Habeo ergo sum: neural correlates for self-concept nourishing with brands’ symbolic meanings

José Paulo Santos (corresponding author)
Affiliations: ISMAI - Superior Institute of Maia
Socius – Research Centre in Economic and Organizational Sociology
Dep. of Management – ISEG/UTL – Technical University of Lisbon
Address: Av. Carlos Oliveira Campos - Castelo da Maia
4475-690 Aviosso S. Pedro
Portugal
E-Mail: jpsantos@ismai.pt
Phone: +351 22 9866000
Fax: +351 22 9825331

Daniela Seixas
Affiliations: Inst. of Histology and Embryology, Fac. Medicine of University of Porto
IBMC – Instituto de Biologia Molecular e Celular, University of Porto
Dep. of Neurorradiology of São João Hospital
Address: Alameda Professor Hernâni Monteiro
4200-319 Porto
Portugal
E-mail: dseixas@med.up.pt

Sofia Brandão
Affiliations: Dep. Radiology, Magnetic Resonance Imaging Unit, São João Hospital
Address: Alameda Professor Hernâni Monteiro
4200-319 Porto
Portugal
E-mail: sofiabrandao@netcabo.pt

Luiz Moutinho
Affiliation: Foundation Chair of Marketing, Business School, University of Glasgow
Address: Department of Management
West Quadrangle Gilbert Scott Building
Glasgow G12, 8QQ
United Kingdom
E-mail: L.Moutinho@lbss.gla.ac.uk
**Habeo ergo sum**: neural correlates for self-concept nourishing with brands’ symbolic meanings

**Habeo ergo sum.** In postmodern societies possessions determine existence. Things are used to categorize individuals in societies, and brands have a relevant role in nourishing individuals’ self-concepts, empowering them, so they proudly project themselves in the social milieu. Hence, brands must provide nutritious social meanings. In this study we approached to this issue using neuroscientific tools. We found a general brain pattern for symbols reading and interpreting, and also a recognition system important for socialising. Furthermore, we found brain markers that distinguish positive from indifferent brands based on emotions and on self-relevant brands’ meanings.

Keywords: brands; Neuromarketing; self-concept; meanings; emotions; social relevance. Track: Consumer Behaviour
1 Introduction

“To have is to be” as already posited by Dittmar and Pepper (Dittmar & Pepper, 1994). At least in Western cultures, each individual uses possessions to categorize his peers and aim that his peers also categorize him according to the materialistic messages conveyed by his belongings (Dittmar, 1994). Beyond functionalities that goods provide, consumption has an implicit symbolic dimension that allows the construction of social reality.

Brands’ meanings are memes, fundamental cultural entities, able to be propagated and imitated in the social environment, and whose significance is concerted in a symbolic interactionist way (Ligas & Cotte, 1999). Brands’ logos are not just the lines, colours, and wording that geometrically compose the sign. The semiotic approach reveals their semantics, as they convey significances (Mick, 1986) in a meta-linguist syntax. Grubb and Grathwohl (1967) propose a theory that links the psychological construct of the individual’s self-concept with the symbolic value that products, brands, and stores embody. By the consumption act, the self-concept is nourished with meanings that are relevant in the social milieu. The role of reference groups as a source for brand meaning and the assimilation of such significances to individuals construct their self-concepts is asserted by Escalas and Bettman (2005), and the eventual repulsive effects of such meanings is also considered (Banister & Hogg, 2004). Emphasising the importance of the social dimension in the self-concept, Johar and Sirgy (1991) subdivide it in actual self-concept, ideal-self-concept, social self-concept, and ideal social self-concept. Economic behaviour can be explained from the congruence between individual’s self-concept and product / brand image (Sirgy & Danes, 1982; Sirgy, et al., 1997), with the self-esteem and self-consistency motives mediation (Sirgy, 1982). Ideal self-congruity is accomplished (or not), with inherent product / brands symbolisms driving the decision process (Sirgy, Grzeskowiak, & Su, 2005).

Avoiding standardization, independent consumers dig for exclusive meanings (Escalas & Bettman, 2005), and the creative consumer looks for diversity to nourish his/her self-concept (Elliott, 1994; Elliott & Wattanasuwan, 1998). Although all these studies fall into behavioural analysis, the brain, the organ that initiates actions, has not been directly quested. This is the aim of the present study: by means of a neuroscientific tool, fMRI (functional magnetic resonance imaging) we investigated if brands’ logos convey meanings, with a special relevance to those that can be used to project self-concept through the social environment. Managerial implications result evident: avoiding verbalisation constrains, there is neural markers that can demonstrate brands’ emotional and social meanings.

2 Method

To investigate the research questions we used visual stimuli consisting in brands’ logos. Each logo was presented one at a time to each participant when he/she was inside the fMRI scanner, and he/she had to rate the brand according to the following paradigm.

The paradigm started with a set of 200 brands’ logos that participants had to rate one by one before the scanning session. To make the assessments, the participants used the PAD (Pleasure, Arousal, Dominance) scale (Mehrabian, 1995; Russell & Mehrabian, 1977), together with the SAM (Self-Assessment Manikin) graphic character (Bradley & Lang, 2007; Morris, 1995), to avoid classical difficulties with verbalisations of affective states. From this set, 35 brands were extracted according to a “positive” criteria (7, or 8, or 9 for Pleasure, and more or equal than 5 for Arousal), and other 35 brands were extracted according to an “indifferent” criteria (4, or 5, or 6 for Pleasure, and less or equal than 5 for Arousal). Another 35 logos were added, but these ones were specifically created for this study, which means that
they do not exist in the market. The paradigm included two baselines: the first one was non-emotional words, i.e. words that do not invoke objects, nor actions, nor emotions, e.g. conjunctions, determiners, prepositions; the second one was a fixation cross that acted as interstimuli interval (ranging from 4000 until 9000 milliseconds in 500 milliseconds steps. The sequence of presentation of the slides was optimised with Optseq2 (http://surfer.nmr.mgh.harvard.edu/optseq).

During the scanning sessions, participants saw the slide set sequence projected in a translucent screen and, for each brand, they had to rate them again. Participants had four possibilities: “positive”, “indifferent”, “negative”, and “unknown”. The choice was made by means of a button box, and the reaction times were also recorded. Simultaneously the BOLD (Blood Oxygen Level Dependant) signal was registered, which allowed inferences about the brain activity. Inferences were extendable to the general population due to the mixed effects strategy used in the data analysis.

The participants were eighteen, seven healthy male and eleven healthy female volunteers, right handed, with neither history of neurological nor psychiatric disturbances (mean age 28.2 years, 6.9 standard deviation, and ranging 19 – 41 years). Seven participants came from outside the campus. Informed consent was obtained in all cases. This research adhered to the Declaration of Helsinki and was approved by the local ethics committee.

3 Results

Table 1 reports the assessments that participants made, and the respective reaction times, obtained simultaneously as they were scanned. As detailed in the table, the majority of previous ratings were maintained into the scanning session (93.7% for the positive, and 67.8% for the indifferent brands), although a clear difference in magnitude. Also, 87.9% of non-brands were rated as unknown. Positive ratings had the fastest responses (1546 ms). Indifferent brands took 2370 ms, and non-brands / unknown took 2334 ms. By F tests, the probabilities of the positive responses not being significantly different to indifferent and to non-brand / unknown is 0.000000. The F test between indifferent and non-brand / unknown returned 0.969508. Among the positive assessments in the scanner, positive / positive had the faster responses (1546 ms), indifferent / positive took 2321 ms, and non-brand / positive took 2811 ms. The F test between positive / positive and indifferent / positive was 0.000022, between positive / positive and non-brand / positive was 0.087770, and between indifferent / positive and non-brand / positive was 0.423533. All F tests are two tailed and α = 0.01.

Table 1 – Rates and mean reaction times of brands’ logos made by all participants.

<table>
<thead>
<tr>
<th>Stimuli</th>
<th>Positive</th>
<th>Indifferent</th>
<th>Negative</th>
<th>Unknown</th>
<th>N.A.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rates</td>
<td>590 1546</td>
<td>29 2791</td>
<td>3 3384</td>
<td>6 3060</td>
<td>2</td>
<td>630</td>
</tr>
<tr>
<td>R.T. (ms)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indifferent</td>
<td>82 2321</td>
<td>427 2370</td>
<td>74 2624</td>
<td>44 2489</td>
<td>3</td>
<td>630</td>
</tr>
<tr>
<td>Rates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R.T. (ms)</td>
<td>33 2811</td>
<td>36 3005</td>
<td>2 3669</td>
<td>554 2334</td>
<td>5</td>
<td>630</td>
</tr>
<tr>
<td>Non-brand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rates</td>
<td>705 1695</td>
<td>492 2442</td>
<td>79 2679</td>
<td>604 2353</td>
<td>10</td>
<td>1890</td>
</tr>
<tr>
<td>R.T. (ms)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N.A. – no answer; R.T. (ms) – mean reaction time in milliseconds.
Figure 1 depicts the activations when positive, indifferent, and non-brands were contrasted to non-emotional words. The conjunction analysis of these contrasts reveals a general pattern that includes the anterior insular cortex, frontal orbital cortex, postcentral gyrus, and paracingulate gyrus.

The pattern of activations obtained when recognized brands’ logos were contrasted against unknown brands includes the middle temporal gyrus, the angular gyrus, and the precuneus (see Figure 2).

The amygdala, frontal medial cortex, ventral medial frontal pole, and ventral paracingulate gyrus contrasted between positive versus indifferent brands (see Figure 3).
Table 2 summarizes the activation patterns, emphasising the participating brain structures in characteristic functional processes.

Table 2 - Summary of the activations grouped by functional processes.

<table>
<thead>
<tr>
<th>Group</th>
<th>Contrasts</th>
<th>Brain structures activated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meaningful symbols</td>
<td>Positive &gt; Non-emotional words</td>
<td>- anterior insular cortex</td>
</tr>
<tr>
<td></td>
<td>Indifferent &gt; Non-emotional words</td>
<td>- frontal orbital cortex</td>
</tr>
<tr>
<td></td>
<td>Non-brands &gt; Non-emotional words</td>
<td>- postcentral gyrus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- paracingulate gyrus</td>
</tr>
<tr>
<td>Recognized logos</td>
<td>Positive &gt; Non-brands</td>
<td>- angular gyrus</td>
</tr>
<tr>
<td></td>
<td>Indifferent &gt; Non-brands</td>
<td>- precuneus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- middle temporal gyrus</td>
</tr>
<tr>
<td>Preferred brands</td>
<td>Positive &gt; Indifferent</td>
<td>- frontal medial cortex</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ventral medial frontal pole</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- ventral paracingulate gyrus</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- amygdala</td>
</tr>
</tbody>
</table>

4 Discussion

The analysis of the reaction times suggests the existence of two different strategies when participants assessed brands: rating positive brands relied in a faster process when compared with rating indifferent brands or non-brands. As the later relied in longer processes we admit that indecision was the cause for the more time consumption to arrive to a decision about the categorization of such symbols. For the positive ratings the assessment process was faster, suggesting that some steps in the decision process were shortcut, as the response were already encoded, ready to deliver. Such procedure was previously proposed by Simonson (2008) using behavioural analysis, and our findings strongly support the existence of inherent preferences that mediate responses, independently of contextual influences.

The analysis of the activation maps reveals a general pattern for logos appraisal. Besides activations in the primary and associative visual areas, justified because the stimuli had essentially a visual nature, and thus, it was expectable that brain areas that support the visual sense participate actively in this task, there were also activations in the anterior insular cortex, postcentral gyrus, and frontal orbital cortex. According to Singer et al. (2004), the anterior insular cortex supports exterior stimuli affective sensing, in an empathic approach, reflecting in the own body the witnessed qualities. By reflecting such qualities in the own body, emotional reactions are produced and then read by the interoceptive decoder: the anterior insular cortex (Craig, 2002). The body is somatotopically mapped in the postcentral gyrus (Nelson & Chen, 2008) forming the somatosensory system, which role is to produce the sensation of touch, proprioception and nociception. Both the insular cortex and the somatosensory systems have a relevant role in the model of the emotions proposed by Damasio and Bechara, generating the feeling (Bechara & Damasio, 2005; Damasio, 1994). Our findings suggest that in order to assess a brand, individuals feel it the same way they feel their own dispositions. Down the stream, identified sensorial information converges to the frontal orbital cortex where associations are made with previously acquired knowledge (Rolls, 2004; Small, et al., 2007). Here, learning and reversal occurs, which means that associations are made or broken, constituting the basis for motivated and adaptive behavioural responses.

Still in the general appraisal of meaningful symbols, we report the participation of the paracingulate gyrus. This brain structure is believed to sustain meta-representations and
Theory of Mind, where an individual assigns thoughts, intentions, beliefs, strategies, goals, desires into others’ brains (Frith & Frith, 2006; Gallagher & Frith, 2003; Rilling, Sanfey, Aronson, Nystrom, & Cohen, 2004; Rebecca Saxe, 2006). All these issues are critical to social processes and we suggest that the eventual social relevant meaning that brands’ logos convey is extracted at this stage, whichever valence and magnitude it has.

There was brain structures that activated when recognized logos were contrasted to the logos specifically designed for this study. This was the case of the middle temporal gyrus, which role in semantic processing is rather known (Bookheimer, 2002). Our interpretation is that non-brands logos are symbols semantically vacant, which is not the case of the recognized ones. In line with this interpretation, the precuneus, which also activated in the same circumstances, is involved in self-centred mental imagery strategies (Cavanna & Trimble, 2006), i.e. where personal identity and past experiences are intertwined, allowing navigating between representations. Commonly the angular gyrus and precuneus activate together under self-referential tasks, e.g. during first-person perspective taking when one observes others behaving. For this reason, the angular gyrus also is thought to process Theory of Mind (Frith, 2007; Frith & Frith, 2006; Rebecca Saxe, 2006; R. Saxe & Wexler, 2005), i.e. extracts social relevant information, although there is some controversy about this matter (Mitchell, 2008; Stone & Gerrans, 2006).

The contrast between positive and indifferent brands revealed activation in the amygdala. These ganglia are a primary emotional inducer in the model of emotions proposed by Damasio and Bechara (Bechara, 2004; Bechara & Damasio, 2005; Damasio, 1994). The amygdala initiates rapid behavioural responses that fall beyond volitional control, e.g. fear from snakes, or exuberance after winning lottery (Adolphs, 2003; Adolphs, Tranel, & Damasio, 1998; Ashwin, Baron-Cohen, Wheelwright, O’Riordan, & Bullmore, 2007; Kensinger & Schacter, 2006a; Norris, Chen, Zhu, Small, & Cacioppo, 2004; Zald, 2003). It is remarkable that only positive rated brands achieved activation in such important structure in emotional induced behaviours.

Ventral medial structures from the frontal lobe also participated actively when contrasting positive ratings versus indifferent ones. This was the case of the frontal medial cortex, ventral paracingulate gyrus and ventral medial frontal pole. Together with the amygdala, the frontal medial cortex responds to high arousal visual stimuli, regardless of a positive, or negative valence (Kensinger & Schacter, 2006b). Furthermore, it is also a brain structure that is considered a secondary emotional inducer (Bechara, 2004; Bechara & Damasio, 2005; Damasio, 1994). In the model of Rolls, it supports and maintains in time behavioural strategies that guide to rewards (Rolls, 2004). Hence, positive rated brands, besides emotional triggering, can be sown as rewards that motivate individuals to desire and pursue them, to have them, to assimilate their symbolic nutrients. This is specially stressed by the activations in the ventral paracingulate gyrus, and ventral medial frontal pole. Northoff et al. (2006) sustain that self-referential thinking is processed in these areas, and the ventral frontal pole activated when participants imagined driving sports cars (Schafer, Berens, Heinze, & Rotte, 2006), which is a clear signal of self-concept empowering. Therefore, we report neural correlates that sustain that having positive brands can lead to self-concept fostering, engaging a strategy where the individual’s existence is determined by his/her possessions: habeo ergo sum.

5 References


