Available online at www.sciencedirect.com

ScienceDirect

Current Opinion in Psychology

# Consumer neuroscience: advances in understanding consumer psychology

Uma R Karmarkar[1] and Carolyn Yoon[2]

While the study of consumer behavior has been enriched by improved abilities to generate new insights, many of the mechanisms underlying judgments and decision-making remain difficult to investigate. In this review, we highlight some of the ways in which our understanding of consumer psychology has been, and can be, advanced through the use of neurophysiological methods. In particular, we outline some of the common neural circuitry that is involved in affective processing, subjective value, persuasion, and attention. We discuss how an understanding of these mechanisms can be used to better elucidate various elements of consumer psychology. We show how recent findings have produced a deeper understanding of decision-making, and suggest directions for future research.

**Addresses**
[1] Harvard Business School, USA
[2] University of Michigan, USA

Corresponding author: Yoon, Carolyn (yoonc@umich.edu)

**Current Opinion in Psychology** 2016, **10**:160–165

This review comes from a themed issue on **Consumer behavior**

Edited by **Jeff Joireman** and **Kristina M Durante**

For a complete overview see the Issue and the Editorial

Available online 10th February 2016

http://dx.doi.org/10.1016/j.copsyc.2016.01.010



## Introduction

Over the last several decades, there have been remarkable innovations allowing us to consider different ways of understanding and modeling consumer behavior. For example, digital and mobile advances in tracking marketplace activity have opened up one source of data, with analytics that can reveal not only patterns of behavior, but also examine how small changes in marketing actions affect them. These methods have proven themselves to be a tremendous source of information. At the same time they notably retain the 'black box' perspective — modeling behavior independent of attempting to understand the underlying processes.

The entrance of neurophysiological methods into this field has, however, offered additional dimensions of insights into the psychology and mechanisms that drive behavior. Whereas early foundational work in consumer neuroscience explored how value and marketing-related concepts are represented in the brain, this field has now grown to allow sophisticated measurement of consumer responses to price, brands, persuasive messages, and a range of other marketing-related factors (see [1–3] for other recent reviews).

The present review provides selective coverage of advances in consumer neuroscience in domains such as affective processing and estimates of value in choice. We also discuss how neural insights can offer a more nuanced understanding of persuasion and attention that can be difficult to capture via behavioral metrics alone. Throughout this review, we highlight some of the findings that have provided a strong foundation for the field, and have forged new paths toward an improved understanding of consumer psychology.

## Affect, preferences, and motivational processes

In terms of both theory and practice, one of the most promising areas for consumer neuroscience to offer insights is in affect and/or emotional responses. Affect is notoriously difficult to capture accurately through methods like surveys or introspection [4]. The continuously dynamic and relatively non-intrusive nature of many neurophysiological measures allow for ways to better understand how consumer emotions change over time, and are, or are not involved in decision-making [5].

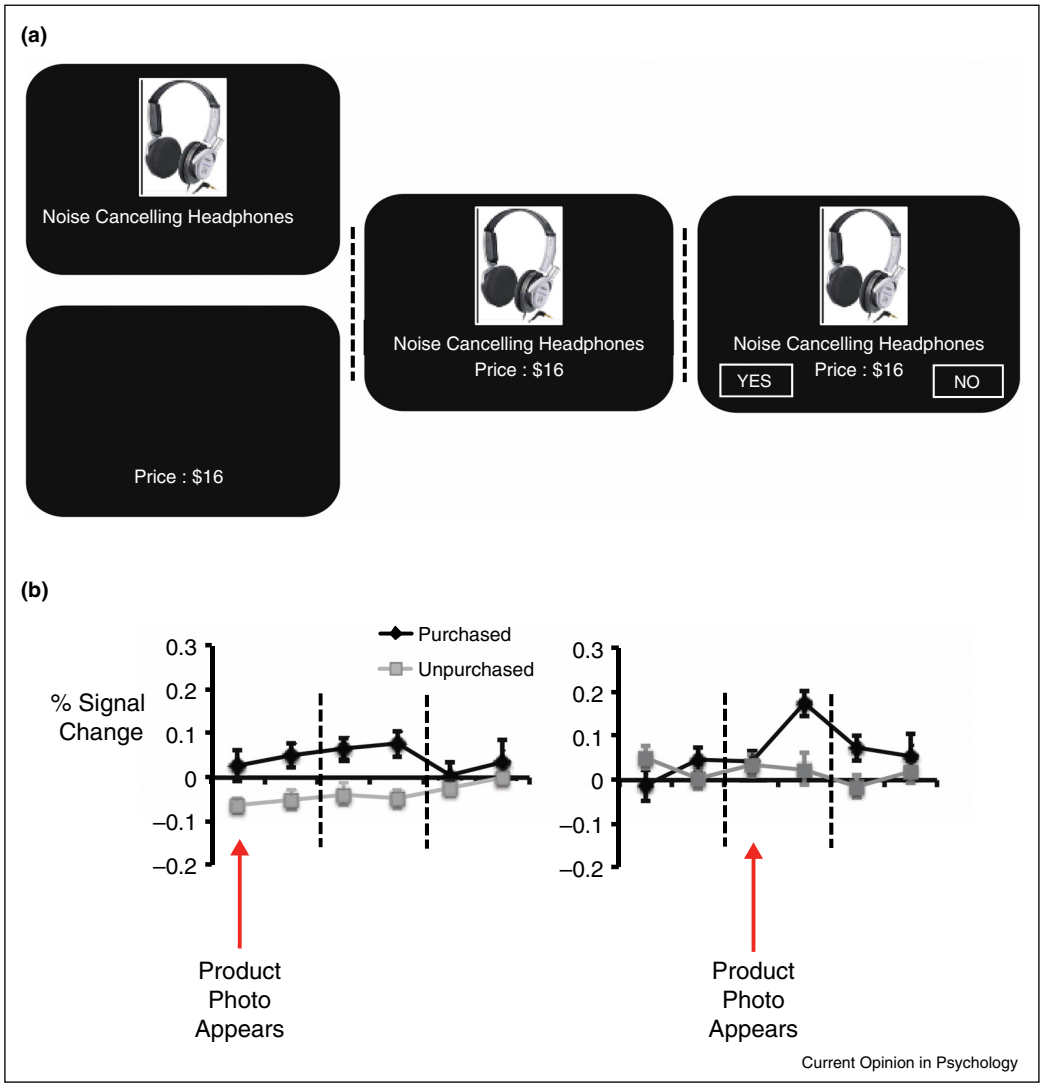
A potentially useful way to conceptualize affective processing from a consumer neuroscience perspective is to draw on an affect-integration-motivation framework (AIM) [6]. According to the AIM, affect can be viewed in terms of subjective arousal and valence [7]. It posits that separable neural circuits (nucleus accumbens (NAcc), insula) first affectively evaluate objects. These evaluations may then be integrated with considerations of specific situational or conceptual information (in the medial prefrontal cortex (MPFC)) and translated into motivation to approach or avoid the object.

The NAcc is a key neural area for understanding that first step of affective processing. Given its location deep in the brain, fMRI is the primary technique used to track NAcc activity in humans. Activity in this brain region has been correlated with positive subjective arousal and is often accompanied by motivation to approach opportunities. In the context of consumer neuroscience, the NAcc has been

shown to reflect how much people like a product, or how attractive they find it [8,9,10••]. It is notable that this affective response is separable from the more comprehensive estimate of value (discussed in the next section). For example, in a purchasing context, consumers may learn of various product attributes, like price, or discounts before they actually see the product (e.g. coming across it in person or viewing a photo on the screen online.) However, studies have found that the onset of NAcc activity occurs only at the time when consumers are viewing the product itself [9,10••] (Figure 1). As such, it appears to specifically reflect an emotional attraction that may or may not be influenced by some of the elements of the marketing mix, like price, or promotion.

This interpretation of NAcc activity has potentially significant implications for identifying and measuring the contribution of affect in consumer behavior. In particular, a series of recent findings have shown that NAcc activity can predict market-level choice outcomes across different decision contexts like music box-office sales [11•], microlending [12••] (Figure 2), and crowdfunding [13]. A notable element of these studies is that in contrast to 'big data,' this predictive power is possible using fMRI data from relatively small samples (e.g. $n = 30$). In addition, predictions from the neural data significantly outperform the predictions from preference measures obtained from traditional surveys collected at the same time from the same individuals. Along similar lines, NAcc activity in response to advertisements has also been

**Figure 1**




**(a)** Experimental design in which products appear before or after price information during the decision process; **(b)** timecourses for nucleus accumbens (NAcc) activity for purchased versus unpurchased products in this experiment.
Adapted from [10••].