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## Toward a neo-Darwinian synthesis of neoclassical and behavioral economics

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### ABSTRACT

There is a schism within economics between the neoclassical and behavioral schools. A primary cause of the behavioral ascent is the experimental evidence of deviations between actual behavior and the neoclassical prediction of behavior. While behavioral scholars have documented these “anomalies,” they have made little progress explaining the origin of such behavior. This paper proposes a biological and evolutionary foundation for the anomalies of behavioral economics by separating proximate and ultimate causation. Such a foundation may allow for a re-uniting of economics; a neo-Darwinian synthesis of neoclassical and behavioral economics.

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### 1. Introduction

Economics is divided into two competing schools based on divergent views of human nature. This paper argues that the two schools of economics can be re-connected by incorporating insights from the natural sciences. In particular, the concepts of proximate and ultimate causation may allow a synthesis of neoclassical and behavioral economics that reconciles and combines the competing perspectives.

Behavioral economics has made significant advances in recent decades. An important source of these successes is the documentation of divergences between neoclassical predictions of human behavior and actual human behavior. Richard Thaler labels these divergences as “anomalies.”

Neoclassical economists dismiss the behavioral anomalies as interesting quirks, laboratory artifacts, or small-stakes effects that can be ignored when working on important, real-world issues. Mainstream economic textbooks, economic teaching, and applied economics are still based primarily on the neoclassical assumptions. While much of economics maintains the status quo, behavioral economists, in turn, dismiss neoclassical economics as irrelevant, applied math.

The two groups of economists do not communicate productively, and the schism is a major obstacle to improving economics. The field of economics is divided, and faces a crisis.

Biologists have faced similar issues regarding the behavior of non-human animals. Animals exhibit sophisticated behaviors, but animals can also behave in ways that appear counterproductive. While economics has fragmented over the apparent contradiction of animals as both optimizers and bumbler, biology accommodates both in a single, unified view of behavior.

Economists may benefit by incorporating the insights of natural scientists. Natural selection favors optimization, but the maximization is achieved by specific physical machinery that does not maximize in all settings (Mayr, 1961; Tinbergen,

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1963, 1968). There is no schism in biology over maximization because natural scientists differentiate between the “ultimate” and “proximate” causes of behavior.

The ultimate cause of a behavior is based in the evolutionary payoffs. The proximate cause of a behavior is based in specific machinery or “mechanism” that produces the behavior. Proximate cause can lead to behaviors that appear destructive or anomalous in the spirit of behavioral economics.

An integrated view of behavior, that combines both ultimate and proximate causation, is richer and more productive than any single idea of causation.

This paper is entitled “caveman economics” to highlight the difference between ancestral human environments and modern industrial or agricultural environments. Proximate mechanisms are more likely to lead to anomalous behavior in evolutionarily novel environments. The behaviors that puzzle economists occur primarily in two types of evolutionary novel environments: Laboratories for economic experiments, and modern industrialized societies.

The caveman economic hypothesis is that behavioral anomalies are caused, in significant part, by an “evolutionary mismatch” between human proximate decision-making machinery and specific environments. The term evolutionary mismatch describes situations when traits are out of equilibrium with important aspects of the environment (Bowlby, 1969; Crespi, 2000; Lloyd et al., 2012; Tooby and Cosmides, 1989, 1990; Wilson, 1978).

This paper focuses primarily on genetic mismatch; the notion that genes can be out of sync with the environment. If human preferences evolved by natural selection, and genetic mismatch is an important issue, then preferences were shaped in ancestral environments. Attempts to understand human economic preferences and behavior should, therefore, model the ancestral and not modern world.

The caveman economics hypothesis is that a number of important puzzles in economics, including the anomalies of behavioral economics, may be resolved by understanding proximate and ultimate causation. Many puzzles in economics disappear when we consider the world of our ancestors and the implications for behavior.

There are important caveats and uncertainties in the caveman economic approach.

First, mismatch takes place for cultural evolution in addition to genetic evolution. This paper focuses on genetic mismatch, without explicit reference to cultural mismatch. However, it should be noted that culture is implicit. For example, evolutionary mismatch is frequently the product of cultural change. Genes and culture co-evolve so that cultures have been selecting genes as much as genes have been selecting cultures for a long time (Stoelhorst and Richerson, 2013; Witt and Schwesinger, in press).

Second, humans have a unique ability to modify and control behavior; we are not lumbering robots, hard-wired to carry out genetic programs. Human genes build flexible behavior that is acutely sensitive to cultural nuances and social norms. This flexibility is greater than that found in other animals, and may even be qualitatively different. For example, our closest animal ancestors, the chimpanzees, have a harder time suppressing certain types of urges (Boysen et al., 1999) and capuchin monkeys appear to have an even harder time at delaying gratification than chimpanzees (Evans et al., 2012).

Third, human brains may be uniquely able to adapt to evolutionary mismatch, thus mitigating the negative consequences. ‘Niche construction’ is a process where animals alter the environment. Some scholars argue that humans are so skilled at niche construction that the negative effects of the lag between genetic evolution and environmental change are mitigated (Laland and Brown, 2006). Furthermore, while this paper argues that the proximate/ultimate distinction will help economics, there is a new literature that de-emphasizes related ideas in the natural sciences (Bolhuis et al., 2011; Dean et al., 2012; Laland et al., 2011).

These three ideas highlight human cultural transmission and human behavioral flexibility, which may limit the benefit of incorporating genetic proximate and ultimate distinctions into economics. The benefit of focusing on genetic mismatch is that the clarity of the perspective may allow insights not available with a more nuanced perspective. The risk, of course, is that the simplification is too extreme, and leads to incorrect conclusions. These ideas are revisited in the discussion.

In summary, economics is a field divided upon itself with the two main camps diverging. The specific goal of this paper is to demonstrate the utility of the distinction between proximate and ultimate causation for understanding behavioral anomalies. The longer term goal is to place economics into a consistent framework where human economic behavior is studied within the same framework as human non-economic behavior and non-human behavior.

The remainder of this paper is structured as follows. In the next section, the schism between neoclassical and behavioral economics is elaborated in more detail. Next, the proximate/ultimate framework is introduced. Using this framework, biology is able to reconcile sophisticated behavior with other behaviors that appear anomalous. The subsequent section discusses two lines of research in economics using the proximate/ultimate framework. In these cases, the biological framework produces novel, testable hypotheses that are different from neoclassical and behavioral frameworks. The empirical data in the handful of studies that have been completed support the value of the biological framework to understanding economic behavior. The final discussion section looks forward to an economics based on an evolutionary and biological foundation.

## 2. The schism between neoclassical and behavioral economics

### 2.1. Behavioral anomalies challenge core assumptions of neoclassical economics

There is a significant divide between neoclassical and behavioral economics. Over the last several decades, the behavioral school has had a significant impact on economics (Thaler, 1992; Kahneman and Tversky, 1979, #2005; Tversky and

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