

Chapter 2

Dietary Behavior and Health Outcomes: A Dual-Self Theory With Applications

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ABSTRACT

How do people choose the level of food to consume considering four important elements, namely, utility from health, health effects of food, hedonic utility from food, and diet restraint costs? The authors model dietary choice as dual-self in a principal-agent framework. The principal is concerned with long-term consequences of dietary choices, whereas the agent is in pursuit of the short-term pleasure from food consumption. Firstly, it incorporates impulsivity, an important element, which turns out to be directly related to the principal's utility from health discounted by the agent's disutility from the same health objective. A health objective could be a particular body mass index (BMI), for example. The authors show that the more distant the goal the more impulsive the individual would be. Secondly, with simple manipulations, this model gives insights into observed consumption behavior in different scenarios. When they eliminate the impulsive component from the model, results are consistent with neoclassical economic theory.

INTRODUCTION

“One can be the master of what one does, but never of what one feels.” – Gustave Flaubert

Food consumption behavior has seen many empirical irregularities (Cutler, Glaeser, and Shapiro, 2003). Individuals, for example, show overconsumption¹ behavior despite increasing knowledge of the linkage between diet and health (Blaylock et al, 1999). Public efforts in arming the consumers with more tools

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for making healthier choices, creating opportunities for physical activities and others, while also regulating revealing true information or requiring the industry for providing healthier alternatives have had limited impact on curbing the obesity epidemic. Behavioral economics literature has tried to provide some answers to such economically irrational behaviors. However, very few studies focused on theorizing food consumption behavior. Recent developments in behavioral economic theory draw evidence from the neuroscience literature, which are also supported by field and lab experiments. They commonly indicate that impulsiveness (hereafter, referred as impulsivity) is an important factor explaining food consumption behavior (Booth et al., 2018; Asirvatham, 2018; Zabelina, Robinson, and Anicha, 2007). Using empirical evidence and psychological and biological research, this study models food consumption behavior with impulsivity component playing a major role in the model.

Neoclassical economic theory models individual as a single identity making rational choices given a set of preferences resulting in optimal consumption level. Although the choices made at any moment are optimal for that moment, it is not necessarily optimal in the long-term. This may be the case despite knowledge of optimal choice in the long-run. Economists have studied such time-inconsistent behavior from as early as Strotz (1956).

In the economics literature, Thaler and Shefrin's 1981 article was among the earlier papers that proposed an economic theory of self-control involving two selves of an individual, where one is a planner or has a long-term view while the other is a myopic doer who is impulsive. Brocas and Carillo (2007) (henceforth referred as BC) have modeled individual choices resulting from two interacting selves within an individual. Neuroscientific research also favors their rendition of the dual-selves modeled in a mechanism design framework. We adopt a similar framework but modify to make it more applicable to food choices. The objective of this research is to model how people choose the level of food consumption. This paper adapts the BC framework specifically to model dietary choices and incorporates four elements of importance in determining dietary choices: utility from health, hedonic utility from food, health effects of food, and diet restraint costs that incur when the principal attempts to maintain good health. These four elements are described in the following sections.

NEUROSCIENTIFIC EVIDENCE OF DUAL-SELF

Evidence from neuroscience research supports the notion of dual selves within an individual. For example, using functional magnetic resonance imaging, McClure et al. (2004) demonstrated that two separate systems in a brain are involved in intertemporal decisions. Specifically, the decisions involving immediately available rewards activated the mesolimbic dopamine system while the intertemporal choices engage regions of the lateral prefrontal cortex and posterior parietal cortex (cortex system). The prefrontal cortex is active irrespective of the delay in realizing cost and/or benefits. The limbic system, on the contrary, did not respond when realizing costs and benefits were delayed more than few minutes. Moreover, an individual's outcomes were attributable to the relative engagement of the two systems (McClure et al., 2004). Brocas and Carillo (2007) used mechanism design to model this intrapersonal conflict of the decision-making process in the brain. In particular, it models the tussle between the long-term principal (the prefrontal lobes) and the short-term agent (the limbic system). Benabou and Tirole (2003 and 2002) have modeled it as a strategic game where the players play alternately. However, evidence from neuroscience studies supports a model that allows both selves to play simultaneously and

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