

Title in English: Understanding consumer acceptance of neuromarketing

Titre en Français : Comprendre l'acceptation du neuromarketing par le consommateur

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1. Abstract in English

Neuromarketing provides opportunities to companies such as better understanding consumer behavior in order to decrease product failure and increase customer satisfaction and loyalty. Indeed, eighty percent of consumers' behaviors and purchases come from their subconscious (Hsu & Chen, 2020). However, for some consumers, the true intentions and techniques used may be unclear. This paper aims to understand the perceptions of consumers toward neuromarketing and highlight its pros and cons. To do this, we conducted three focus groups (N1 = 6; N2 = 6; N3 = 7) and used the group nominal technique to analyze our results (see Claxton et al., 1980). Results show that the acceptance of neuromarketing relies on four main categories (i.e., attention, feelings, consumer behavior, innovativeness) which contain subcategories (i.e., attractive products, higher prices, better strategies, emotions, doubts, fears, intentions, attitudes, new experiences, curiosity, technology trust). This research follows the literature that explains how marketers can improve neuromarketing acceptance by favoring consumers' attention, feelings and behaviors thanks to neuromarketing techniques (Nicks & Carriou, 2016).

Résumé en français :

Le neuromarketing offre des opportunités aux entreprises, comme mieux comprendre le comportement du consommateur pour limiter les échecs des produits et favoriser la satisfaction et la fidélité des clients. En effet, près de 80% des comportements d'achats des consommateurs proviennent de leur subconscient (Hsu & Chen, 2020). Néanmoins, les véritables intentions et techniques utilisées peuvent ne pas être claires pour certains consommateurs. Cette recherche vise à comprendre la vision des consommateurs à l'égard du neuromarketing et à mettre en évidence ses avantages et inconvénients perçus. Pour cela, nous avons mené trois focus groupes (N1 = 6 ; N2 = 6 ; N3 = 7) en utilisant la technique du groupe nominal pour analyser nos résultats (voir Claxton et al., 1980). Les résultats montrent que l'acceptation du neuromarketing repose sur quatre catégories principales (ex. l'attention, les sentiments, le comportement du consommateur, l'innovativité), contenant des sous-catégories (ex. produits attractifs, prix plus élevés, meilleures stratégies, émotions, doutes, peur, intentions, attitudes plus spontanées et éthiques, nouvelles expériences, curiosité, confiance technologique). Cette recherche suit la littérature qui explique comment les marketeurs peuvent améliorer l'acceptation du neuromarketing en favorisant l'attention, les sentiments et le comportement des consommateurs grâce aux techniques de neuromarketing (Nicks & Carriou, 2016).

2. Key words

Neuroscience, consumer behavior, perceptions and evaluations

Mots-clés : Neuroscience, comportement du consommateur, perceptions et évaluations

3. Introduction and objectives

Cognitive neurosciences study the central nervous system linked to higher psychological processes involved in consumers' perceptions, memorization, intentions, evaluation, planning and decision-making (Centre d'analyse stratégique, 2010). Neuromarketing is an area of marketing that uses neuroscience tools, such as brain imaging techniques, magnetic resonance imaging and intelligence artificial tools like eye tracking (to understand what attracts consumers' attention), pupil tracking and facial coding (to understand consumers' emotions) (Droulers & Roulet, 2010). These technics enable to understand consumers' conscious and subconscious behaviors (Droulers & Roulet, 2010; Morin, 2011; Nilashi et al, 2020; Yoon et al., 2006). Therefore, neuromarketing can provide benefits to companies by leading efficient marketing campaigns and strategies. Neuromarketing decreases product failure and increases customer satisfaction. These are reasons why neuromarketing forecasts a 15.6% market growth from 2019 to 2024 (Market updates, 2020). However, neuromarketing can guide strategies to adapt products and services to consumers in general, whereas traditional marketing studies can target a specific audience (Sultana & Nangunoori, 2008). Combining neuromarketing and traditional marketing shows the interest and investment in meeting consumers' needs (Sultana & Nangunoori, 2008). Moreover, for consumers, neuromarketing means a subconscious manipulation of their brain to increase companies' profits since they understand how the brain works, they can activate a buy button in their brain to push them toward more consumption (de Sousa, 2018).

This paper aims to understand the bright and dark sides of neuromarketing from consumers' perspectives and give recommendations to managers who are willing to launch neuromarketing strategies.

4. Research question

Neuromarketing enables to understand how the brain works when choosing a product / service (Morin, 2011). The field of application of neuromarketing evoke neuroethics issues such as legal, social and ethical issues linked to neuroscience (Anom, 2020). Research has shown that using neuromarketing tools is beneficial for companies (Courbet & Benoit, 2013) whereas it raises ethical issues regarding the influence on consumers -seen as persuasion and manipulation- and the data management for commercial purposes (Harleen et al., 2014). Firms need to promote acceptance of marketing techniques (du Pre Gauntt, 2008; Merisavo et al., 2007). Indeed, the number of companies that consider using neuromarketing is increasing each year whereas actual use is increasing very little (de Sousa, 2016). This study aims to understand the acceptance process of neuromarketing in order to consider consumers' perceptions, highlight the positive aspects and find solutions according to the perceived obstacles.

5. Literature review

Neuromarketing enables managers to get some knowledge about the brain circuits involved in the search, selection and purchase of their product or service (Morin, 2011). The main issue with neuromarketing is the lack of transparency regarding its intentions and methods. Many consumers do not trust the way neuromarketing acts behind the scenes (de Sousa, 2018). Neuromarketing keeps an image of pushing a "buy button" in consumers' brains through techniques seen as more unethical than ethical (de Sousa, 2018). The media diffused this information, frightening consumers and giving doubts to managers interested by neuromarketing opportunities. Each year, a higher percentage of managers say they consider using neuromarketing in their strategy (21% of managers in 2013). Yet companies that use neuromarketing hide this information, justifying that they protect confidential intellectual property (de Sousa, 2018). Marketers need to gain consumer acceptance regarding any

marketing techniques they consider using (du Pre Gauntt, 2008; Merisavo et al., 2007; Ranchhod, 2007). Literature has shown that positive factors act as enhancers whereas negative factors act as brakes of consumer acceptance (Truong, 2011). Therefore, understanding the acceptance factors of neuromarketing should help companies to know how to use this marketing technique and how to communicate about it, increasing transparency, trust and ethics.

6. Method

To define the antecedents of neuromarketing acceptance, we organized three focus groups (N1 = 6; N2 = 6; N3 = 7) and used the group nominal technique. The group nominal technique is a structured method for group brainstorming that encourages contributions from participants and facilitates agreement on issues, problems and solutions (Claxton et al., 1980). This technique enables to structure and classify qualitative information about existing or new products and services (Giannelloni & Vernetto, 2001). Each focus group lasted for half an hour (see Appendix 1 for details of the methodology). The literature recommends a sample of eight participants to ensure dynamism and interactions (Vernetto, 2011). Due to the coronavirus context, we selected 6 to 7 participants for each focus group (8 women, 11 men; age = 25-35 years). Age should have no effect on the results (Vernetto, 2011).

7. Findings

The main ideas are organized into four categories (i.e., attention, feelings, consumer behavior, innovativeness) which contain subcategories (i.e., attractive products, higher prices, better strategies, emotions, doubts, fears, new experiences, attitudes, intentions, curiosity, technology trust). Table 1 presents a summary of our results.

Categories	Ideas (<i>order of importance: 1 = very important to 3 = less important</i>)
Attention (visible aspects: what consumers expect to see with neuromarketing)	Neuromarketing should improve consumers' attention ("catch the eye" (G1)) through: 1. Attractive products: "modern", "beautiful packaging" (G3), "labels" (G1, G2, G3) 2. Higher prices: "why more expensive?", "it's easy to increase the price" (G2), "quality price ratio" (G1, G2, G3) 3. Better strategies: "visual identity", "seduction is more important than financial aspects" (G2), "marketing = sales are guaranteed" (G3), "importance of the location in the store shelf" (G2, G3)
Feelings (invisible aspects: how consumers feel about neuromarketing)	Neuromarketing brings out three kinds of feelings: 1. Emotions: "emotions" (G1, G2, G3), "positive feelings replace reason" (G2), "pleasure" (G3), "feelings", "souvenirs" (G2, G3) 2. Doubts: "it needs to be done without consumers being aware of it, otherwise they will have a bad feeling", "how does it work?" (G2) 3. Fears: "it's a shame to pay more for this" (G1) "psychological impact", "subconscious", "it's scary" (G2), "too subjective", "madness" (G3), "manipulation" (G1, G2, G3)
Consumer behavior (the process involved when consumers select, purchase, use or dispose of	Neuromarketing should change the way consumers used to behave by developing and creating: 1. New experiences: "positive buying experience", "neuromarketing is more like selling an idea, a concept, an experience than a product" (G1), "touch", "see" (G3), "testing something new" (G1, G2, G3)

products, services, ideas or experiences to satisfy their needs and desires; Solomon et al., 2006)	2. Intentions to accept: “purchase decision”, “reasons for purchase” (G1), “it’s rare so it’s acceptable”, “intention to purchase”, “I could accept” (G3) 3. More spontaneous and ethical attitudes: “a way to act better and be respectful”, “a different act of purchase”, “spontaneous purchases”, “generate purchase or another spontaneous action” (G2), “ethical choice”, “own choice” (G3)
Innovativeness (the degree of tendency and willingness to accept new technologies more quickly than other consumers; Midgley & Dowling, 1978)	Neuromarketing seems to be more accepted by innovative people who own senses of curiosity and higher technology trust, and less accepted by others who doubt and fear more new technologies: 1. Curiosity: “curiosity”, “curious” (G1), “does more expensive equal better?” (G2), “innovation” (G3) 2. Technology trust: “feeling of trust” (G1), “trust this technique” (G2, G3) 3. Technology doubts: “what is the promise of neuromarketing?” (G2), “it is difficult to anticipate the demand and to influence it” (G3), “do we get a full knowledge of the product or preconceived ideas?” (G1)

G stands for focus group

Table 1. Summary of our results

8. Discussion

These results highlight four main antecedents of the neuromarketing acceptance, namely attention, feelings, consumer behavior and innovativeness. More specifically, it shows that neuromarketing should lead to products that are more attractive, better strategies, positive emotions and new experiences. This should increase positive intentions and spontaneous and ethical attitudes thanks to curiosity and technology trust while it should decrease doubts, fears and the brake of higher prices.

First, consumers mentioned how neuromarketing could improve their attention to brands and products (quoted 34 times). Attention is the art of focusing consciously or subconsciously on one or a few aspects in the presence of other aspects (Chou et al., 2010). Literature highlights three types of attention: characteristic-based attention (i.e., related to low-level perceptual processes, such as colors and movements; Maunsell & Treue, 2006), spatial attention (i.e., based on spatial movements and influencing goal-oriented motor behaviors (Scholl, 2001), and object-based attention (i.e., resulting in object-based mental representations that enable object identification; Haladjian & Montemayor, 2016). While complex tasks like learning a new skill require engaged attention (Meuwese et al. 2013), other attentional processes can be captivating and feel effortless (Bruya, 2010). With neuromarketing, consumers expect to be attracted to positive features such as colors and contrasts (Bornczyk et al., 2017), attractive products (28 citations), innovative strategies (17 citations) (Burke & Leykin, 2014), or negative features such as higher prices (18 citations) (Burke & Leykan, 2014). However, consumers are ready to pay higher prices for a higher quality or new attractive experience, or when they can easily find the product they are looking for (Burke & Leykan, 2014).

Second, consumers think neuromarketing can create feelings (12 citations). They believe it could be positive emotions that could create “souvenirs” (G2, G3) or negative feelings linked to manipulation (G1, G2, G3), and fear (G2). Research has shown that neuroscience is more reliable and robust than social science to study emotions, since it uses scientific techniques like

brain imaging (Deluermoz et al., 2019). Neuroscience has demonstrated that the insula in the brain reacts when consumers face feelings of pain, like high prices, which leads to the activation of the prefrontal cortex for decision-making process. Therefore, the activation of the insula leads to longer processes of decision to compare the pros and cons of the product (Wright et al., 2004). However, if only the amygdale reacts to stimuli, it implies a more spontaneous purchase where positive emotions take over reason (Frackowiak et al. 2004). Therefore, by working together, neuroscience and marketing can understand how to create positive emotions through an emotional marketing to appeal consumers.

Third, consumer behavior theory provides evidence that functional and utility benefits are not sufficient to explain consumer attitudes (Chitturi et al., 2008; Christodoulides & Michaelidou, 2010). Specific brain regions react according to judgments about perceptual stimuli from environments (Adolphs, 2003). Neuromarketing uses theories from economics, psychology, neuroscience, cognitive science and decision theory in order to explain and predict how consumers make decisions (Glimcher & Rustichini, 2004). Neuroscience has shown that attention, emotions, and memory all influence consumer behavior (Nicks & Carriou, 2016). Consumers want to live new experiences (quoted 15 times) and are ready to adopt new ethical behaviors (quoted 11 times). Neuromarketing can push people toward adopting new behaviors and attitudes, by activating the right lever, which will incite targeted consumers to act in the expected direction (Singler, 2015).

Fourth, according to the Innovation Diffusion Theory, people react differently to new things due to innovativeness (Rogers, 1983). Technology optimism and curiosity enhance innovation adoption (Gilly et al., 2012). Indeed, innovative people have more positive beliefs about technology use than non-innovative ones (Agarwal & Karahanna, 2000; Eastlick & Lotz, 1999; Goswami & Chandra, 2013; Reynolds & Ruiz De Maya, 2013). Finally, the acceptance of neuromarketing increases when consumers are more aware of their purchasing decisions: free will is essential and products should be in accordance with their expectations (i.e., “better quality” for G3, “good for health” for G1).

9. Conclusion

This paper aims to determine the acceptance process of neuromarketing. Our three focus groups lead us to the following conclusion: the antecedents of neuromarketing acceptance are defined by consumers’ attention, feelings, consumer behavior and innovativeness. This research follows the literature that says that marketers can influence attention, feelings, memory and consumer behavior, and understand how with neuromarketing techniques (Nicks & Carriou, 2016). To remove the problem of higher prices, attractive visuals and higher quality seem to compensate this issue (Berger & Milkman, 2012), and to remove doubts and fears, we recommend to communicate more about neuromarketing techniques and intentions to be transparent.

10. Limitations

This research is not free from limitations. First, we interviewed small sample sizes due to the coronavirus context, which makes it hard to generalize the results. Second, interpretation can differ according to researchers (Verette, 2011). Third, we did not use real-time consumer behavior indicators, and perceptions can differ according to people (Ahmadpour et al., 2016; Donaldson & Dunfee, 1994). During the focus groups, participants could see each other, removing confidentiality and anonymity and perhaps, it influenced participants’ responses. Finally, we need to take into consideration new coming laws, changing demand, media alerts, and social influences that may influence people’s beliefs and consequently the image of neuromarketing, and thus the antecedents highlighted in this research.

11. Further research

The limitations of this research leave room for improvement and further research. First, researchers could replicate this study with respondents from other countries (Straub et al., 1997). Second, researchers recommend deepening these findings with quantitative studies to build theoretical models (Venkatesh & Davis, 2000). Third, we also want to collect and interpret real-time data (Ahmadpour et al., 2016; Van Ittersum et al., 2013) through intelligence artificial tools like eye tracking and facial coding for example. Fourth, consumers may perceive neuromarketing as immoral (Charmettant, 2018). It is important to find ethical ways to use neuromarketing, even if this was not the main result that emerged from the study. Thus, it would be interesting to study the importance of neuroethics, its perception and its development for managers.

12. Managerial implications

This research highlights the key factors of the perception of neuromarketing, guiding managers toward new strategies. Research has shown that managers are willing to find new ways to reach consumers' attention (Mortimer, 2009). First, marketers can target innovative people who appear to be curious and enthusiastic about neuromarketing opportunities (Gilly et al., 2012). They also trust more technology and look forward new experiences of consumption (Agarwal & Karahanna, 2000). Second, price is not a main brake (Burke & Leykin, 2014) if consumers perceive a high quality, a positive brand image, positive feelings (Berger & Milkman, 2012) and a new experience to enjoy. For example, to increase the consumers' attention, marketers can create greater color contrasts between their packaging and competitors (Burke & Leykin, 2014). Indeed, neuromarketing enables to understand how to activate the right lever to make consumers behave a specific way toward products and services (de Sousa, 2018). Third, as it is also consumers' intentions, marketers can push their target to perform more ethical and responsible behaviors thanks to marketing nudges (Singler, 2015). Finally, despite some obvious benefits of neuromarketing techniques to create efficient marketing strategies, neuromarketing also raises ethical issues regarding safety and reliability (Claeys & Vialatte, 2012). In France, the Civil Code (Article 16-14) forbids the use of brain imaging for business and marketing purposes.

13. Bibliography

- Adolphs, R. (2003) Cognitive neuroscience of human social behaviour. *Nature Reviews Neuroscience*, 4, 165-178. Doi10.1038/nrn1056.
- Agarwal, R., & Karahanna, E. (2000). Time flies when you're having fun Cognitive absorption and beliefs about information technology usage. *MIS Quarterly*, 24, 665694.
- Ahmadpour, N., Kühne, M., Robert, J.-M., & Vink, P. (2016). Attitudes towards personal and shared space during the flight. *Work*, 54(4), 981-987.
- Anom, B. Y. (2020). Ethics of Big Data and artificial intelligence in medicine. *Ethics, Medecine and Public Health*, 15, 1-11.
- Berger, J., & Milkman, K. L. (2012). What makes online content viral? *Journal of Marketing Research*, 49(2), 192-205.
- Boronczyk, F., Rumpf, C., & Breuer, C. (2018). Determinants of viewer attention in concurrent event sponsorship. *International Journal of Sports Marketing and Sponsorship*, 19, 11-24. 10.1108/IJSMS-09-2016-0063.

- Bruya, B. (2010). *Effortless attention: A new perspective in the cognitive science of attention and action*. MIT Press.10.7551/mitpress/9780262013840.001.0001
- Burke, M. R. R., & Leykin, A. (2014). Identifying the Drivers of Shopper Attention, Engagement, and Purchase. http://www.eyetechds.com/uploads/4/7/3/0/47308795/rmr_2014_shopperattentionengagementpurchase.pdf
- Centre d'analyse stratégique, 2010, <https://www.vie-publique.fr/sites/default/files/rapport/pdf/104000139.pdf>
- Charmetant, E. (2018). La neuroéthique : histoire, actualité et prospective. [In English: Neuroethics: history, news and outlook]. *Transversalités*, 146, 45-58 DOI10.3917/trans.146.0045
- Chitturi, R., Raghunathan, R., & Mahajan, V. (2008). Delight by design: the role of hedonic versus utilitarian benefits. *Journal of Marketing*, 72(2), 48-63.
- Chou, K. L., Amick, M. M., Brandt, J., Camicioli, R., Frei, K., Gitelman, D., Goldman, J., Growdon, J., Hurtig, H. I., Levin, B., Litvan, I., Marsh, L., Simuni, T., Tro, A. I., & Ergun, Y. (2010). A Recommended Scale for Cognitive Screening in Clinical Trials of Parkinson's Disease. *Movement Disorders*, 25(15), 2501-2507.
- Christodoulides, C., & Michaelidou, N. (2010). Shopping motives as antecedents of e-satisfaction and e-loyalty. *Journal of Marketing Management*, 27(1-2), 181-197.
- Civil Code (2011). Chapitre IV : De l'utilisation des techniques d'imagerie cérébrale (Article 16-14). [In English: Chapter IV: The use of brain imaging techniques]. Accessed on: https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000024324450/
- Claeys, A., & Vialatte, J.-S. (2012). Rapport sur l'impact et les enjeux des nouvelles technologies d'exploration et de thérapie du cerveau. [In English: Report on the impact and challenges of new technologies for brain exploration and therapy]. Office Parlementaire d'évaluation des choix scientifiques technologiques, Assemblée Nationale, Sénat session ordinaire de 2011 – 2012.
- Claxton, J. D., Brent, R., & Zaichkowsky, J. L. (1980). The group nominal technique: its potential for consumer research. *Journal of consumer research*, 7 (3), 308-313.
- Courbet, D., & Benoit, D. (2013). Neurosciences au service de la communication commerciale: manipulation et éthique - Une critique du neuromarketing. [In English: Neuroscience at the service of commercial communication: manipulation and ethics - A Critique of Neuromarketing]. *Études de communication - Langages, information, médiations*, Université de Lille, 40, 28-42.
- De Sousa, J. (2016). *Neuromarketing Technologies: Global Markets*. BCC Research.
- De Sousa, J. (2018). *The Challenge of Neuromarketing*. IGI Global. <http://doi:10.4018/978-1-5225-4834-8.ch002>
- Deluermoz, Q., Dodman, T., & Mazurel, H. (2019). L'émotion en débat : Neurosciences affectives *versus* sciences sociales des émotions. [In English: Emotion in Debate: Emotional Neuroscience versus Social Sciences of Emotion]. *L'information psychiatrique*, 95(6), 431-434. <https://doi.org/10.1684/ipe.2019.1975>
- Donaldson, T., & Dunfee, T. W. (1994). Toward a Unified Conception of Business Ethics: Integrative Social Contracts Theory. *Academy of Management Review*, 19, 252-284.

- Droulers, O., & Rouillet, B. (2010). Neuromarketing: Le marketing revisité par les neurosciences du consommateur ? [In English: Neuromarketing: Marketing revisited by consumer neuroscience?] Paris, Dunod, 224.
- Du Pre Gauntt, J. (2008). Mobile advertising: After the growing pains. New York, NY: eMarketer.
- Eastlick, M. A., & Lotz, S. (1999). Profiling potential adopters and non-adopters of an interactive electronic shopping medium. *International Journal of Retail & Distribution Management*, 27(6), 209-223.
- Frackowiak, R., Karl, S. J., Friston, J., Christopher, D., Frith, R., Dolan, J., Price, C. J., Zeki, S., Ashburner, J., & Penny, W. (2004). *Human Brain Function*. Second edition, San Diego: Elsevier Academic Press.
- Giannelloni, J.-L., & Vernet, E. (2001). Etudes de marché. Vuibert.
- Gilly, M., Wolfenbarger, C., Celsi, M., & Schau, H. J. (2012). It doesn't come easy: overcoming obstacles to technology use within a resistant consumer group. *The journal of consumer affairs*, 62-89.
- Glimcher, P. W., & Rustichini, A. (2004). Neuroeconomics: The consilience of brain and decision. *Science*, 306, 447-452. DOI10.1126/science.1102566.
- Goswami, S., & Chandra, B. (2013). Convergence dynamics of consumer innovativeness vis-à-vis technology acceptance propensity: an empirical study on adoption of mobile devices. *Journal of Marketing Management*, 12(3), 63-87.
- Haladjian H. H. & Montemayor, C. (2016). Artificial consciousness and the consciousness-attention dissociation, *Consciousness and Cognition*, 45, 210-225, 10.1016/j.concog.2016.08.011.
- Harleen, F., & Xiaofeng, W., & Swati, C. (2014). An Investigation on the Characteristics of Mobile Applications: A Survey Study. *International Journal of Information Technology and Computer Science*, 11, 21-27.
- Hsu, L., & Chen, Y.-J. (2020). Neuromarketing, subliminal advertising, and hotel selection: An EEG study. *Australasian Marketing Journal (AMJ)*, 10.1016/j.ausmj.2020.04.009.
- Maunsell, J. & Treue, S. (2006). Feature-based attention in visual cortex. *Trends in neurosciences*. 29. 317-22. 10.1016/j.tins.2006.04.001.
- Merisavo, M., Kajalo, S., Karjaluoto, H., Virtanen, V., Salmenkivi, S., & Raulas, M. (2007). An empirical study of the drivers of consumer acceptance of mobile advertising. *Journal of Interactive Advertising*, 7(2), 1-19.
- Meuwese J. D., Post, R. A., Scholte, H. S., Lamme, V. A. (2013). Does perceptual learning require consciousness or attention? *Journal of Cognitive Neuroscience*, 25(10), 1579-1596 DOI10.1162/jocn_a_00424.
- Midgley, D. F., & Dowling, G. R. (1978). Innovativeness: The Concept and Its Measurement. *Journal of Consumer Research*, 4, 229-242.
- Market updates (2020). Global Neuromarketing Market Size 2020. Accessed from: <https://www.theexpresswire.com/pressrelease/global-neuromarketing-market-size-2020->

industry-growth-size-share-global-forecasts-analysis-company-profiles-competitive-landscape-and-key-regions-analysis-research-report_10961256

Morin, C. (2011). *Neuromarketing: The New Science of Consumer Behavior*. Society, 48, 131-135. DOI: 10.1007/s12115-010-9408-1.

Mortimer, R. (2009). Getting the right attention. *Brand Strategy*, 55.

Nicks, G., & Carriou, Y. (2016). *Emotion, Attention & Memory in Advertising*. Ipsos, Game Changers, November 2016.

Nilashi, M., Samad, S., Ahmadi, N., Ahani, A., Abumalloh, R.A., Asadi, S., Yadegaridehkordi, E. (2020). Neuromarketing: a review of research and implications for marketing. *Journal of Soft Computer Decision Support System*, 7(2), 23-31.

Ranchhod, A. (2007). Developing mobile marketing strategies. *International Journal of Mobile Advertising*, 2(1), 76-83.

Reynolds N., & Ruiz De Maya, S. (2013). The impact of complexity and perceived difficulty on consumer revisit intentions. *Journal of Marketing Management*, 29(5/6), 625-645.

Rogers, E. M. (1983). *Diffusion of Innovations*. The Free Press, New York.

Scholl, B. (2001). Objects and Attention: The State of the Art. *Cognition*. 80. 1-46. 10.1016/S0010-0277(00)00152-9.

Singler, E. (2015). *Nudge marketing : Les sciences comportementales pour un marketing gagnant-gagnant*. [In English: *Marketing nudge: Behavioral sciences for win-win marketing*]. Pearson France, 376.

Solomon, M., Bamossy, G., Askegaard, S., & Hogg, M. K. (2006). *Consumer behaviour : a European perspective*. 3rd ed., Harlow: Financial Times.

Straub, D. W., Keil, M., & Brennan, W. (1997). Testing the Technology Acceptance Model Across Cultures: A Three Country Study. *Information & Management*, 33, 1-11.

Truong, Y. (2011). Antecedents of Consumer Acceptance of Mobile Television Advertising. *IJTHI*. 7. 70-83. 10.4018/jthi.2011070105.

Van Ittersum, K., Wansink, B., Pennings, J. M. E., Sheehan, D. (2013). Smart shopping carts: How real-time feedback influences spending. *Journal of Marketing*, 77(6), 21-36.

Venkatesh V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management Science*, 46(2), 186-204.

Vernette, E. (2011). *Techniques d'études de marché*, Vuibert.

Wright, P., He, G., Shapira, N. A., Goodman, W. K., & Liu, Y. (2004). Disgust and the Insula: fMRI Responses to Pictures of Mutilation and Contamination. *Neuroreport*, 15(15), 23-47.

Yoon, C., Gutchess, A. H., Feinberg, F., & Polk, T. A. (2006). A functional magnetic resonance imaging study of neural dissociations between brand and person judgments. *Journal of Consumer Research*, 33(1), 31-40.

13. Appendix

Appendix 1. Methodology

Before the focus group session, volunteers received an email informing them of the session's subject: motivations and barriers toward neuromarketing. During the focus group, we gave each participant the following instructions:

YOUR ACCEPTANCE OF NEUROMARKETING

Neuromarketing is a field of marketing that uses neurosciences (such as brain imaging techniques or magnetic resonance imaging) to study our brain's reactions to advertising solicitations in order to understand our purchasing behaviors for example.

- 1) Individual time: Write down words, expressions and questions that come to your mind after reading the following scenario: "You are in the dairy products section. Some products are slightly more expensive than the average price. You choose these products because you are seduced by the colors, visuals and text of the packaging that have been developed using neuromarketing".
- 2) Group discussion: Share your answers to the group while we write them on a white board for everyone to see.
- 3) Group discussion: We clarify your ideas in order to classify them by groups (or themes).
- 4) Individual time: Select the ideas that seem the most important to you about neuromarketing, write down your new thoughts, questions, opinions (negative or positive, etc.).
- 5) Group discussion: Share with the group what you thought were the most important topics and why. If ideas are not selected, they will be deleted.
- 6) Individual time: Evaluate each idea from 1 to 5 with 1 = not important at all to 5 = very important.