

Editorial Note

Integrating neurophysiological and psychological approaches: Towards an advancement of brand insights

In recent years, a synergy has emerged between the social and biological sciences, in efforts to gain a deeper understanding of human cognition and behavior. A longtime common view among social scientists had been that social and behavioral processes could be studied in relative isolation from the brain (and, more generally, the body), and consequently from the evolution or genetics that forged its structures and processes. Similarly, biological scientists investigated internal mechanisms of the brain and body by attempting to control for external, non-physiological factors that could otherwise complicate analyses. Following some notable calls for cross-level integrations (e.g., [Berntson & Cacioppo, 2004](#); [Wilson, 1998](#)), an emerging view is that this strict division of labor is not only unjustified but also an obstacle to fostering major advancements along various fronts of social, behavioral, and biological sciences.

The past decade has seen steady progress in the effort to ground the social sciences in neurobiology. Both evolutionary psychology ([Kurzban, 2010](#)) and social neuroscience ([Cacioppo, 2002](#)) have brought biological findings to bear on the understanding of social phenomena. Neuroeconomics ([Camerer, Loewenstein, & Prelec, 2005](#)) and decision neuroscience ([Shiv et al., 2005](#)) have provided valuable theoretical insights about decision making that account for both individual choices and the neural mechanisms that generate those choices. Within the marketing discipline, there has been a growing interest in the neurosciences as a means of gaining new theoretical and process-level insights about consumer behavior ([Plassmann, Yoon, Feinberg, & Shiv, 2010](#)).

It is against this backdrop that this Special Issue seeks to showcase how neurophysiological perspectives, in concert with more traditional psychological approaches, can inform our understanding of brands. Judgments and decisions involving brands comprise an area of study of central interest in consumer behavior. As such, a great deal of theoretical and practical knowledge has accrued about brands, primarily via experiments, surveys, and other qualitative methods (e.g., interviews, focus groups).

Adding neurophysiological methods to consumer psychologists' collective research toolkit will inevitably lead to richer insights about brands specifically and other consumer domains more generally. We submit that neuroscience can provide consumer researchers with a number of tangible benefits:

opportunities and guidelines to facilitate theoretical development; new empirical tests of standard theoretical claims; explanations for observed heterogeneity within and across consumer groups; and novel mechanisms for considering the physiological context and the role of numerous biological factors, including hormones and genes, on consumer preferences and decisions.

Combining standard behavioral methods with neurophysiological ones provides opportunities to deepen and expand our understanding of consumer psychology. Advances in neuroscientific techniques have made such measures more accessible to consumer researchers. Some techniques have enabled researchers to avoid asking consumers directly about their thoughts and reactions: for example, eye tracking for measuring attention, and skin conductance response (SCR) or galvanic skin response (GSR) assessing arousal. In a similar vein, functional magnetic resonance imaging (fMRI) and various forms of electroencephalography (e.g., EEG) can measure neural activity associated with attention, cognition or emotion without having to ask consumers what they are processing or which mental systems are implicated. Of course, like other research techniques, each neurophysiological method has unique advantages and disadvantages in terms of the biological and psychological variables it can measure, and fundamentally different inferences that can be drawn. These relative strengths and weaknesses have been detailed elsewhere (e.g., [Plassmann et al., 2010](#)).

Each of the articles in this special issue elucidates an aspect of consumer psychology related to brands, and collectively describes the variety of approaches and methods that can be drawn upon to answer brand-related questions. Specifically, they each both demonstrate and explicate how consumer psychologists can benefit from applying a mix of neurophysiological and psychological perspectives to develop and test richer models, and to generate insights ultimately valuable not only for academic scholars, but also for consumers and practitioners as well.

Overview of the special issue

Some of the papers in this special issue highlight the use of integrative social–biological approaches, while others rely on traditional experimental methods to address brand-related research questions. The issue is organized as follows. The first

three articles together provide a comprehensive review of the recent literature related to brands and neurophysiological approaches to the study of brands. The remaining nine articles present empirical studies that investigate specific questions about brands using different research methods. These articles are loosely categorized into following subtopics: brand perceptions, brand evaluations, brand relationships, and brand preferences.

Reviews

The article by [Schmitt \(2012\)](#), “The Consumer Psychology of Brands” presents a general model and highlights key psychological constructs and processes that have emerged from prior studies on brands. He identifies gaps in knowledge with respect to underlying psychological constructs and processes that lead to brand outcomes (e.g., choice, loyalty, equity) and generates research ideas that can be addressed not only via traditional research tools, but also via neuroscientific methods. In particular, he suggests that understanding the neural bases of different levels of consumer engagement with brands will contribute to a more complete and integrative understanding of the consumer psychology related to brands.

The article by [Plassmann, Ramsøy, and Milosavljevic \(2012\)](#), “Branding the Brain: A Critical Review and Outlook,” provides a comprehensive review of the emerging literature in consumer neuroscience, with an emphasis on studies that offer insights about the consumer psychology of brands. They organize their review by discussing four broad classes of key processes involved in brand decisions: representation and attention, predicted value, experienced value, and remembered value and learning. With respect to representation and attention, they limit their review to visual processes (and leave the discussion of other sensory processes to [Spence, 2012](#) in the next article). Much research progress has been made in the recent past about the neural bases of predicted value, and how the valuation system guides consumer choice. Plassmann et al. provide an extensive discussion of the ventromedial prefrontal cortex (vmPFC) and associated parts of the ventral striatum that are recruited when consumers encode the subjective value of goods and actions. They further review studies on experienced value and remembered value and report that specific neural regions such as the orbitofrontal cortex (OFC) and hippocampus are implicated in brand preference and brand memory, respectively. These initial findings set the stage for subsequent investigations of brand-related responses that are informed by neuroscience. Plassmann et al. offer clear directions for using neurophysiological approaches to generate important brand insights, and also discuss concrete suggestions about how future researchers can avoid potential pitfalls associated with these approaches.

[Spence’s \(2012\)](#) article, “Managing Sensory Expectations Concerning Products and Brands: Capitalizing on the Potential of Sound and Shape Symbolism,” presents an intriguing account of crossmodal sensory processes, a topic area that warrants greater research attention in consumer behavior. He considers the effects of color or shape (e.g., angularity of packaging) on taste perceptions (e.g., bitterness) and oral-

somatosensation (e.g., carbonation). He further reviews what is known about the crossmodal correspondences between sounds (e.g., tone/pitch, phonetic stimuli, musical parameters) and tastes and flavors. He suggests that these processes occur at an implicit level to guide consumer expectations and discusses the implications for products and brands. Spence identifies many unanswered questions regarding crossmodal correspondence effects that call for future empirical testing.

Brand perceptions

The article by [Litt and Shiv \(2012\)](#), “Manipulating Basic Taste Perception to Explore How Brand Information Affects Experience,” introduces a novel physiologically-based method, the use of miraculin, to investigate a fundamental question related to taste perception that has been difficult to address directly via other methods — that is, whether exposure to information extrinsic to the inherent experiential aspects of a product truly does distort the experience itself. In their study, some participants were given miraculin, which temporarily ablated sour tastes and thereby distorted taste perceptions, while others were given an inert tablet. By comparing the two group’s subsequent taste perceptions, Litt and Shiv obtain empirical evidence suggesting that extrinsic information can indeed alter actual basic sensory experiences (e.g., experienced taste). They suggest a number of approaches using miraculin for assessing consumers’ sensory and perceptual experiences. Importantly, this article demonstrates how researchers can use physiologically-based approaches to modify the intrinsic characteristics of sensory processes (e.g., taste, touch, sound) rather than having to rely on manipulation of participants’ ability to perceive a sensory input.

The article by [Milosavljevic, Navalpakkam, Koch, and Rangel \(2012\)](#), “Relative Visual Saliency Differences Induce Sizable Bias in Consumer Choice,” examines visual attention processes under conditions of rapid decision-making and cognitive load. Very little prior work has focused on what happens in such contexts, despite the fact that these conditions reflect many real-world shopping situations. Milosavljevic et al. use eye tracking to investigate the relationship between visual saliency (e.g., brightness) and preference in real food choices at fast decision speeds. They uncover a pronounced visual saliency bias (i.e., visual saliency exerts a greater influence than preference) in choices made at very quick exposure times (e.g., <200 ms) and under cognitive load. They find that the bias manifests especially when preferences for the choice alternatives are relatively weak.

Brand evaluations

The next three empirical papers consider various aspects of brand evaluations, each with a different methodological approach. The article by [Esch et al. \(2012\)](#), “Brands on the Brain: Do Consumers Use Declarative Information or Experienced Emotions to Evaluate Brands?,” examines the neural bases of evaluations of brands as a function of their strength and familiarity. Using fMRI, Esch et al. find that activations in neural regions associated with linguistic encoding (e.g., Broca’s area) are higher

for unfamiliar and weak brands compared to strong brands; however, they also unexpectedly find stronger activation of the insula for unfamiliar and weak brands compared to strong brands. They additionally find differential activations in neural areas associated with information retrieval (e.g., Wernicke's area) for familiar (strong and weak) brands, compared to unfamiliar brands. Other key neural findings lend support to the idea that strong compared to weak brands differentially activate positive feelings (e.g., pallidum), whereas no differential activations in areas associated with processing of declarative information (e.g., prefrontal cortex) are found for strong compared to weak brands. Esch et al. interpret these results as providing deeper insights about evaluations of weak brands insofar as they appear to activate simultaneously ad hoc encoding and retrieval processes. They further underscore the notion that processing of positive experiential information (rather than declarative information) drives evaluations of strong versus weak brands, thereby arguing that existing models of brand evaluation and brand equity may overly emphasize cognitive associations.

The article by [Estes, Gibbert, Guest, and Mazursky \(2012\)](#), "A Dual-Process Model of Brand Extension: Taxonomic Feature-Based and Thematic Relation-Based Similarity Independently Drive Brand Extension Evaluations," employs a traditional experimental approach to investigate evaluations of brand extensions. Estes et al. propose a dual-process model to explain how consumers process taxonomic similarity and thematic similarity between the brand and its extension. The lack of a distinction between these two similarity constructs in the branding literature has sometimes been a source of confusion. The article provides a nice example of work that draws on neuroscientific evidence — that taxonomic and thematic similarity judgments engage distinct neural circuits — to make the case for distinct constructs that are then experimentally tested. In four experiments, Estes et al. differentiate between thematic and taxonomic brand extensions and demonstrate that thematic and taxonomic similarity contribute independently to evaluations of brand extensions. They further document that thematic brand extensions are processed faster and evaluated as being more novel and positive than taxonomic brand extensions. However, when the processing condition induces consumers to focus on commonalities between the brand and its extensions, taxonomic brand extensions are evaluated as being more novel and positive than thematic brand extensions.

The article by [Saad and Stenstrom \(2012\)](#), "Calories, Beauty, and Ovulation: The Effects of the Menstrual Cycle on Food and Appearance-Related Consumption," takes an evolutionary perspective and speaks to the question of how biological drivers can drive consumption. Saad and Stenstrom administer a longitudinal survey panel to females who reported their daily consumption of foods and appearance-related products across their ovulatory cycle. They track product consumption and menstrual cycle, and find that women increase their appearance-related consumption on fertile days, in order to maximize their attractiveness to potential mates within this time period although the women are presumably not aware of doing so. Also as they expect, peak caloric intake is found to occur during the luteal, rather than the fertile phase. They also

report on a separate panel of females who recorded their daily consumption of specific brands, those with known 'brand personality' traits. Interestingly, brands with personality traits that are thought to be associated with public mating signals (e.g., sexy, exciting) did not yield more positive evaluations during fertile days. They suggest that the causal link between evolutionary mechanisms and certain types of brand evaluations may be less direct than between a woman's hormonal status and behaviors related to food or beautification. Consumer responses to brands and branding are likely to be determined by a wide range of intervening variables, such that the direct link between mechanisms driven by evolutionary biology and brand evaluations may not be readily detectable. These findings serve to underscore the idea that when incorporating neurobiological factors in consumer research, the relationship between neurophysiological variables and behavioral responses may require a multilevel analysis that accounts for a complex interaction of biological and sociocultural factors.

Brand relationships

The next two articles provide insights about brand relationships. The article by [Aggarwal and Larrick \(2012\)](#), "When Consumers Care about Being Treated Fairly: The Interaction of Relationship Norms and Fairness Norms," investigates how brand evaluations are affected by interactions with two different types of brand relationships. By applying concepts describing social relationships, they distinguish between communal and exchange relationships. In experiments, they find that consumers' responses to interactional fairness (captured via brand evaluations) vary as a function of the type of relationship as well as distributive fairness of the final outcome. When the distributive fairness is low, consumers who have a communal relationship with a brand respond more favorably to the brand than those who have an exchange relationship, presumably because the nature of the interaction serves to compensate for the low distribution outcome. By contrast, when the distributive fairness is high, consumers who have an exchange rather than a communal relationship with a brand respond more positively to the brand. This article demonstrates the importance of understanding different types of brand relationships to the extent that they entail varying expectations about relationship norms that influence brand evaluations.

The article by [Reimann, Castaño, Zaichkowsky, and Bechara \(2012\)](#), "How We Relate to Brands: Psychological and Neurophysiological Insights into Close Consumer–Brand Relationships," uses a mixture of behavioral and physiologically-based methods to test the idea that a close brand relationship, in its early stages, is accompanied by the motivation to expand oneself. They measure consumers' skin conductance responses to close brands to assess emotional arousal, and find increased emotional arousal for recently formed "love" relationships with brands and decreased emotional arousal for established close brand relationship. Reimann et al. further conduct a fMRI study to examine the neural correlates of established consumer–brand relationships and find that the insula is differentially engaged for brands with which

consumers have close relationships. These studies, in sum, provide a more nuanced view of close brand relationships and suggest a number of interesting questions to be addressed by future research.

Brand preferences

The last two articles speak directly to the potential usefulness of neuroscience to marketing practitioners and academic scholars alike. The article by Venkatraman, Clithero, Fitzsimons, and Huettel (2012), “New Scanner Data for Brand Marketers: How Neuroscience Can Help Better Understand Differences in Brand Preferences,” provides novel ideas about how neuroscience could be used to help practitioners make real world decisions about brands. In particular, they discuss ways that neuroscientific insights with respect to preferences, context dependencies, and individual differences can be applied to address brand-related questions. Venkatraman et al. offer a useful set of concrete examples to explain how neural evidence can be employed to make better managerial decisions.

Finally, the article by Berns and Moore (2012) “A Neural Predictor of Cultural Popularity,” constitutes a pioneering effort in demonstrating the practical value of neuroimaging data. They find that neuroimaging data from a small number of consumer study participants can predict future purchasing decisions of the population at large. Activity in reward-related areas of the brain, namely the orbitofrontal cortex and ventral striatum, while participants listened to different pieces of music, predicted relative popularity of the music in terms of sales at the population level three years in the future. Importantly, Berns and Moore also find that subjective likeability ratings of the music did not predict sales. Thus their findings represent an exciting initial proof of concept that neuroimaging data can be superior to self-reports in predicting purchase behavior. Future studies are needed to validate this general approach; however, its broad applicability is likely to be constrained by the stringent study protocol requirements in fMRI data collection.

Concluding comments

We would like to thank all authors who responded to our call for papers in this special issue. We are especially grateful to the authors of the articles in this Special Issue and to the many reviewers who provided suggestions, and whose contributions are necessarily uncredited by name. There is every reason to be optimistic about the future role of neuroscientific techniques, and neuroscience more generally, in marketing. We are excited by the new research paradigms that are now possible, and hope that readers will share our enthusiasm.

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