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From “Where” to “What”: Distributed Representations of Brand Associations in the Human Brain

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1. **What is the question (of the paper)?**

   Whether our brains process the information of brand image in a specific pattern or within some recognizable areas, and whether we can identify what information is retrieved when provoked by different brands.

2. **Why should we care about it?**

   Differentiation by establishing a unique brand image has always been an important marketing strategy, but collecting reliable data about consumers’ perception on brands is difficult since such information is mostly composed of feelings, emotions, or some other subconscious thoughts. Neuroscience is thus helpful for obtaining objective observations. However, the physical observations may not be meaningful if we are not able to link the brain activities to specific information about brands. This paper provides a solution for both needs.

3. **What is your (or the author’s) answer?**

   The two hypotheses are justified: 1) our brains process the information of brands stably in some regions where brand images can be recovered by observing brain activities. 2) for different characteristics of brand images, there are different corresponding neural response patterns. This means that ideas of brands can be constructed by simply observing brain activities without requiring the respondents’ self-report.

4. **How did you (or the author) get there?**

   An experiment consists of consumer survey, brain scanning, and machine learning is conducted. First a set of brands were displayed to the participants, who were later asked to think about the brands freely while being scanned by functional magnetic resonance imaging (fMRI). Then they filled-in a brand association survey, in which they gave a rating on each brands to each characteristic. A factor analysis was conducted using survey data from the second stage and the principle components of brand traits were listed out. To combine the components with the brain images, multiple regression was used to estimate correlation between neural responses and each component. Using the estimated coefficients, researchers were able to predict neural responses for some specific brands. The outcome was significant.

An example

假設某家汽車品牌想調查其廣告是否能精準塑造其品牌形象，若只是邀請一些受訪者進行質性訪談，蒐集到的回饋將僅限於某些形容詞的排列組合，並且汽車廣告著重於意象描繪，很難有邏輯地理解與表達，而其答案亦有極大的可能被題目所引導，因此很容易就得到廣告很有效的結論，這是採用受訪者自我回報(self-report)的風險。如果能夠知道受訪者那些區塊的腦部活動代表正在處理哪種資訊(例如感到正面積極、感到穩定安心等等)，即能透過掃描腦部活動就知道消費者是否能正確解讀廣告訊息，而不必透過困難且容易偏誤的問答。

常用符號對照表

y_j^v	neural response in voxel v to brand j voxel: 體素，大腦活動的基本單位
$f_{n,j}$	the value of the nth personality feature for brand j,
c_n^v	a scalar parameter that specifies the degree to which the nth feature activates voxel v. (the marginal effect of brand features to neural repsonese)