NEUROSCIENCE TECHNIQUES AND THE PRIMING PROCESSES SIGNIFICANCE TO NEUROMARKETING ADVERTISING

Lobna Ben Nasr, MA
University of Carthage, ISCU, Tunisia

Abstract

Neuromarketing is an innovative field of research which challenges the classic marketing model that has failed to fully understand the customer's cognitive and affective drives for the purchasing decision. This research seeks to explore the contribution of neuroscience techniques and findings as well as the priming processes to promote the efficiency of commercial advertising of consumer goods in modern society. The neuroscience techniques which are Functional Magnetic Resonance Imaging (fMRI), Steady State Topography (SST), galvanic skin response (GSR), Eye tracking, Magneto-encephalography (MEG) reveal the human brain activity or heart pulses when exposed to marketing messages to highlight the brain responses to the ads. The pre/post testing techniques assess the ads degree of engagement to influence the consumer's brain. These techniques aim to unveil the subliminal drives behind the purchasing decisions and identify the extent to which the ad draws the consumer's attention and affecting his emotion in order to better satisfy the his needs and boost the sales. Nevertheless, despite the scientific significance of neuroscience and the concision it offers about the consumer's engagement, the neuroscience techniques are not tools of designing the ad itself. It is the role of the priming processes to provide the marketers with the necessary techniques to design effective ads. These processes are: brain stimuli and the deep metaphors. The main concern of this article is to pinpoint the complementarity of neuroscience techniques and the priming processes in shaping neuromarketing ads.

Keywords: Neuromarketing, neuroscience, emotional analysis, attentional analysis, priming processes

Introduction

For many decades, the engagement of the customer with the brand has become a priority for marketers and advertisers and marketing processes aiming to minimise the risks, to boost the sales and to guarantee return on investment (ROI) through understanding and satisfying the customer's needs (Williams 2007); (Shaw and Jones 2009); (Morin 2011). Neuroscience research and findings about the human mind and its subconscious mechanisms, as far as buying and advertising is concerned, brought about a shift of paradigms towards the neuroscientific perspective of marketing (Boricean 2009); (Shaw and Jones 2009); (Morin 2011) as customer surveys, interviews and questionnaires alone were not reliable sources of research data (Williams 2007); (Ferguson 2007). Since 2000, a new field of marketing research and application, namely neuromarketing, has been adopted by several advertising companies. In this research, there is an overview of the techniques and processes that neuromarketing advertisers use to identify the customer's needs and to better satisfy them and to test the marketing messages reliability. However, neuroscience techniques are not tools to design the advertising messages which paves the way to the need for the interpretive techniques such as deep metaphors and the six brain stimuli in order to design engaging marketing messages and respect the consumer's emotion-bound purchasing decisions. (Morin

2011) ascertains that "neuromarketing offers cutting edge methods for directly probing minds without requiring demanding cognitive or conscious participation.There are two parts in this research, part one defines neuromarketing and explores the relevance of neuroscience to neuromarketing. Part two describes the priming processes: the six brain stimuli and the deep metaphors used by neuromarketing advertising agencies to design its ads.

Neuromarketing

Neuromarketing is mostly defined as a new field of marketing research studying consumers' cognitive and affective responses to different marketing stimuli (Zaltman and Zaltman 2008; Boricean 2009; Morin 2011; Zurawicki 2010; Dooley 2012). Its objective is to unveil the subconscious mechanisms governing the customer's decisions. That is why it delves into the interdisciplinary interface of different sciences, such as neuro-anatomy (morphology and connectivity), neurology (the cerebral system and its treatment), neuropsychology (intelligence and emotions), neuro-endocrinology (the connection between the nervous system and the hormonic one), and the cognitive neurosciences (the connection between the nervous and the cognitive system).

Neuromarketing research is based on neuroscience findings and techniques, which unveil the cognitive and affective mechanisms governing the purchasing decisions (Williams 2007); (Ferguson 2007) ;(Morin 2011). However, apart from neuroscience techniques and findings, the six brain stimuli and deep metaphors provide the advertisers with the opportunity to better attract the customer's attention to the product and make him/her buy. Neuromarketing has a direct action on the human brain. The brain anatomy reflects the parts affected by advertising and the emotion-bound aspect of purchasing decision.

The human brain anatomy

The human brain has a complex structure whose parts are interconnected. A brief description of the brain anatomy and functions according to Zurawicki's model, (Zurawicki 2010) will account for the different parts of the human brain and lay special emphasis on the parts involved in the consumer's behaviour. The human brain is composed of the cerebral cortex, the cerebellum and the brain stem. As for the limbic system, it encompasses the thalamus, the hypothalamus, amygdale, hippocampus and cingulated cortex (located above corpus callosum) and deals with emotion formation and processing, learning and memory (Zurawicki 2010). The limbic system is located in the deep structure in the subcortical part of cerebrum and related to the consumer behaviour and his decision-making. The deep understanding of this part and how it processes information provides marketers with interesting insights of how stimulating and responding to consumer's needs (ibid). The "almond-shape amygdala" is located in the medial part of the temporal lobe [fig1.1]. It acts as a repository of unconscious emotions and memories. Hippocampus is positioned in the basal medial part of the temporal lobe and surrounds the thalamus, hypothalamus and amygdale (ibid). The hypothalamus is responsible for the most elementary emotions, such as hunger, thirst, pain and pleasure (ibid. 36). Emotions "express what the world means to the individual and determine a subjective well-being" (Zurawicki 2010, 35); that is why purchasing decisions are emotion-driven. Emotions and satisfaction are interrelated, and purchasing is one stimulus that triggers a sense of satisfaction. Zurawicki (2010) further argues that emotions can be positive enhancing the human well-being or they can be negative worth avoiding. The ultimate objective of customer's purchasing is his satisfaction and well-being either through an attracting positive emotion elicited by the ad or through avoiding a negative emotion elicited by the ad (Zurawicki 2010)

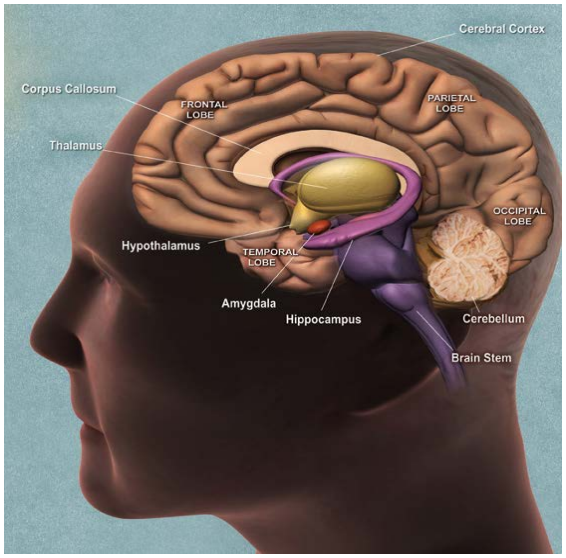

Figure 1. Anatomy of the human brain.

This figure (Fig 1.1) exhibits an overview of the brain anatomy where the major parts of the human brain, the four lobes and the limbic system are revealed. Different areas of the brain are activated as a response to different stimuli, which is revealed by the neuroimaging techniques.

Neuroscience techniques

Neuromarketing uses neuro-imaging techniques and tries to explore and explain the underlying cognitive and affective processes underlying purchasing decisions. Thanks to neuroscience techniques, neuromarketing "delves right into customer minds" (Tolon et al 2004,

Functional Magnetic Resonance Imaging (fMRI)

It shows the flow of blood as a response to a stimulus (Morin 2011). The action of buying, for example, involves a bigger supply of blood support to support the customer's decision shown by fMRI (Tolon 2004). When the customer has a particular interest in a certain product, the brain's medical prefrontal cortex lights up showing an increase of neural activity (Tolon 2004, 2; Morin 2011) (fig 1.2). In fact, this area of the brain is associated with preferences and choices. Consequently, the lighting up of this area at the sight of a particular product means that the consumer is more likely to purchase it (Randall2009).

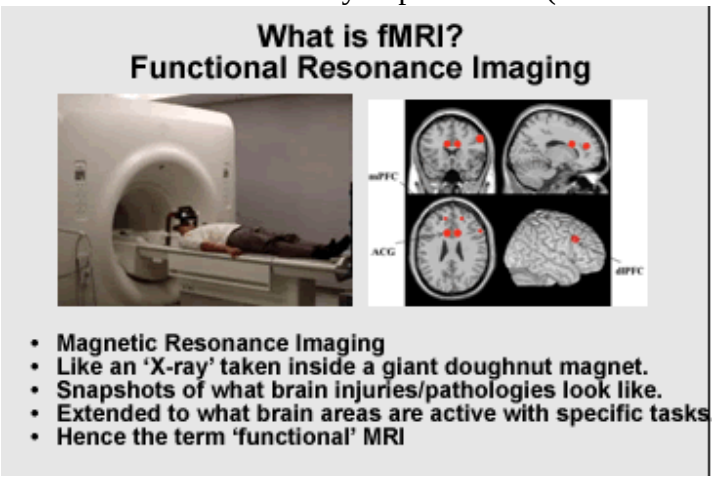

Figure 2. fMRI device and brain image performed by fMRI

This technique is used to identify the emotional responses in the consumer's brain to advertising messages in order to measure the impact of the ad on the consumer.

Steady State Topography (SST)

There has been a long history of electro-dermal activity research, most of which dealing with spontaneous fluctuations (Zurawicki 2011). It monitors the brain activity and its responses to stimuli especially advertising. It brings neuromarketing research closer to an accurate measurement of advertising effectiveness because it depicts the impact of advertising on memory and its relation to brand preference change.

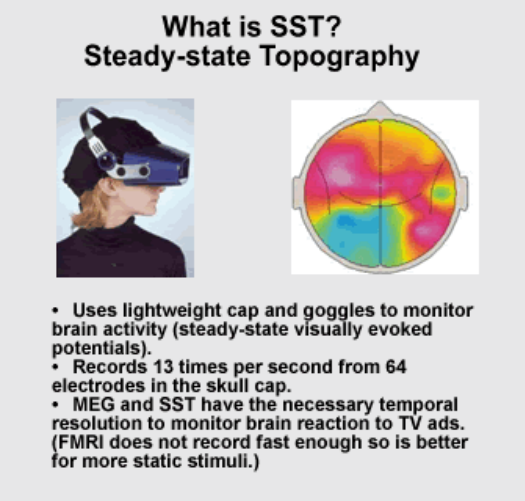

Figure 3. SST device and the image of the brain performed by SST.

Galvanic Skin Response (GSR)

It is also known as electro-dermal response (EDR), psycho galvanic reflex (PGR), or skin conductance response (SCR) (Sutherland 2007). It measures the electrical resistance of the skin showing electro-dermal activity. The customer is subjected to GSR in order to detect responses to different stimuli. In the neuromarketing context, it is used to identify the emotional responses to ads (ibid)

Electroencephalography (EEG):

Neurons are defined in Morin (2011) as "the cells responsible for the biological basis of our cognitive responses". As a response to a stimulus, such as an ad, these neurons emit electrical signals amplified by the EEG and put out in form of brainwaves (ibid). Electrodes are placed on the scalp of a test subject using a helmet or a band (Morin 2011). EEG simultaneously 'views' the brain activity "in various regions by measuring brain wave activity across the scalp" (Williams 2007).

Eye tracking

Eye tracking is used in research on the visual system, in psychology, in cognitive linguistics and in product designs using an eye tracker (Sutherland2007). The most popular variant uses video images from which the eye position is extracted (ibid). Other methods use search coils or are based on the electroculogram. They record eye movements showing that the observer's attention is usually held only by certain elements of the picture. When a test subject is looking at an ad, eye tracking follows where the subject is looking at and in what order. This is done by artificial intelligence software (Sutherland 2007). Accordingly, the eye tacking analysis shows the scan path and eye gaze of the customer, revealing the customer's engagement to the ad elements. The ad elements/ variables comprise the logo, the brand, the caption and the product. In this piece of research, these elements are referred to as the ad

elements, items or variables. The scan path and the eye gaze focusing on the ad elements reflect the effectiveness of the ad. In this vein, (Scuili et al 2012, 92) points out that "it is proposed that by examining eye fixations, durations, and saccades, the effectiveness of a given promotional tool may be determined and, in fact, approved upon. Wedel and Pieters (2000) examined an individual's eye fixations on print advertisements and their ability to remember brands".

Figure 4. Eye tracking

The following visual is an instance of eye tracking analysis which reflects the scan path results in lines and eye gaze results in numbered circles on the variables of the ad. The numbers show the order of the eye gaze attracting the customer. In the following ad, eye tracking analysis reveals which elements of the ad are focused on by the viewer's gaze and the scan path.

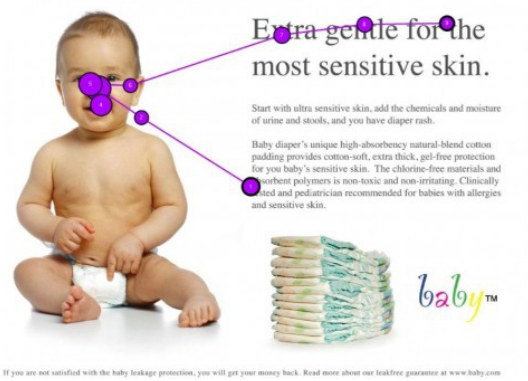

Figure 5. An example of an eye tracking analysis

Magneto-encephalography (MEG)

This technology has the same role as fMRI but is faster as it detects the brain activity. It has some advantages over EEG because the magnetic field is not hampered by the type of the tissue in the brain. So, the magnetic field can go as deep as required (Zurawicki 2011).

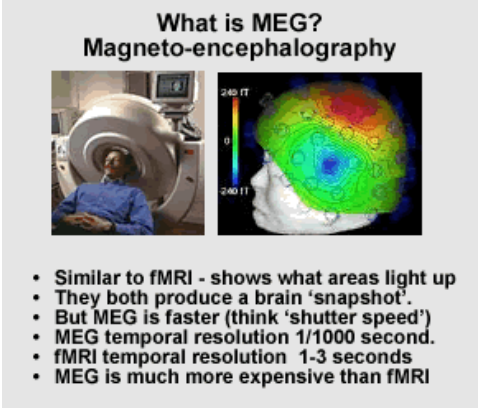

Figure 6. MEG brain image showing the areas of the brain lighting up

These techniques of psycho-analyzing the human cerebral activity help to understand the sphere of emotions, sensations and desires through the lighting up of certain areas as a response to an ad and are translated into effective and valuable marketing guidelines (Sutherland 2007; Morin 2011). As a result, marketers can identify the highly engaging positive response to a particular ad and press the buying button in the customer's minds (Ferguson 2007; Renvoisé and Morin 2007). The following subsection deals with the pre/post testing analyses which assess the ad effectiveness in terms of emotional and attentional engagement of the customer.

Pre/post testing analyses of the advertisement

The pre-post testing of advertising is a scientific technology based on the simulation of the human mind translated in algorithmic formula depicted by the artificial intelligence software.

Eye tracking analysis

Eye tracking is the study of the eye movement and the eye gaze of the customer while watching the ad. It is also called attentional analysis as it determines which items attract the customer's sight in the ad and in what order. This is ascertained by (Dufresne et al 2010, 1): Eye-tracking measures are being used regularly to analyze what are the points of fixation, the duration of fixations and the scan paths, in order to follow what are the zones of interest and at the opposite, which information or navigation elements may have been missed by users. These measures are used along with usability methodologies to evaluate applications before they are made accessible.

Figure 7. An attention analysis

Emotional analysis

Zurawicki (2010) defines emotion as unconscious sensations that generate pulses and affect human reactions and attitudes towards different stimuli. As for stimuli, the ones accompanying emotion-producing experiences become the emotion-generators because they are internalized as proxies for rewards/ punishments Zurawicki (2010). In this regard, positive emotion is equated with satisfaction. So, the association between the items eliciting emotions in an ad has a direct influence on the customer. Zurawicki (2010, 100) insists that "when a certain emotion is experienced, it activates particular nodes in the person's associative networks bringing related facts to mind". These associations are used in advertising to enhance customer emotionality and boost sales. For example, the use of babies, who are strongly associated with the need of security and vulnerability in ads, has a special effect on the customer's mind (Dooley 2010). As noted in Dooley (2010), the image of the baby embeds a significant load of emotions.

The following visual (fig 8) is performed by the fMRI technique displaying the brain emotional response to the baby presence in an ad and the brain emotional response to the

presence of adults in an ad. The different locations of the responses show the emotional appeal of the babies in ads to the customer. Babies elicit emotional response on the frontal part of the brain and adults elicit a brain response in the back of the customer's brain.

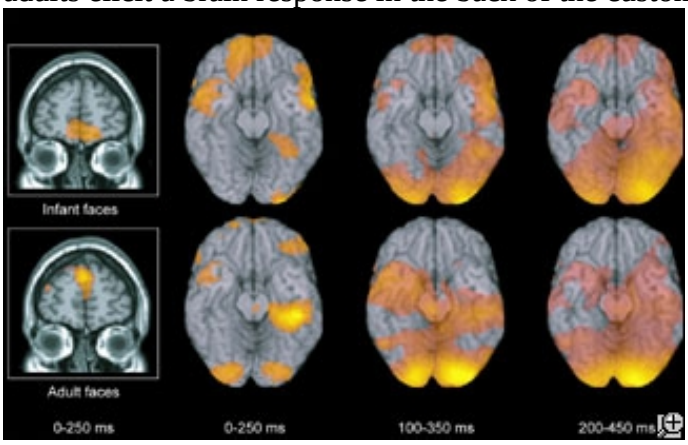

Figure 8. The difference between brain responses to the baby (frontal part is activated) and those to the adult (the back of the brain is activated)

As for emotional analysis on ads, it is meant to reflect the customer's attraction to the product and the variables related to it, such as the logo, the caption, the image and the people.

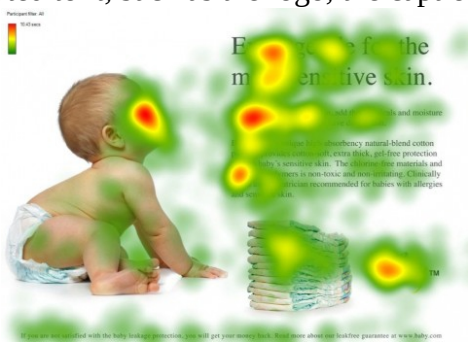

Figure 9. An example of emotional analysis

In case of effective ads, these analyses (the emotional and the attention ones) should highlight the focal variables such as the product, the product name, the caption, the logo and the characters in the ad. Otherwise, the ad is not attracting the customer and there is no customer engagement.

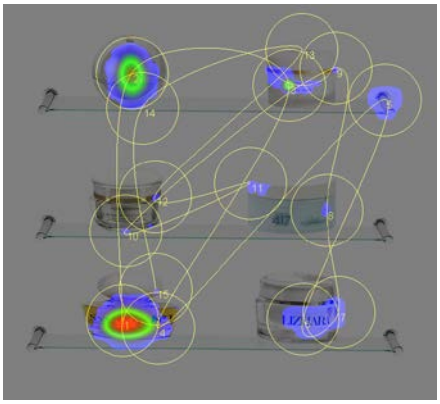

Figure 10. An example of an effective ad

The application of priming processes to neuromarketing advertising: brain stimuli and deep metaphors

Brain stimuli

In this section, we seek to explore the relevance of the six brain stimuli to neuromarketing advertising. These priming processes are used in advertising in order to design effective ads. That is, their role is to better benefit from the neuroscience findings as far as consumer's behaviour is concerned to stimulate the customer's needs and boost the sales. Based on neuroscience findings such as the supremacy of the old brain (the reptilian brain) in decision-making and the emotional drives behind decision-making, marketers adopt techniques, such as the brain stimuli, to design effective ads. This is stated in the following quote from (Morin 2011):

What Damasio and many others have demonstrated is that while we appreciate and even worship our cognitive abilities, the brain has been dependent on instinctual responses for millions of years. And it will continue to do so for a long time since biological adaptation to a fast changing environment is too slow. What does this mean from a neuromarketing perspective? It means that there are specific principles that should apply to advertising messages in order to optimize the processing of information at the level of our brain.

The six brain stimuli are the stimuli that influence the customer decision making and they are represented in the following visual.

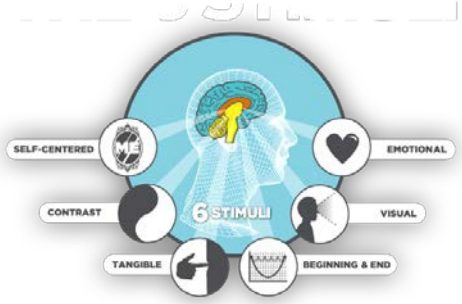

Figure 11. Representation of the six brain stimuli and the parts of the brain they influence

According to Zurawicki (2010), studying the consumer's brain and behaviour refers to the way people perceive, learn, remember and feel as far as products or services are concerned. The consumer's experience of consumption and the sensations involved are unveiled by the neuroscience techniques and are crucial to the understanding of the consumer's behaviour.

Besides, measuring the consumer's emotional engagement using simulation techniques while exposing the consumer to different stimuli reveal how the human brain responds to these stimuli and provides the marketers with the tools stimulating and enhancing the buying as stated in the following quote by Zurawicki (2010, 64): "human brains are wired to respond to novelty. It has been namely shown that dopamine whose secretion is linked to pleasure is also released when people encounter new stimuli." Accordingly, marketers use different stimuli while designing ads to convince the brain and to enhance the buying. These stimuli are: ego, emotionality, tangible facts, contrast, visual and story-telling.

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The product mirroring customers' needs and their satisfaction is the core of neuromarketing advertising, as stated in (Zurawicki 2010, 200): "I am what I buy".

Emotional aspect of ads

The limbic system in the human brain is responsible for the emotions whether they are positive or negative. In fact, the putamen registers the nice emotions, such as joy or pride. The amygdale is the part responsible for the unpleasant emotions, such as fear (Fakhfakh 2010; Zurawick 2010). As stated by (Zurawicki 2010, 35), emotions "express what the world means to the individual and determine a subjective well-being." The feeling of wellness is the ultimate objective of new experiences that humans seek through buying. This feeling is deeply related to emotionality which entails the punishment/reward dichotomy (Zurawicki 2010). Reward is everything positive and to which people are attracted whereas punishment is everything people try to avoid. The avoidance of something is linked to fear. The association between the smiling pretty woman and the product implies a sense of satisfaction which is equated with the product in the consumer's mind. This feeling of satisfaction and well-being the pretty woman reveals is intended to be transferred to the consumer to elicit the same sense of satisfaction and well-being in the consumer's brain. It is called 'positive contagion' or 'contamination effect' or also 'mood transfer', according to Zurawicki (2010). The effect of such a technique is to make the customer identifies himself to the smiling satisfied person in the ad and link the reason of his satisfaction to the product.

Contrast in ads

It is the process that the brain undertakes to determine the status of the person after the purchase. It is the with/without, the win/loss dichotomy that influences the customer's decision strategy when exposed to a product and faced to a particular buying decision. Zurawicki points out that "even if people pride themselves for being rational and logical, they still cannot defuse the emotions (as in passing/failing the lie detector test)" (Zurawicki 2010, 105). It is the notion of rationality that is elicited by this stimulus as the brain weighs the winning/loss before the purchasing act or any other type of reasoning to rationalize the choice. The old brain is attracted by disruptions and reacts accordingly. Consequently, the more winning/losing contrast the ad involves, the more attractive and effective it is.

Tangible aspect of ads

The old brain cannot process abstract information, like abstract notions or complicated expressions. For example, an expression like 'more money' is more accepted than 'maximising R.O.I.' (Metznik 2012). The customer needs tangible facts about the product in order to be able to take a purchasing decision. The following ad gives a description of the product and its benefits, which aims to convince the consumer of buying it.

Deep metaphors

Metaphor, according to the Glossary of Literary Terms, is defined as "a statement [...] that says that one thing is something else but, literally, it is not". Besides, metaphoric language is used to express a new and different meaning. Deep metaphors are basic structures and images we internalize about the world around us (Zaltman and Zaltman 2008). They are unconscious and universal and they recast everything we think about or we sense or we do

(Zaltman and Zaltman 2008). According to Zaltman and Zaltman (2008), deep metaphors are classified into seven major ones which are significant to designing an effective ad. These deep metaphors are explained in relation to human culture and mental models constructions underlying customer thinking and behaviour. The seven deep metaphors they consider universal are: balance, transformation, journey, container, connection, resource and control.

The metaphor of balance

It deals with the interplay of elements which preserves the customer's equilibrium (Zaltman and Zaltman, 2008; Rossides, 2012). This can be individually-related or contextually-related (Rossides, 2012). It encompasses the physical balance, the moral balance, the social balance, the aesthetic balance and the psychological balance (Zaltman and Zaltman, 2008). In terms of generational science classification, it may concern the boomers/silent generation (45-65).

The metaphor of transformation

The emotional meaning that taps into thoughts and feelings are related to the positive aspects of transformation (Lagace 2008). It involves significant changes of states or status and it can be physical or emotional. This deep metaphor is generally the generation x objective (25-44).

The following visual is an example of an ad which triggers transformation. The product advertised promises health amelioration for the consumer. This product is intended to offer a cure against the damages of smoking.

The metaphor of journey

The notion of past, present and future affects the customer's mind. It is related to how we define the past, present, and future which are subject to redefinition (Rossides 2012). People like to view and interpret their past and future and consider life as a journey (Zaltman and Zaltman 2008).

The metaphor of container

It is about the effect of inclusion, exclusion and other boundaries on the customer's mind. "It implies our values about social class and status, with our memories, feelings, bodies, and socio-cultural surroundings acting as containers" (Rossides 2012). Consumers find themselves in or out of physical shape or condition (Zaltman and Zaltman 2008). The following visual shows the notion of container. The product provides a means of protection of people's contacts and interests.

The metaphor of connection

It deals with feelings of belonging or exclusion. Consumers express psychological ownership when identifying themselves with a brand or a celebrity (Zaltman and Zaltman 2008). The connection between oneself and others is realized through the product. In the following visual, the notion of connection is highlighted through the use of the product (a hearing device) emphasizing its role in people's relationships.

Figure 12. an example of an ad with a metahpor of connection.

The metaphor of resource

It concerns the importance of the acquisitions and their consequences on the customer's mind, and it is related to the perception of satisfaction, well-being and physical survival. It deals with everything that supports people and makes their life comfortable (Zaltman and Zaltman 2008). In the following ad, the notion of acquisition is inspired by the product which promises satisfaction.

The metaphor of control

The metaphor of control deals with the significance of the sense of mastery, vulnerability and well-being of the customer. It triggers the notion of power embedded in the product that fulfils the customer's desire for power and control (Zaltman and Zaltman 2008; Rossides 2012). This deep metaphor will be tested in the empirical part where a questionnaire related to an ad from CB portfolio assesses some variables.

The priming processes are tools that provide the advertisers with the necessary 'colour' to make the ad look more engaging. And it is thanks to the neuroscience that advertisers can assess the effectiveness of the marketing message. Accordingly, neuroscience and priming processes complement each other in terms of their objective to better satisfy the consumer's subliminal needs.

Conclusion

In this research, there is a description of neuroscience techniques and how they function to image the human brain in the presence of marketing messages. However, the neuroscience techniques do not help with the ad designing and here come the role of priming processes and their relevance to neuromarketing: the use of the six brain stimuli and the influence of deep metaphors. The ad design responds to different criteria and is tested by the Artificial Intelligence before its release. In fact, the pre-post test administered to ads help to identify the deficiencies of the ad before its release. Thanks to the Artificial Intelligence software, the ad designer can depict the flaws of the ad before broadcasting it or make sure it is effective and can boost sales and guarantee its ROI. The neuroscience techniques and the priming processes complement each other as the ones identify the effectiveness of the ad and the others provide techniques to design the ad.

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