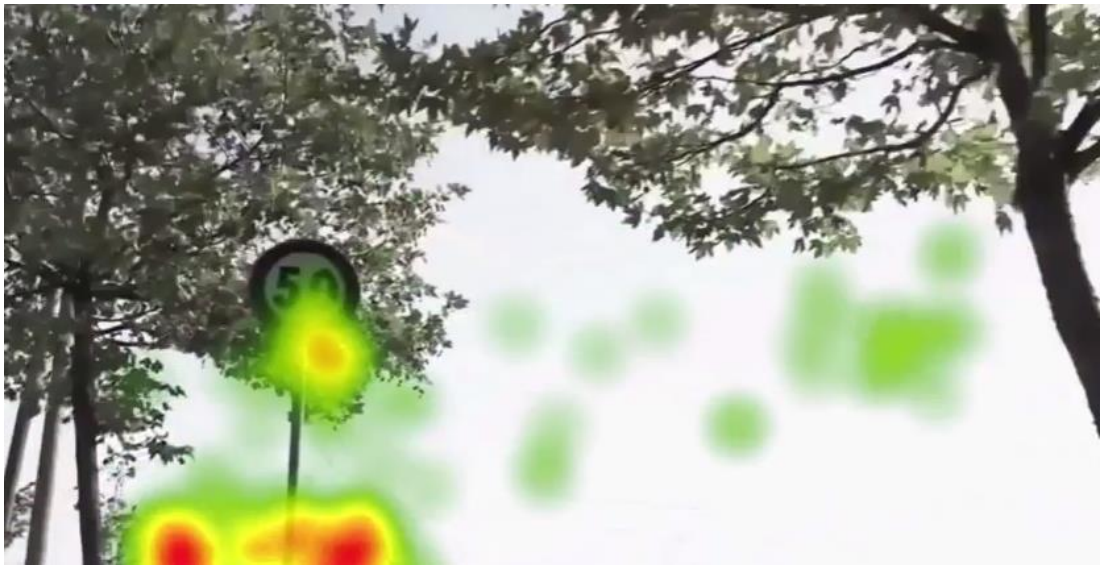

d, or live with it.


It's 30 for a reason.

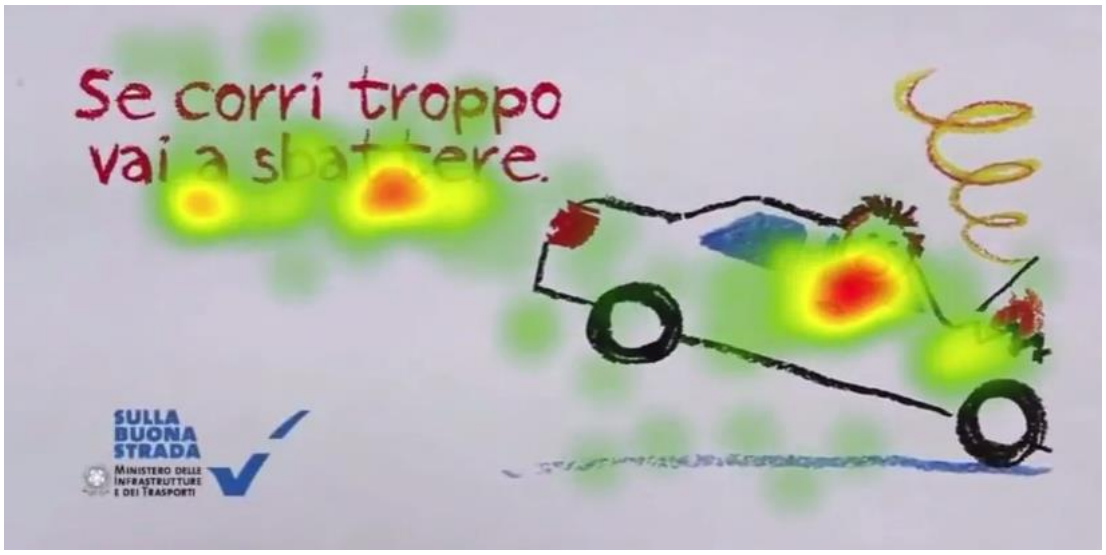


Commentary: the image of the dead child did not entail a change in gaze's direction; on the contrary, it results to be a clear focus point in the stream. During the final frames, when the claim about speed limits appear, the gazes is well-centered on the both on the sentences and on the speed limit symbol. The latter observation makes reasonable to assume that the claim has been distinctly perceived.

Screenshots from IT road safety video's Eyetracker records:




Se corri troppo
vai a sbattere.



Commentary: there is no straight focus on the speed limit signal, the gaze seems to skim it. During the spot, subjects' eyes follow the mouths of the actors speaking. At the end, when the statement about speed appears, the gaze is not exactly centered, contrary to what happened in the last frames of the UK spot; anyway, this does not come to be as a negative performance, the subjects manage to embrace the whole picture, identifying its focus points.

To conclude the analysis of the results, the survey answers must be considered as well. Not only we have used the survey to gather the demographic information, and test high context communicational features; we have also tried to gain understanding of what the subjects thought about the two videos. The choice of the survey as a qualitative analytic tool originates from many reasons. First of all, a strong assumption of our research methodology relays on the inter-complementarity between analytic techniques; generally speaking, the more diverse analysis approaches come to be employed, the more the likelihood of getting complete and accurate information increases. Thus, after having "spied" the subjects' thought and feelings by observing their brain activity, we wanted to give them voice and focus also on mediated perceptions. To tell it in other words, through the neuroimaging tools we recorded implicit and partially unconscious responses, whereas through the survey we asked for explicit, personal interpretations.

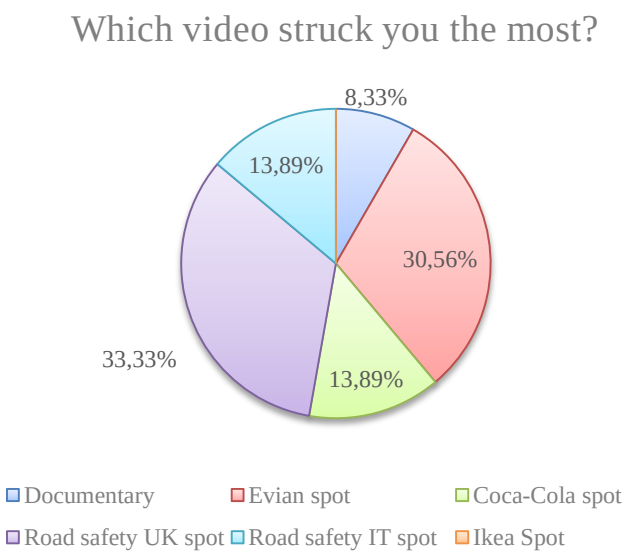
Such a method has been constructed with two main purposes:

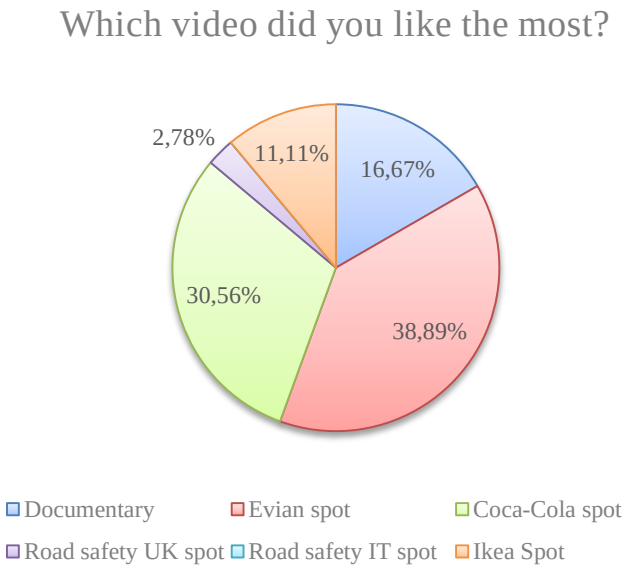
- to reach for significance and accuracy;

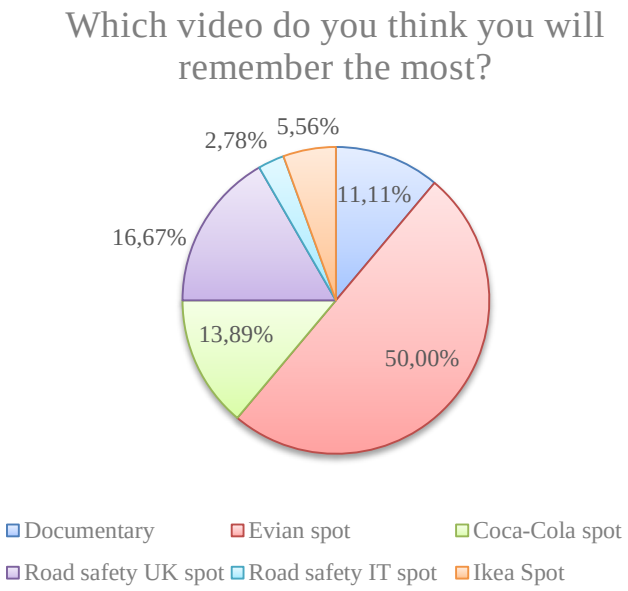
- to individuate eventual relevant distortions between the underlying neural patterns highlighted through the EEG-Biofeedback, and the explicit thought derived from the survey's answers.

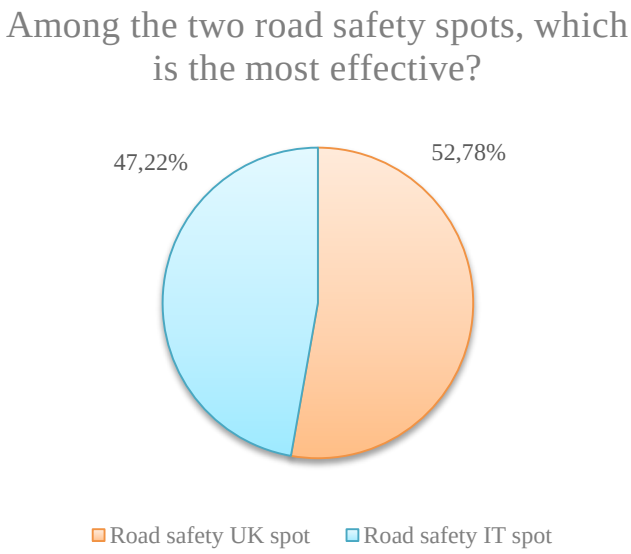
To complete the premise, we have opted for a survey-mode rather than in-depth interviews mainly because of time and resource constraints.

Questions and answers are displayed below in graph form.









Summary:

As anticipated in the methodology exposition, six videos have been displayed during the experiment but only two of them, specifically the two road safety spots, were considered relevant to our research being the target stimuli.

For the sake of clarity, the survey answers related to the two target stimuli have been further collected in the table below.

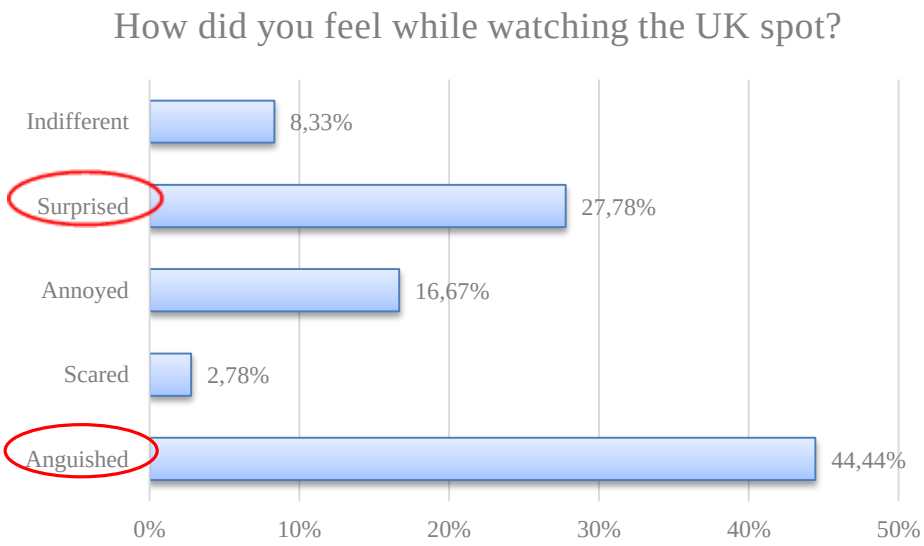
It is interesting to notice that the UK video captured systematically higher attention with respect to the IT one, but when subjects were asked to identify the most communicative one, they've spitted almost equally[41].

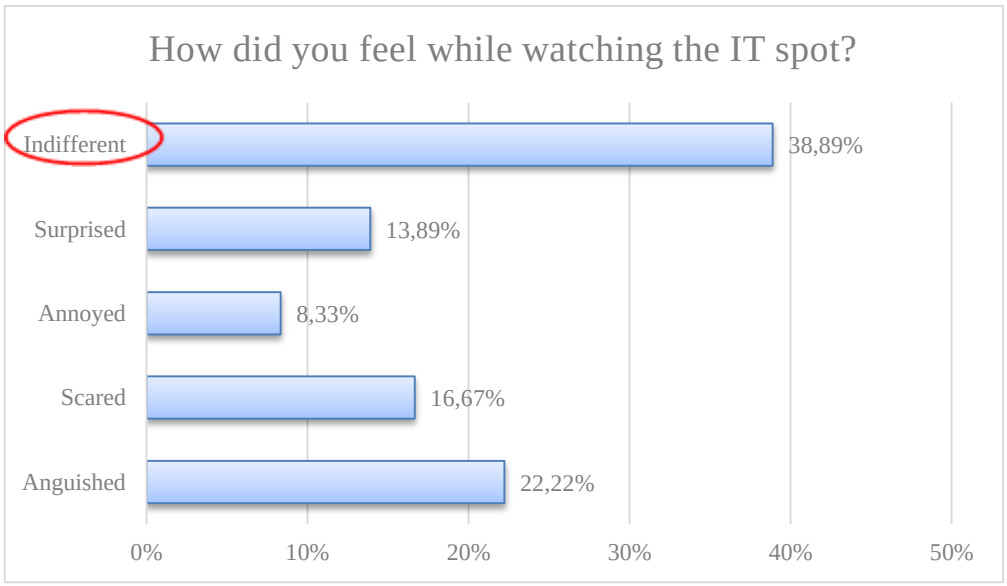
Table 4.3

% of subjects that considered the videos:				
	The most striking (among the 6)	The most appealing (among the 6)	The most unforgettable (among the 6)	The most effective as a road safety campaign (among the 2 target stimuli)
UK Road safety spot	33,33%	2,78%	16,67%	52,78%
IT Road safety spot	13,89%	0%	2,78%	47,22%

After having collected the judgments about the video, we asked the participants to express how they felt while watching them. As a significant threshold we have chosen Q1[42], that is to say that by assumption we have considered to representative to the analysis all the options chosen by >25% of the subjects[43].

[41] The latter evidence will be object of discussion in the following paragraph.
[42] The first quartile (Q1) is also known as the 25th percentile.
[43] The significant options are visible in the graph as circled in red.





At the end of the survey an open question was also provided, in order to let the subjects refer spontaneously to the videos, without any external influence. They have been asked to fill in a blank space, describing each one of the two videos with an adjective. Although being 36 subjects, we have collected 12 adjectives for the road safety UK spot and 14 adjectives for the road safety IT one, meaning that some subjects happened to write the very same word. The results are shown below in the form of wordcloud maps[44]; the size of the words in the clouds is proportional to the frequency with which they have been mentioned in the survey answers.

[44] We considered the wordcloud map to be the most immediate and efficient graphic tool to gather such semantic data.

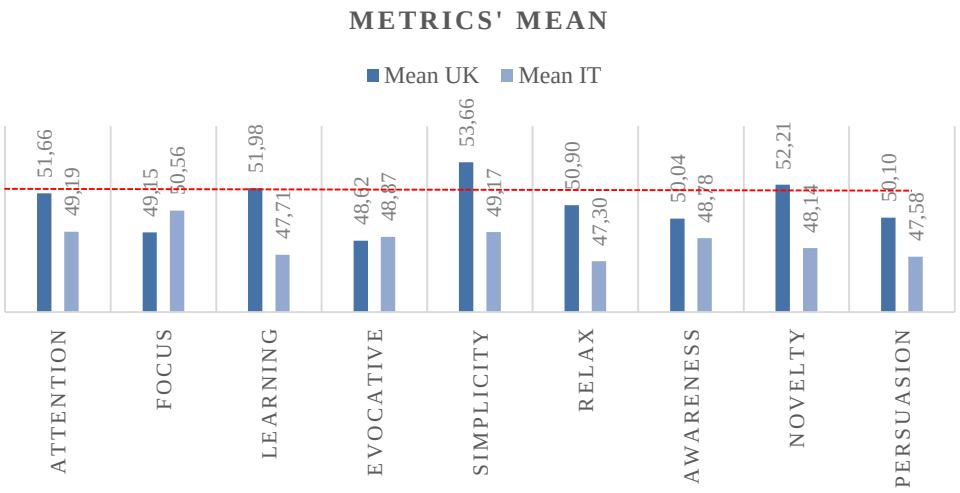
An adjective to describe the UK road safety spot:

An adjective to describe the IT road safety spot:

Discussion

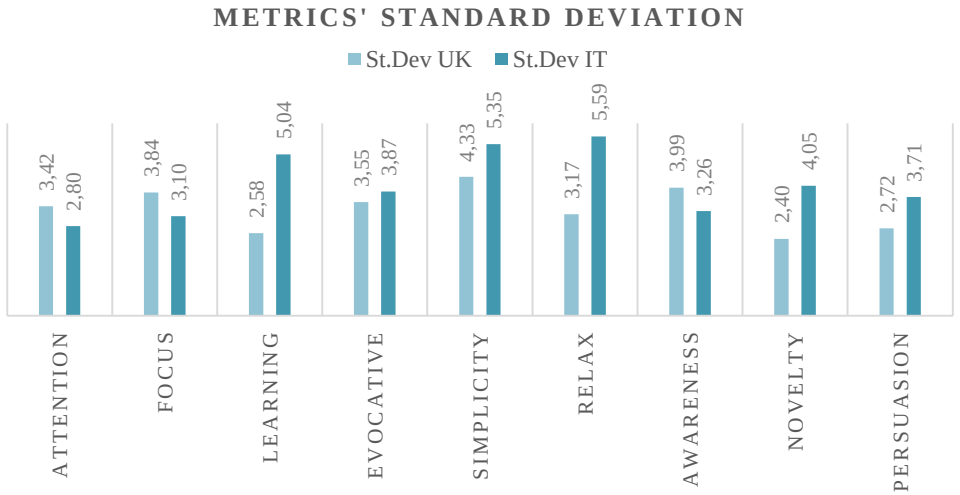
The first macro result that captures the attention is the fact that the UK road safety spot generates greater activity in the EEG-Biofeedback patterns. A part from the case of Focus metrics, which measures the focus on details and happens to be higher in the IT spot, all the other metrics performed better during the display of the English video. The phenomenon is significantly relevant to the purpose of our research, since our aim was to verify whether there would have been an impairment in cognitive processes due to the shocking form of the UK spot message. Right from the EEG-Biofeedback analysis it is possible to state that the hypothesized impairment did not take place, indeed the video appeared to raise the mental processes with respect to the other one. This early observation moves away from the current opinion, according to which shocking advertising would be generally ineffective to an Italian audience; whereas it confirms and reinforces the neuroscientific theories above discussed, according to which emotional communication would benefit from substantial activation in cognitive processing, specifically when it comes to negative emotions' elicitation. The named result is evident in the graphs and tables collected in the previous paragraph; however, to make it even clearer we have reported the aggregate statistics about mean and standard deviation of the metrics ratings.

It seems appropriate to precise that such values assume principal relevance in terms of visual lucidity, while in terms of substantiality of the information it is favorable to consider the trends of the singular metrics in intertemporal relation to the progressive frames of the videos.



Reminding that 52 is the critic threshold for the metrics to be considered enabled,

it is easily observable that during the UK spot there have been stronger activation patterns with respect to the IT one. Conversely, the mean values of the metrics related to the IT road safety spots all stand below the activation threshold, which is visible in correspondence of the red line in the graph.



Interesting observations can be derived from the standard deviation analysis. The standard deviation, as overall trend, is higher in IT spot metrics, except for Attention, Focus, and Awareness. As said, in the UK video Attention scored with higher mean value with respect to the IT one, it is possible to notice that it also scored higher in standard deviation. Thus, subjects' attention has experienced greater volatility, facing up and down peaks. The most significant down peak has been recorded in frames number 13-14. The fall may be attributable to two main causes: first of all, those scenes come right after a relevant positive peak in almost all the metrics, therefore there might have been a break after an effort, since by nature attention comes to be characterized by a fluctuating pattern. Moreover, frames number 13-14 are extremely dark, it seems possible to infer that this may have influenced the attentive performance. It is not surprising that Awareness follows basically the same path as Attention, recalling that Awareness itself is built as the average of Attention and Evocative. Concerning Focus, its trend differs from those of the other metrics; in the UK video, Focus is lower on average and experiences greater volatility compared to the IT spot values. It is reasonable to state that, among the observable reactions, subject's poorly performed in Focus during the display of the English video.

It is worthy to derive some evidence from the analysis of the significant positive peaks in the EEG-Biofeedback activity during both videos.

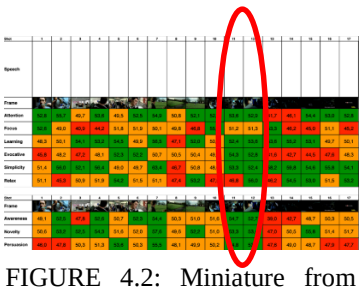


FIGURE 4.2: Miniature from table 4.1 UK road safety spot metrics.

The green zone represents the best moment for cognitive activation during the UK road safety spot. Attention, Learning, Evocative and Simplicity, and consequently Awareness, Novelty and Persuasion, are simultaneously enabled.

Paradoxically as it may sound, the correspondent frames, namely frames number 11-12, display the close-up of the death body of the child. Not only the shocking form of the advertising provoked an increase, rather than an impairment, of mental processes, but the most disturbing scene resulted to be the highest moment of cognitive activity. This appears to constitute a further evidence that emotions, specifically negative ones, benefit from a higher activation in mental processing and memory systems.

Significant activation patterns are also appreciable in the final scenes, when the claims about danger and speed limits appear.

FIGURE 4.3: Miniature from table 4.2 IT road safety spot metrics.

Concerning the IT road safety spot, the most positive peak is registered during the 15th frame, with Attention, Learning, Evocative, and consequently Simplicity and Persuasion, positively enabled.

In the 15th frame of the video, the close-up of the child appear, accompanied by a voice talking. It might not come as a coincidence that in both videos a raise in cognition has been registered during the display of a close-up; it is plausible to hypothesize that close-ups favor attentive peaks in videos, as further confirmed by the Eyetracker hotspots. It is also easy to observe that, contrary to what happens in the UK video, the final scene of the IT spot- the one in which claims about dangers of high speed come into view, is characterized by a total routine state in metrics. Nonetheless, the table refers to average values, the continuum graphs show that cognitive activity was not dormant actually; indeed, there were positive peaks in Learning and Simplicity. It is possible to state that both messages have been acknowledged by the subjects.

The results from the EEG-Biofeedback attribute a better overall performance in communication to the English spot. The Eyetracker, although being a behavioral tool and therefore lacking in mental processing highlights, somehow complete and confirm such findings. At first, we have used the Eyetracker to check subjects' reactions to the death body of the child in the English spot; consistently with the EEG-Biofeedback metrics that outlined an increase in attentive patterns, the hotspots showed that the dead body was a major gaze's focus point in the screen. Formulating a hypothesis based both on the current opinion about shocking advertising in Italy and on the answers from the survey, which describe the UK video as disturbing, distressing, and even horrendous, we could have expected, as a natural reaction, to observe subjects moving away their look. But they did not. Instead, they stayed fix on that image.

Anyway, although it has been proved for emotions to perform better in capturing attention and eliciting memory systems, this is not enough to grant a successful outcome of the communication. It may be argued that, despite engaging the public, the non-conventional form could distract the focus from the real claim of the campaign.

Even if it is not the time and place to give an absolute rule of thumb on the subject, it is still possible to make a point about the present case. It is relevant to notice that in the last frames of the UK spot, when the claims about speed limits are displayed, the gaze is progressively centered on every word and on the signal of speed limit. This result, together with the observation that correspondently to those scenes the EEG-Biofeedback metrics are good on average, it is conceded to presume that the message has been carefully read. Considering the fact that the cognitive activity of the subject had been in a state of general activation during the whole display of the spot, it seems reasonable to infer that, not only the claim has been read, it should have been also accepted and absorbed. Therefore, concerning the experiment, it can be concluded that the unconventional spot, namely the English one, was the most effective in terms of brain elicitation and message delivery.

Furthermore, the answers from the survey seem to be almost aligned with the depicted picture. At the beginning, subjects were asked to give judgement about the six videos, including the target stimuli, but also the documentary and the three commercials. Among the answers, we have gathered and analyzed the ones regarding the target stimuli and found out that subjects revealed significantly higher engaged towards the English video, rather than the Italian one[45]. Nonetheless, when they have been asked to operate a direct comparison among the two videos, answering to the question "Between the two road safety videos, which one do you think to be the most effective as part of a sensitizing road safety campaigns?", they have split almost equally with a slight majority choosing the English spot (52.78% UK road safety spot; 47.22% IT road safety spot). The data are interesting and worthy to be discussed. It seems reasonable to assume that, in answering the first set of questions, subjects still totally ignored the core of the research, and probably did not build any relevant connection among the two road safety videos.

[45] See Table 4.3.

Thus, their replies resulted to be instinctive and spontaneous to relevant extent. Instead, when they went for the direct comparison, they probably realized that there was a focus on the two videos and gave a more reasoned answer. For instance, that was the moment when mental models shaped by culture might have played a role. In delivering a mediated answer, there might have been an internal debate about the social acceptability of the English video, driving almost half to the participants to state that the Italian video was the most effective, while all the previous results clearly stand in favor of the English one. This stays as a hypothesis, further insights, such as in-depth interviews, would be needed to provide with a concrete evidence; there seem to be a fertile ground to set a focused research.

Moreover, it is worthy to notice that the most widely shared feelings during the English video have been acknowledged to be anguish and surprise, while concerning the Italian spot, indifference has prevailed. The result implies the fact that during the UK road safety spot, the emotional elicitation successfully took place; while the Italian video did not come to be relevantly characterized by emotional arousal. In the IT spot, the charged emotion seems to have stayed below the activation threshold. This have been confirmed by the adjectives selected by the subject to describe the videos. Subjects attached negative emotional attributes to the UK video, while concerning the Italian spots there was no trace of emotional stimulation.

CONCLUSION

Before coming to draw the conclusion of the present research work, it seems both useful and appropriate to briefly recapitulate the covered path.

As a matter of fact, in the last decades neuroscience casted light on several aspects of mental processing and decision making patterns, relying on findings and evidence concerning the underlying fundamental neural activity. Emotions have been recently acknowledged to be a key element in shaping human thought and behavior, due to the neural reactions that they come to enable in the central and peripheral nervous system. By being in its early age of life, the emotional sphere as a field of study is experiencing constant development and improvement, raising a growing interest across diverse disciplines. To a managerial viewpoint, neuroscience advances appeared to represent an unexploited fertile opportunity for two main reasons. First of all, neuroscience provides with the most accurate know-how and instruments to enter the consumer mind, that is to say, to reach for one of the greatest goals set by the actual socio-economic environment. Marketing has progressively become a "Social and Economic Process" (Vargo and Lusch, 2004) characterized by being relational, market oriented, service centered and, above all, consumer focused. The consumer lately evolved being a co-creator, co-producer, and the ultimate decision-maker able to attach value to companies' offer; thus, it goes without saying that understanding his/her mind assumed the valence of a crucial mission. Moreover, the recent findings about emotions offer a promising communicational channel to be experimented in marketing strategies, especially in a globalized context defined by overlapping information and indistinct systems of meanings, such as the contemporary one is.

In this framework we have set our research question, with the aim to provide further evidence about the results derived from emotional advertising in a transnational perspective. Specifically, we have focused on the eventual influence of cultural peculiarities on consumer emotions' perception. We have selected the case study to work on starting from an empirical observation: while non-conventional communication and emotional advertising are experiencing a general raise, with great success achieved in Anglophone countries, in Italy they are still struggling to gain acceptancy.

We have analyzed several cases, the most extreme and iconic one lays in Oliviero Toscani's history, and pointed out the fact that most of the attempts of bringing the new communicational forms in Italy had unfortunate outcomes characterized by harsh criticism. Not only has public opinion usually showed reluctance, but also regulations and norms, especially concerning social marketing, set constraints for unconventional communication. It is still widespread conviction that emotional and shocking advertising, particularly when it comes to social issues, would be ineffective in Italy. A plausible explanation to such a phenomenon could be found in the fact that Italian communication style is known to be a High Context one. Contrary to Anglophones languages, Italian mostly relay on indirect communication, leaving large responsibility to contextual elements and interpersonal interpretation. Therefore, it seems reasonable to assume that it might be interfere with some kind of unconventional communication such as too direct, straightforward shocking images and contents.
However, neuroscience brought the spark for further discussion; although acknowledging the fact that culture owns a relevant influence in shaping neural patterns and human thought, neuroscience progress also revealed that emotional arousal, and particularly negative emotional elicitation, would be able to increase cognitive activity due to neural processes. Therefore, we have tried to deepen the debate ad offer a contribution on the subject.

We have designed an *ad hoc* experiment, with the purpose to highlight, thanks to neuroscientific tools and techniques, whether non-conventional communication would actually induce an impairment in the cognitive activity of an Italian audience, thus ending up being ineffective, or conversely, if the emotional arousal might improve attention and learning, despite the reluctance in acceptancy. We have tested 36 subjects' reactions to two road safety spots, of which was from the social marketing campaign run in the UK by the Department of Transport, the other from the Italian *Ministero delle Infrastrutture e dei Trasporti*. The English spot was definitely emotional and nearly shocking, whereas the Italian spot had a traditional, almost descriptive, approach. For our analysis we have used the EEG-Biofeedback as neuroscientific tool, the Eyetracker as behavioral tool, and a survey as qualitative technique.

The results that we have gathered and analyzed globally stand in favor of the neuroscientific emotional theories, according to which emotions would be able to enhance cognitive activity. During the English video, subjects showed on average greater activation in terms of attention, learning and awareness, thus permitting to define the spot as the most impactful and communicative among the two, despite the strong, shocking form. The cultural influence emerged from the survey, in which subjects identified the English spot as disturbing and even horrendous, showing a trend to refuse that kind of communication when they have been asked to express their opinion about it.

Such a discrepancy might represent the starting point for a broader research, aimed at highlighting how mediated perception, driven by experience and cultural based mental models, may happen to differ by the actual spontaneous underlying neural activity.

It is due to restate that our outcome has no pretense to lead to absolute statements, it is just a drop in the bucket of the developing research. Nonetheless, it allowed us to draw two major conclusions. First of all, what appears as disturbing and distressing to the common opinion, it is not said to be ineffective in terms of communication. In the specific case, the English video, that could have been easily defined as excessively sick by the Italian press –as it happened even to softer campaigns- ultimately resulted to be the one able to engage the subjects and enable their awareness and memorization systems. To our opinion, this seemed representative enough to suggest that not only emotions are confirmed to be a powerful communicational channel, but also that cultural differences are not inevitably an obstacle in consumer emotions' perception; indeed, they might come as opportunity as well. In order to deeply understand how to reach for a successful implementation of non-conventional communication and emotional advertising in a transnational context, taking into proper account eventual cultural barriers, further studies will be needed and, to our perspective, recommended. Referring to the present experiment, we are convinced that it would be meaningful to replicate the experience on a double sample, with half English and Italian subjects, in order to gather a wider range of comparable elements. The quality research could also provide with more focused insights, if it would b developed following the track of the ZMET, being integrated by trans-disciplines techniques such as mental imagery, phototherapy, laddering and metaphor elaboration.

Moreover, the experiment has offered concrete evidence of the fact that neuroscientific techniques and tools are empowered to reveal hidden and mostly unconscious aspects of the human thought, that would not being perceivable through other means. On the other hand, it has to be noticed that the use of the survey also brought additional and complementary information. Such observation appears to be a further hint of the fact that, when it comes to marketing research, an holistic approach enriches the variety and reliability of the available data, leading to improved results.

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