

# Testing Product Packaging With the Use of Neuromarketing to Optimize Sales

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*Consumers' attitudes and behaviors are driven by a complex set of factors, many of which operate primarily in the subconscious mind<sup>i,ii,iii</sup>. With the emergence of neuroscience-based methodologies, professional marketers now have viable options for exploring consumers' minds more deeply than is possible with traditional tools like surveys and focus groups. Lately, there has been an increase in the use of eye-tracking techniques to measure consumers' cognitive processes, especially attention and perception, with the aim of better understanding decision-making processes and consumer preferences and motivations<sup>iv</sup>. However, by themselves, eye-tracking metrics do not reveal whether a fixation is a function of interest or confusion or what impact exposure had on the consumer's subsequent choices. Consumers today are looking for more personalized and memorable experiences. They are no longer passive onlookers; instead, they engage with businesses with which they have a stronger connection and affinity. By experimenting with experiences in new and innovative ways across channels, categories, and partners, brands are continuing to please their customers, stay relevant, and win. Hence, for evaluating multidimensional concepts, such as brands<sup>v</sup>, a multidimensional approach of combining eye-tracking with EEG should be used<sup>vi</sup>.*

The current article is a real-world case study in which product packaging was evaluated at the subliminal level through EEG and eye-tracking. The case study involves the brand Imunoalfa, a dietary supplement for boosting immunity, marketed by the pharmaceutical company Orange & Green. The two neuroscience techniques were used to assess the consumer impact of a package design concept for Imunoalfa. The goals of the study were to help the brand refine the proposed design and achieve greater consumer impact and better brand positioning as well as to demonstrate how combined neuroscience-based methodologies can provide actionable insights for package label design and answer market research questions.

## Methods

A total of 55 respondents (41M, 14F, ages 25-50) with normal vision and an active interest in health and a healthy diet were recruited to participate in the study. Respondents were asked to sit in front of a 61 cm monitor at a distance of about 60 cm, with eye-tracking equipment installed on top of the monitor (Gazepoint, GP3 60Hz). A neoprene EEG headband (Enobio8) with two electrodes in the left and right frontal sites (F7, F8) was placed on their heads. Those prefrontal sites of the dorsolateral cortex were chosen for measuring frontal asymmetry (FA). The FA, also known as a marker of approach and avoidance, is the reliable correlate showing the average difference in alpha-band activity

between right and left frontal areas <sup>vii</sup>. When measured during a task, increased right-frontal activity may be attributed to avoidance behavior, while increased left-frontal activity may be described as an index of approach behavior <sup>viii</sup>.

The following eye-tracking metrics were taken to assess packaging design based on the areas of interest (AOIs) to identify how well the brand is positioning itself on the subconscious level: time to first fixation (TTFF) (average amount of time needed for respondents to notice specific AOI from the stimulus onset), respondent ratio (percentage of how many of the respondents that saw the stimulus actually saw the AOI), first fixation duration (how long the first fixation on AOI lasted for), dwell fixation time (average amount of time respondents spent looking at a specific AOI).

After a ten-minute rest, which served as an EEG baseline, participants looked at a post for Imunoalfa on Facebook (Figure 1). During the exposure, both the eye-tracking system and EEG captured the behavior.



Figure 1

## Key Findings

According to the heat map, visualization showing the focus of visual attention for all respondents, the upper part of the image in the area of the brand logo attracted the most attention (Figure 2b).

AOI A (area with the name of the product - Imunoalfa) had a significantly shorter time to first fixation (TTFF) than AOI C (area containing additional information – Immune Dietary Supplement for Children and Adults). No significant difference in TTFF was observed between the AOI A and AOI B (brand logo – Orange & Green), nor between AOI B and AOI C (Table 2, Figure 3).

There was no significant difference in the dwell fixation time between the AOIs, the first fixation duration between the AOIs, nor in the respondent ratio fixating on the AOIs (Table 1).

The observed frontal asymmetry index of 0.09 suggests the possibility of avoidance behavior but this was not supported by robust statistical confidence (Table 3).

## Discussion

The eye-tracking data suggested that the AOI A with the Imunoalfa sign is the area that is highly visually prioritized, and it is the most eye-catching when compared with others.

The data in Figure 2a suggested that the positions of AOI B and AOI C should be switched, so more consumers can first see the purpose of the product and mentally categorize it earlier in their exposure to the package. Currently, within six seconds, 34/55 participants have read the words “Immune Dietary Supplement for Children and Adults” (fixation number 27 in Figure 2c), while 47/55 participants have read the name of the company (fixation number 16).

Despite the lack of statistically significant results, qualitative analysis of the data illustrated in the form of a heat map (Figure 2b) and gaze plot (Figure 2c) indicated that respondents did not notice the herbs listed at the base of the bottle. It is therefore recommended to remove them from the front of the packaging and instead place more emphasis on “Tablets made from goat’s and mare’s milk with added herbs”.

The EEG index of FA is used to assess the “approach-avoidance effect” in motivation. After normalizing the scores to fit the 0-1 range, scores higher than 0.5 denote “approach motivation” while scores lower than 0.5 indicated “avoidance motivation” <sup>ix</sup>. Since avoidance generally results in an “unpleasant” feeling (e.g., disgust, fear), it is probable that the respondent reaction, indicated by the FA of 0.09 ( $p = 0.69$ ), did not quite reach the threshold of confusion or bewilderment. In case of a large and significant FA, the need for improvement would have been urgent and pervasive across the design.

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Figure 2A



Figure 2B



Figure 2C

Table 1. Obtained eye-tracking metrics.

AOI	TTFF sequence	TTFF (s)	Dwell Fixation Time (s)	First Fixation duration (s)	Respondent Ratio (%)
A	1	1.25	0.50	0.03	89.1
B	2	1.62	0.42	0.04	63.6
C	3	2.15	0.29	0.03	47.3
		F (2,107)= 4.13, p = 0.02	F (2,107) = 1.99, p = 0.14	F (2,107) = 1.23, p = 0.30	F = (2,6) 1.21, p = 0.36

Table 2. Descriptive statistics for TTFF differences.

(I) AOI	(J) AOI	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
A	B	-0.37	2.88	0.41	-1.05	0.31
	C	-0.90	3.15	0.01	-1.65	-0.15
B	A	0.37	2.88	0.41	-0.31	1.05
	C	-0.53	3.36	0.25	-1.33	0.26
C	A	0.90	3.15	0.01	0.15	1.65
	B	0.53	3.36	0.25	-0.26	1.33

Table 3. Descriptive statistics for EEG.

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig.
				Lower	Upper			
Alpha F7 – Alpha F8	0.09	0.10	0.04	-0.08	0.11	0.42	9	0.69

## Potential applications of the findings

The way consumers absorb the information they are exposed to has become the foundation stone of scientific neuromarketing research. Given that the average consumer is exposed to 11 million bits of information a second, but the cognitive mind is only able to process 50 bits of information per second, 10,999,950 bits of information remain unnoticed<sup>8</sup>. Unlike the traditional marketing research methods such as questionnaires, focus groups and in-depth interviews, which help to understand consumer's decisions from a conscious point of view, using a combination of eye-

tracking and EEG allows an insight to be gained into the subconscious response to a packaging or advertising concept. Knowing what exactly consumers were looking at when their emotions peaked or memory formation took place provides marketers with actionable information. In addition to the current study evaluating packaging design, the same combination can also be used to explore the emotional response of the brain and focus of the attention while browsing, choosing, and/or purchasing the product on the internet as well as to compare how the product stands visually and

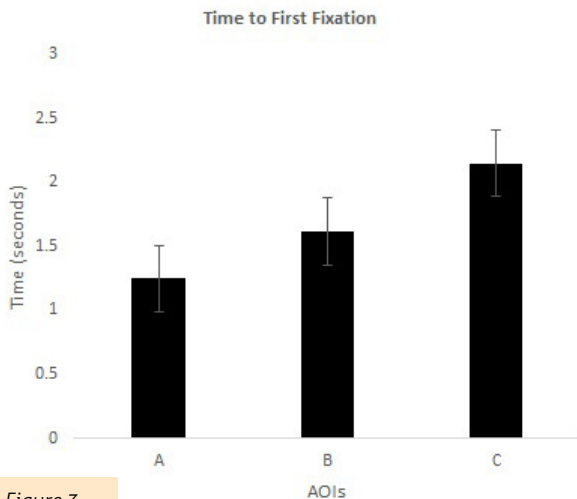


Figure 3

emotionally relative to its competitors. Even though the original hypothesis failed based on the statistically insignificant EEG findings, in this instance specifically eye-tracking provided sufficient information to improve the product design. The eye-tracking technique alone is also valuable within the packaging design research field. In addition to the location of labels, other aspects such as shape, font, color and size of packaging and the presence of misleading elements potentially creating false expectations can be evaluated to enhance packaging designs and subsequently increase conversions.

The entire study is described in the following article:

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