

Man in Search of Rationality: Neurosociological Foundations of Moral and Economic Decision Making

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How to cite this paper: Georgiev, E. (2025). Man in Search of Rationality: Neurosociological Foundations of Moral and Economic Decision Making. *Sociology Mind*, 15, 457-483.

<https://doi.org/10.4236/sm.2025.155019>

Received: August 4, 2025

Accepted: September 21, 2025

Published: September 24, 2025

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Abstract

This article develops a neurosociological decision-making model integrating economic sociology, social neuroscience, and Dual-Process cognitive theories. It challenges Rational Choice Theory (RCT) from neoclassical economics by arguing that rational behavior cannot be reduced to utility maximization based on stable preferences and perfect information. Drawing on economic sociology critiques, the paper highlights the social embeddedness of economic action, the constitutive role of cultural norms, and institutional influences. Behavioral economics and social neuroscience findings further demonstrate that emotions are central, not peripheral, to decision-making. The framework builds on Dual-Process models—distinguishing fast, intuitive (System 1) from slow, deliberative (System 2) processes—and extends them by including socially and culturally acquired knowledge. Central to the model is conation, defined as the neurocognitive capacity for adaptive, goal-directed action amid emotional and contextual complexity. Rationality is reconceptualized as a dynamic, context-dependent process arising from the interaction of neural mechanisms and socio-cultural environments. The article proposes three testable hypotheses linking neural activity patterns to moral and rational evaluations across social contexts. By integrating cognitive neuroscience with sociological theory, it establishes a theoretical and methodological foundation for neurosociology and offers a multidisciplinary approach to understanding the cognitive architecture of moral and economic behavior.

Keywords

Neurosociology, Rational Choice Theory, Dual-Process Models, Economic Sociology, Social Embeddedness, Decision-Making, Conation, Adaptation

1. Rational Choice Theory in Neoclassical Economics

Rational Choice Theory (RCT) emerged in the 1960s and 1970s as an economic framework and by the 1990s became dominant in neoclassical economics, economic sociology, and political science, with limited application in anthropology. Within neoclassical economics, RCT explains how individuals prioritize consumption and production to maximize utility under constraints. Its core assumptions, generally accepted *ceteris paribus*, include:

1) Rationality: Individuals consistently choose the optimal action yielding the greatest benefit.

Goal-oriented behavior: Decisions are guided by specific aims.

2) Awareness of alternatives: Individuals are informed and able to evaluate options relative to goals.

3) Scarcity of resources: Decisions occur under constraints like time, money, and information, requiring optimization.

4) Stable, individual preferences: Preferences are distinct and relatively stable over time.

For this study, I adopt a working definition emphasizing that social actors are well-informed about options, capable of thorough evaluation aligned with preferences, and select the most satisfactory action. Individuals also anticipate others' actions, grounding decisions in cost-benefit analysis and expectations about others' behavior. This conception aligns with Milton Friedman's view that human behavior aims to optimize cost-benefit ratios to maximize utility (Friedman, 1953). Fifty years later, Richard Thaler described the neoclassical rational decision-making model based on three assumptions about *Homo economicus* (Thaler, 2016, p. 1578):

1) *Homo economicus* has clearly defined, stable preferences and impartial beliefs, unaffected by culture or emotion, and entirely self-interested.

2) *Homo economicus* consistently chooses the optimal option based on these fixed preferences and beliefs, assuming unlimited cognition and perfect self-control.

3) *Homo economicus* is motivated solely by self-interest to maximize personal utility.

Of these, the assumption of exclusive self-interest has faced the most criticism, especially in economic sociology. According to Thaler, the neoclassical model posits that *Homo economicus* maximizes expected utility through impartial beliefs and clear preferences. This idealized form of RCT has spurred intense debate, with two major critiques emerging from economic sociology and social neuroscience.

Economic sociology, which gained autonomy partly by challenging neoclassical economics, reinterprets economic action through social conditioning. It highlights how social relations, cultural norms, and institutional contexts shape economic behavior. Key themes from economic sociology include recognizing that rationality, though important, cannot be reduced to utilitarian calculus di-

vorced from social context. Rather than rejecting rational choice, economic sociology reframes it within broader social and economic structures. A central concept is *bounded rationality*, which challenges RCT's assumption of complete, error-free information in decision-making (Simon, 1982; Williamson, 1975). Social actors face uncertainty, cognitive limits, and time constraints, making rationality context-dependent and structurally constrained. Social networks, interaction patterns, and institutional environments critically influence economic behavior. Over time, sociological models emphasizing these structural factors have become credible alternatives to neoclassical economic theories.

1.1. The Critique of Rational Choice Theory in Economic Sociology

Critiques of Rational Choice Theory (RCT) in economic sociology highlight its failure to account for the social structures shaping human behavior. Although RCT recognizes that individuals act strategically within a social environment, it does not treat that environment as constitutive of decision-making. This neglects the deep structural conditioning underlying economic action.

Economic sociology extends rational choice beyond purely economic reasoning to include social influences. Scholars challenge the model of the rational actor as autonomous and atomistic, emphasizing instead the social embeddedness of behavior (Granovetter, 1985; Uzzi, 1996). This critique counters neoclassical assumptions that individuals act solely out of self-interest, detached from social context. Mark Granovetter's influential work critiques both the "oversocialized" model of behavior in Durkheimian and Parsonsian traditions and the "undersocialized" model of RCT. He argues that economic behavior arises from social networks that structure interaction and exchange—not from isolated rational calculation or normative determinism. Markets, in this view, are embedded in systems of trust, norms, and interpersonal relations. Granovetter's concept of embeddedness emphasizes that economic transactions are situated within enduring social ties. Decisions cannot be understood through cost-benefit logic alone; they must be interpreted in the context of the networks in which they occur. His theory underscores that economic behavior is culturally and socially contingent, challenging universal models of rationality. Where neoclassical economics seeks general laws, economic sociology stresses the constructed and contextual nature of rational action. Accordingly, individual choices must be analyzed within institutional frameworks, social expectations, and normative constraints. Social networks do not merely influence economic decisions—they constitute and shape them. Rationality, in this view, is not absolute but socially constructed and normatively framed (Granovetter, 1973, 1983, 1985, 2017, 2018). Building on this, Sharon Zukin and Paul DiMaggio distinguish four forms of embeddedness—cultural, cognitive, political, and structural—showing that economic action is deeply conditioned by cultural models, mental schemas, and institutional contexts. Fred Block and Peter Evans extend this analysis by focusing on the state's role in eco-

conomic development (Zukin & DiMaggio, 1990; Block & Evans, 2005; Somers & Block, 2005; DiMaggio, 1994). Evans's idea of embedded autonomy emphasizes balancing state independence with integration into social networks. Effective economic policy, he argues, requires both (Evans, 1995). This expanded view of embeddedness presents economic action as shaped by social networks, institutional structures, and cultural processes. Culture, in particular, not only influences decisions but structures the perception of opportunities, legitimizing certain goals and strategies. It provides the symbolic and normative tools through which individuals interpret economic situations. Such insights challenge the neoclassical notion of universal rationality, demonstrating that rationality is always socially and culturally embedded. David Dequech critiques neoclassical assumptions like "complete information," "rational expectations," and "self-interest," arguing these are too abstract to capture real-world behavior. He contends that economic choices are guided by cognitive schemas and culturally constructed meanings, not reducible to utility maximization (Dequech, 2003). From this view, economic action is shaped by cultural norms that define what is seen as reasonable or optimal. This renders behavior socially structured and normatively constrained, calling into question classical rational choice models.

Another line in economic sociology focuses on social relationships, asserting that economic processes cannot be understood in isolation from them. Social ties are not peripheral but central to economic activity (Bandelj, 2020; Emirbayer, 1997; Tubaro, 2021). Viviana Zelizer demonstrates how economic transactions are embedded in social norms and cultural contexts (Zelizer, 1994, 2005, 2012). She shows that economic life is institutionalized through transactions and relationships that co-structure both social and economic domains. Economic action, then, is embedded in webs of meaning, trust, and norms that are not just background conditions but constitutive of the behavior itself (Zelizer, 2012: p. 151). Max Besbris furthers this by analyzing how social ties influence consumer preferences in real estate (Besbris, 2016). He finds that interpersonal relationships shape how goods are evaluated, while social roles introduce ambiguity in expectations (Bandelj, 2012; Zelizer, 2000). The relational approach examines how expectations emerge through reciprocity and obligations, fostering long-term commitments and shaping preferences (Rossman, 2014; Wherry et al., 2019). It highlights the temporal and interactive nature of economic behavior, viewing preferences as emergent rather than fixed. Economic sociology also offers foundational insights into the cultural dimensions of economic processes. This literature explores how norms, stereotypes, and institutional logics influence decisions and constrain choices (DiMaggio, 1997, 2019; Zukin & DiMaggio, 1990; Meyer & Rowan, 1977; DiMaggio & Powell, 1983; Scott & Meyer, 1994; Scott, 2005; Dequech, 2006). Cultural analysis thus becomes essential for understanding economic life beyond universalistic and individualistic models.

In the 21st century, economic sociology has increasingly integrated insights from evolutionary and cognitive sociology. This trend is especially evident in the-

ories of rationality and decision-making. Sigwart Lindenberg, a key figure in cognitive sociology, has contributed to this integration. In *Social Rationality and Economic Sociology* (2023), he outlines social rationality as an approach spanning individual interactions, group dynamics, organizations, and formal institutions. Lindenberg argues that human decision-making must be understood in light of the brain's evolution for navigating complex social environments. He identifies three heuristic approaches to social rationality, diverging from the classical *Homo economicus* model (Lindenberg, 2023: p. 247). The first draws on Gerd Gigerenzer's notion of fast and frugal heuristics (Gigerenzer, 2004), suggesting that humans use simple, adaptive strategies—like imitation or following the majority—for making decisions under uncertainty. The second highlights two co-evolving types of preferences: one tied to private interpersonal relationships (e.g., child-rearing, cooperation), and another to the public sphere, shaped by strategic interaction and historical shifts from physical to institutionalized hierarchies enabled by technologies such as weapons. The third and most important for economic sociology is the “third speed”—an evolved capacity for rapid behavioral adjustment via context-sensitive activation of goals. This is linked to goal-framing theory, where specific goals guide attention and behavior in socio-economic settings. Social rationality here is not a static reaction but a dynamic process where goal activation shapes interpretation and action. Mental constructs like goals, norms, and heuristics only influence behavior when activated. This distinguishes the third speed from slower processes like evolutionary change (first speed) or learning (second speed). Though distinct, these three speeds interact to shape behavior. Understanding social influences on decision-making is crucial, particularly how changes in the salience of mental constructs drive behavior. Even internalized norms require contextual activation to exert influence. Lindenberg stresses that unless we specify the conditions for such activation, the explanatory power of social rationality remains limited (Lindenberg, 2023: pp. 247-248). Lindenberg's core contribution lies in theorizing social rationality as a dynamic, adaptive process. Through the third speed, he shows how cognitive mechanisms and goals are continuously activated and reshaped in specific contexts. This capacity not only enables adaptation but redefines available choices. Social rationality thus emerges as a flexible, ongoing process structuring economic behavior in real-world conditions.

1.2. Emotion and the Critique of Rational Choice Theory: Insights from Social Neuroscience

A second major critique of RCT comes from social neuroscience, which challenges the theory's marginalization of emotion. Classical RCT treats emotions as peripheral—or even irrelevant—to decision-making. Social neuroscience, however, increasingly shows that emotions are central and foundational to human behavior. As theoretical and empirical critiques from neuroscience and economic sociology mount, many social scientists—including economists—have begun reassessing

the role of emotions in human life through more integrative frameworks. One of the most influential outcomes of this reassessment is the Dual-Process model of thinking, developed in cognitive psychology. Also called the dual-system framework, it provides a theoretical basis for analyzing how intuitive and analytical reasoning interact in decision-making.

2. The Dual-Process Model and the Role of Cognitive Bias in Economic Behavior

Israeli cognitive scientist Daniel Kahneman, the first psychologist to receive the Nobel Prize in Economics (2002), is widely regarded as one of the most influential contemporary social thinkers. His long-standing collaboration with Amos Tversky, a key figure in cognitive psychology, began in the 1970s and laid the groundwork for behavioral economics—an interdisciplinary field examining how psychological, cognitive, and neurobiological factors shape economic behavior.

Rejecting classical assumptions of rationality, behavioral economics investigates how people actually respond to economic stimuli, revealing systematic cognitive errors and departures from rational choice ideals (Thaler & Sunstein, 2008; Thaler, 2015; Camerer et al., 2004; Kahneman, 2003a; Tomer, 2007; Wendel, 2020). While Kahneman and Tversky made broad contributions to cognition, this analysis focuses on a key aspect of their work: the Dual-Process model of thinking, or dual-system framework (Kahneman, 2011; Tversky & Kahneman, 1974). According to (Kahneman, 2011, 2003a, 2003b; Kahneman & Frederick, 2002), two primary cognitive systems govern human reasoning and decision-making¹. System 1 is automatic, fast, associative, and intuitive, requiring minimal cognitive effort. Its decisions are emotionally influenced and shaped by immediate affective states. In contrast, System 2 is slow, deliberate, and analytical, supporting logical reasoning, conscious decision-making, and regulation of System 1 outputs. Emotionally neutral, it plays a corrective role. Kahneman's dual-system model is one of the most cited theories in cognitive science and has gained wide traction across the social sciences (Chaiken & Trope, 1999; Stanovich & West, 2000). Rather than rejecting rational choice theory, it refines it by showing how cognitive biases—typically unconscious, automatic, and emotionally driven—shape preferences and decisions (Kahneman, 2003a, 2003b, 2011). Prospect theory, developed by Kahneman and Tversky, exemplifies this approach. Unlike expected utility theory, which assumes rational calculation under uncertainty, prospect theory emphasizes subjective perceptions of gains and losses. A key finding is loss aversion: losses feel more intense than equivalent gains, leading people to favor safer but less profitable choices (Kahneman, 2011; Nofsinger, 2017). Though System 2 can override System 1, it is not always activated. Most decisions rely on System 1, whose outputs, while efficient, are prone to bias. In economic contexts, this often leads to devia-

¹Kahneman uses the terms System 1 and System 2 as conceptual metaphors to represent distinct modes of cognitive processing, not specific brain regions or neurobiological mechanisms. Thus, his model is primarily functional and descriptive, aimed at explaining systematic cognitive biases and limitations rather than providing a direct neuroscientific mapping.

tions from rational choice predictions and choices misaligned with long-term interests. Crucial to the model is the concept of heuristics—mental shortcuts introduced by Kahneman and Tversky in the 1970s to explain decision-making under uncertainty (Kahneman et al., 1982; Tversky & Kahneman, 1974; Kahneman & Tversky, 2013). Heuristics simplify complex information but often result in systematic errors.

Three core heuristics identified are:

- 1) Availability: estimating event likelihood by how easily examples come to mind.
- 2) Representativeness: judging probability by similarity to a prototype.
- 3) Anchoring: relying too heavily on initial information when estimating values.

Over 100 heuristics have since been identified (Kahneman & Frederick, 2002), shown to influence nearly all areas of cognitive processing. Though they enhance efficiency under uncertainty or time constraints, heuristics can lead to flawed reasoning. For instance, representativeness can cause errors by prioritizing resemblance over statistical logic.

In the dual-system framework, heuristics are governed by System 1. When they cause significant errors, System 2 may intervene—but only if cognitive effort is exerted. This doesn't always happen, even when deliberate reasoning would be more appropriate. Heuristics are useful in routine decisions (e.g., choosing a toothbrush color) but risky in complex, high-stakes contexts (e.g., financial trading). Yet even in such scenarios, they often dominate, helping explain irrational behavior among investors and other economic actors. This interaction has led to growing research on when and how System 2 is engaged, and when its monitoring fails, allowing heuristics to dominate (Shafir & LeBoeuf, 2002; Gilbert, 1991). Contextual factors—like time pressure, emotional arousal, and cognitive load—critically influence this dynamic. High time pressure, for example, can hinder System 2 activation, while logical training and reflective practices enhance its corrective capacity (Finucane et al., 2000; Agnoli, 1991).

Today, the dual-system model underpins much of behavioral economics and broader theories of decision-making. Central is the idea that System 1 biases systematically influence behavior, explaining diverse “irrational” actions—in finance, consumption, politics, and law compliance (Thaler & Sunstein, 2008; Thaler, 1993; Smith, 2005).

Since the early 2000s, behavioral approaches have expanded significantly. New academic departments, degree programs, associations, conferences, and journals have emerged. Governments—such as those of the U.S., U.K., and European Commission—have formed behavioral science teams to design evidence-based policies (Oullier, 2013). Behavioral economics has also contributed to the rise of neuroeconomics, an interdisciplinary field investigating the neural basis of emotional, intuitive, and deliberative decision-making. While neuroeconomists aren't necessarily behavioral economists, the two fields share theoretical and empirical concerns—especially their interest in why real-world decisions diverge from clas-

sical rationality^{2,3}. Within neuroeconomics, it is widely—though not uncontroversially—assumed that the two cognitive modes described by Kahneman correspond to distinct, relatively autonomous neural networks. System 1 is seen as the evolutionarily older, faster, and more automatic mode. In everyday contexts, cognitive processing is typically dominated by System 1, which, though less precise, yields effective outcomes with minimal effort. This process “economizes” mental resources and aligns with principles of cognitive efficiency (McClure et al., 2007; Albrecht et al., 2011).

Today, behavioral approaches based on the Dual-Process model are prevalent across the social sciences. Yet the core assumption that emotional and cognitive functions belong to clearly separable systems has come under increasing neuroscientific scrutiny. Some researchers continue to associate the two systems with partially distinct neural modules or networks. Others, drawing on neuroimaging data (fMRI, PET), emphasize the functional integration of emotional and cognitive processes—suggesting they are dynamically interdependent rather than modular. This body of evidence challenges the overly dichotomous interpretation of the model and supports a view of decision-making as shaped by overlapping, interactive neural systems (Grayot, 2020). One empirical study by Kirsten Volz and Yves von Cramon found that brain areas implicated in intuitive judgments (System 1) are also active during analytical tasks (System 2) (Volz & von Cramon, 2008). In a subsequent article, Volz and Gerd Gigerenzer argue that the conceptual vagueness of Dual-Process models undermines their scientific testability. They stress that the lack of clearly defined activation criteria and blurred system boundaries compromises predictive power and enables unfalsifiable post hoc explanations (Volz & Gigerenzer, 2014). In a meta-analysis, James Grayot concludes that existing evidence does not support a fixed neural architecture for Systems 1 and 2 (Grayot, 2020; see also Osman, 2004; Keren, 2013). Instead, cognitive processes linked to both systems often rely on shared neural pathways (Mugg, 2016; Keren & Schul, 2009; Evans & Stanovich, 2013). This suggests that the systems are not structurally autonomous but operate via complex neural interactions. Further critiques—such as those by Lee Jussim—challenge the methodological reliability and interpretation of key psychological experiments supporting claims of cognitive bias and irrationality. Jussim questions the generalizability of behavioral eco-

²*Neuroeconomics* is an interdisciplinary field examining how brain processes and neurobiological mechanisms influence economic decisions and behavior. It combines economic theories and methods with neuroscientific techniques to study brain activity. Its primary goal is to understand how the brain processes economic information, identify neurobiological factors shaping decision-making, and explain seemingly irrational economic behaviors. For comprehensive reviews, see Glimcher and Fehr (2013), Camerer (2007), Camerer et al. (2004a, 2004b, 2005), Glimcher and Rustichini (2004), and Poltser (2008).

³*Behavioral finance*, a subfield of finance, examines psychological factors influencing economic decisions and market outcomes. Unlike traditional economics' assumption of rational actors, behavioral finance acknowledges that cognitive biases, emotions, and social influences shape human behavior. Foundational concepts such as prospect theory, mental accounting, and loss aversion offer a more realistic framework for explaining deviations from rational decision-making in financial contexts. For further reading, see Peterson (2010), Venkata Ramana et al. (2024), Hirshleifer (2015), and Ritter (2003).

nomics findings beyond controlled settings (Jussim, 2012). Similarly, Alex Stein argues that decisions in Kahneman and Tversky's foundational studies may reflect rational strategies adapted to specific contexts. From this perspective, behaviors labeled "irrational" by RCT might indicate deeper adaptive reasoning (Stein, 2013). In a critical review of the ongoing debate over Dual-Process models, Grayot writes:

"This leaves behavioral economists and neuroeconomists with something of a dilemma: either they stick to their purported ambitions to give a realistic description of human decision-making and give up the narrative, or they revise and restate their scientific ambitions." (Grayot, 2020: p. 105)

Although System 2—or its functional equivalent—is often labeled the "rational system" due to its involvement in higher cognitive functions like hypothetical reasoning, error detection, and inhibitory control, this attribution is problematic. The key question is whether System 2 necessarily produces rational outcomes. The answer is negative. Assigning normative rationality to System 2 assumes a universal standard of rationality based on deductive logic and probability theory (Evans & Over, 1996; Gigerenzer, 1996; Stanovich, 1999; Stein, 1996; Grayot, 2020). While this normative ideal has been widely debated in philosophy and psychology, the more pertinent issue here concerns System 2's relationship with critical thinking. System 2 is often equated with the capacity for critical thinking. (Gigerenzer & Goldstein, 1996; Samuels et al., 2012; Samuels & Stich, 2004; Over, 2004; Grayot, 2020) The American Philosophical Association defines critical thinking as purposeful, self-regulatory judgement which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgement is based (Facione, 1990). What does it mean to equate System 2 with critical thinking? According to Grayot, this can be interpreted two ways: 1) System 2 is necessary for critical thinking—without its activation, critical thinking cannot occur; and 2) System 2 is sufficient, so any cognitive process within it counts as critical thinking (Grayot, 2020: p. 125; see also Bonnefon, 2018). The second view is untenable. System 2 engages in many routine cognitive tasks that do not constitute critical thinking. For example, reading a novel involves hypothetical reasoning but is not necessarily critical thinking. Moreover, deliberation can lead to errors. Bonnefon identifies two System 2-specific mistakes: false justification or "pseudorational" reasoning, where impulsive choices are rationalized post hoc; and cognitive overload or "overthinking," where excessive deliberation causes confusion or indecision, even with simple information (Bonnefon, 2018; Grayot, 2020: pp. 125-126). Similarly, Mercier and Sperber argue that System 2's principal function is argumentation—building logically structured representations aimed at persuasion rather than truth. This suggests System 2 often supports rationalization over rationality, especially when motivated by social or ideological commitments (Mercier & Sperber, 2011: pp. 63-66). Although System 2 errors may be less systematic or frequent than those of System 1, they highlight that System 2 does not guarantee rationality nor eliminate inferential error. Thus, it is mistaken to as-

sume—common in many Dual-Process models—that System 2 is rational by default or ensures sound judgment (Grayot, 2020). Economists often prefer blaming System 1 for irrationalities, preserving the neoclassical ideal of rationality despite contrary evidence. This permits modeling deviations without abandoning the normative benchmark (Grayot, 2020). Berg and Gigerenzer critique this as “neoclassical economics in disguise” (Berg & Gigerenzer, 2010). These critiques do not invalidate Dual-Process models but clarify their limits within behavioral economics’ psychological frameworks. Conceptually, their relevance can be maintained if reinterpreted within broader socio-cultural contexts and decoupled from narrowly economic notions of rationality. This calls for integrating Dual-Process models into sociological approaches and developing a neurosociological framework for rational behavior, which will be elaborated in the following sections.

Dual-Process Models in Sociology: Cultural Cognition and Moral Evaluation

The next field to consider is sociological models based on the Dual-Process approach. Sociologists have long examined how cultural meanings and practices shape human behavior. The complex debate on culture’s causal influence exceeds this article’s scope, but it is worth highlighting foundational perspectives, starting with Max Weber, who argued that cultural meaning influences behavior as individuals pursue cultural goals (Weber, 1946 [1922-3]: p. 280)⁴. Talcott Parsons further institutionalized this view, making it dominant in sociology for decades (Parsons & Shils, 1951).

In the 1980s, Ann Swidler introduced a novel perspective emphasizing that the cultural environment shapes individual behavior, rather than vice versa (Swidler, 1986, 2001). Known as “culture in action,” this approach argues that social structures shape collective meanings and practices, which actors then draw upon as cultural resources activated during social interaction. Cultural elements—often conceptualized as cultural “tools” or “capabilities”—are internalized and shape possible behavioral trajectories. While retaining the causal role of goals in individual action, this perspective diverges from Weber’s by considering these cultural goals largely unconscious (DiMaggio, 1997, 2013; Mizrachi et al., 2007; Martin, 2010; Guetzkow & Ben-Zvi, 2017; Mencken & Froese, 2019; Rosen, 2017; Sewell, 1992; Swidler, 1986, 2001, 2008). Rather than conscious goals or interests, actors operate based on unconscious, embodied schemas formed within social practices (Bourdieu, 1984, 1977, 1990; Lizardo, 2004, 2007, 2009; Ignatow, 2007, 2009; Martin, 2010; Vaisey, 2008a, 2008b, 2009, 2013; Vaisey & Lizardo, 2010; Lizardo & Strand, 2010; Vaisey & Frye, 2019). Central here is Steven Vaisey’s sociological Dual-Process model (DPM), which builds on Jonathan Haidt’s moral psychology (Vaisey, 2008a, 2008b, 2009, 2013; Vaisey & Lizardo, 2010; Vaisey & Frye, 2019; Haidt, 2001). Vaisey argues that individual reasoning plays a limited motivational

⁴For a comprehensive analytical review of the sociological literature dedicated to Dual-Process models—including a summary of the critiques of these approaches as well as their contributions to sociological analysis—see Leschziner (2019).

role, proposing that cultural interaction develops moral “schemas”—unconscious neural networks formed by experience—that automatically generate moral intuitions guiding judgments about deviant or prosocial behavior (Vaisey, 2009, pp. 1681, 1686, 1698). Reasoning serves primarily as post hoc rationalization triggered by social expectations (Vaisey, 2009). Vaisey’s model has faced critiques. Luis Antonio Vila-Henninger, citing neuroscientific evidence, stresses the significant role of goal-directed thinking and the frequent interaction between System 1 and System 2, challenging the strict conscious/unconscious dichotomy of “strong practice” theory (Vila-Henninger, 2015). Other studies highlight this dichotomy’s limitations for explaining creativity and social context (Abramson, 2012; Bursell & Olsson, 2021; Cerulo, 2018, 2019; Leschziner, 2015, 2019; Leschziner & Green, 2013; Leschziner & Brett, 2019; Winchester, 2016). Extending this, Omar Lizardo and colleagues propose a Dual-Process framework for cultural cognition centered on enculturation—the storage, processing, and use of cultural information (Lizardo et al., 2016: p. 292; Lizardo, 2017: pp. 90-91). They distinguish two types of cognition: Type I (implicit, automatic) and Type II (explicit, deliberative), across four domains of enculturation—learning, memory, thinking, and action—each with distinct Type I/II interactions (Lizardo et al., 2016: pp. 289, 291). This approach defines the scope and limits of Dual-Process models within specific cultural cognition domains. Moral judgment emerges as a domain with robust empirical and theoretical support for Dual-Process models (Brett & Miles, 2021; Miles, 2014; Miles et al., 2019; Moore, 2017; Vaisey, 2009; Vaisey & Lizardo, 2010; Stoltz & Lizardo, 2018; Vila-Henninger, 2015, 2020, 2021a, 2021b). Furthermore, research in economic sociology and behavioral economics shows moral judgment influencing traditionally rational-choice contexts, including economic behavior. This prompts inquiry into synthesizing behavioral economics’ Dual-Process models of automatic and deliberative mechanisms with cultural cognition models of moral judgment, potentially enabling an integrative Dual-Process model of economic behavior incorporating self-interest and culturally shaped moral evaluations (Vila-Henninger, 2021a). However, the persistence of unresolved tensions—such as the rigid conscious/unconscious dichotomy, limited integration of neurobiological mechanisms, and insufficient attention to context-specific variability—indicates that existing sociological Dual-Process models cannot fully account for the complex interplay between morality and rationality in real-world decision-making. These limitations provide the conceptual impetus for developing the neurosociological framework outlined in *Section 3*, which seeks to address these gaps by uniting insights from neuroscience, sociology, and moral psychology into a coherent analytical model.

3. Neurosociology of Rationality: Social-Evolutionary Adaptiveness

In this article, I argue that moral choice and rational action interact to shape social behavior through a neurosociological lens grounded in the evolutionary development of human nature. Moral behavior and rational choice are two sides of the

same coin—the capacity for decision-making amid anticipated future outcomes. Rationality should not be reduced to mere instrumental maximization of an agent’s welfare, as this oversimplifies human behavior’s complexity. Although rationality involves pursuing goals, it cannot be confined solely to optimizing individual well-being.

The myth that rational thought grants humans a privileged status over other animals is deeply embedded in Western tradition, reinforced by the misleading “battleground” metaphor where reason and emotion eternally struggle for dominance. Empirical evidence contradicts this. Numerous sources argue that emotions fundamentally underpin every decision and action. Damage to neural networks connecting the prefrontal cortex and hippocampus—crucial for integrating emotional and cognitive memory elements—impairs rational decision-making (Damasio, 1994). Turner notes that such impairments hinder all decision-making (Turner, 2021, p. 63). The human brain thus did not evolve to produce a calculating *Homo economicus* but functions as an integrated system where no action is isolated from interoception—the neural representation of internal bodily states—and affective processes (Barrett, 2017). Interoception, shaped through cultural interaction, is central to social reality construction, representing an intricately orchestrated self-fulfilling prophecy embedded in brain architecture, revealing the biological-social interconnection in human behavior (Barrett, 2017).

Within this neurosociological framework, rational choice is an adaptive process emerging from neurobiological and social environment interaction, leading to actions aimed at specific goals. Rational behavior is thus a form of social adaptation oriented toward realizing a goal structure aligned with the individual’s context⁵. “Rational behavior” underscores the socio-cognitive and neurobiological capacity to evaluate options and select those best suited to desired outcomes. “Social adaptation” denotes a dynamic process where the brain continuously processes cultural information to maximize satisfaction while minimizing risks and optimizing benefits. This involves cognitive functions—attention, memory, problem-solving, decision-making—interacting with emotional and social factors that influence motivation and values. Emotions are crucial here: the brain integrates emotional information with cognition to form adaptive behavior, involving emotional perception, regulation, and learning, all essential to social adaptation. Achieving specific goals entails the capacity to form desires, articulate objectives, and select strategies using cognitive and neural resources. This includes analyzing social environments, forecasting outcomes, and adapting behavior within cultural contexts. A fundamental aspect of rationality is conation, defined neuropsychologi-

⁵From a neurosociological perspective, “adaptation” refers to a dynamic, context-dependent process by which the brain continuously adjusts its functions and behavior in response to social feedback. It is not a static state, but an ongoing neural and behavioral recalibration shaped by the interplay of biological mechanisms and social influences. Examples include the development of empathy and cooperation, the internalization of social norms, and the capacity to learn from experience and adjust behavior accordingly. Through neural plasticity and cognitive-affective regulation, the brain adapts to its social environment, forming the neurobiological basis of social behavior.

cally by Reitan and Wolfson as the ability for consistent, productive task execution over time—the application of intellectual energy toward concrete results (Reitan & Wolfson, 2000: p. 444). They distinguish conation from cognition, which encompasses the mental processes involved in thinking, learning, and memory. Crucially, while motivation may overlap with conation, the two are not identical: motivation concerns the arousal of needs and the provision of incentives for behavior, whereas conation reflects the goal-directed intentionality and sustained effort required to transform cognitive potential into concrete action. Similarly, vigilance, though superficially resembling conative behavior, is described as a more passive state of sustained neuropsychological readiness (Reitan & Wolfson, 2000: p. 444). Without conation, the link between cognition and behavior—including social behavior—remains weak. As TenHouten notes, it represents the sustained intellectual energy necessary to manage complex, demanding tasks (TenHouten, 2013: p. 224). In the context of the proposed model, conation thus denotes both the drive and the capacity for decision-making, goal-setting, and action initiation—serving as a key mechanism of adaptive self-regulation.

Conation is relevant for two reasons. First, it integrates cognitive processes (attention, memory, processing) with emotional and bodily aspects—including neurobiology and somatic signals, some culturally mediated—jointly shaping choice and rationality. Second, it remains conceptually neutral on free will and agency, allowing use across theoretical frameworks without ontological commitments. Even accepting determinism, such as Harris’s metaphor of us as *phenomenological harps played upon by an invisible hand* (Harris, 2010), does not negate individuals’ capacity to exert effort, achieve goals, and overcome challenges. Conation integrates internal motivation and external social context—a prerequisite for informed, consistent, responsible behavior. Without it, accurate cognitive evaluation does not ensure action. Moreover, conation encompasses emotional self-regulation and self-control—the neurobiological basis of responsibility—thus framing individuals as responsible agents who engage with goals and adapt to social contexts regardless of determinism. This perspective rejects viewing rationality as isolated intracerebral activity. The brain is evolutionarily a social organ, its cognition inseparable from social context. Rational processes within the brain are always culturally embedded. Therefore, rational choice is not solely psychic but integrally linked to cultural aspects, with moral norms shaping rational decision-making by promoting or constraining actions, thus shaping rationality’s architecture in cultural contexts. Moral behavior and rational choice unify human nature’s biological and social aspects. Linking them to Dual-Process cognition, I argue that System 1 and System 2 are not isolated modules but interact constantly, mediated by socially and culturally acquired knowledge permeating automatic and reflective moral evaluations. Social norms influence both fast, affective System 1 responses and slower, cognitive System 2 judgments. To maintain relevance, the Dual-Process model must be regarded beyond psychology as a socio-scientific construct. Following sociological Dual-Process models, I differentiate socially

produced Type I and Type II cognition from individual System 1 and System 2, allowing finer analysis of social and cultural penetration into decision-making. The social construction of moral choices does not negate human nature's biological component. Moral capacity is biologically universal, an evolutionary platform on which societies build norms and values. These socially constructed norms constrain and support rational choices, shaping moral behavior's dynamics. Moral and rational decision-making evolve individually across the life course and macrosocially via changes in structures, culture, and societal expectations. Morality and rationality are dynamic, adapting continuously to social, cultural, and technological changes. Every choice and action results from neurological activity influenced positively or negatively by various factors. Humans lack full conscious control over choices; decisions arise from complex interactions between social environments (including culture) and brain neurobiology. Commonly, the frontal brain regions—especially the prefrontal cortex—are identified as centers of cognitive rationality. While necessary, the frontal lobes alone are insufficient for rational decisions. Gardner describes them as where neural networks of internal feelings, motivations, and knowledge merge with external sensory systems (Gardner, 1983: p. 262). TenHouten calls them the brain's leadership enabling innovation and success (TenHouten, 2013: p. 222), attributing exceptional human cognitive control to frontal cortex neural activity that determines rational behavior. He highlights instrumental rationality as selecting efficient means to achieve pre-planned goals.

I endorse the view of the prefrontal cortex as key to executive function and rational goal pursuit (Miller & Cohen, 2001), but emphasize a critical neuroscience insight for neurosociology: emotions precede reason in decision-making. Disconnection between prefrontal and limbic emotional centers causes severe rational decision deficits. Emotional components surpass conscious post hoc rationalizations. Ample evidence shows neurologically intact individuals can make irrational decisions based on irrelevant or distorted prior experiences, later rationalized cognitively. This post hoc confabulation does not negate affective and unconscious neural impulse primacy in decision-making (Bailey, 2007: p. 132). Cushman (2020: p. 3) illustrates with a scenario: rational action proceeds from beliefs and desires to optimal behavior (e.g., self-defense), while rationalization reverses this—action occurs first, then beliefs justify it (e.g., shooting someone justified as self-defense). This shows cognitive rationalization often follows behavior. People continuously rationalize their actions. Importantly, rationalization can be adaptive, supporting reasoning and guiding conative social behavior. It is not merely cognitive error but an active integration of emotion and reason producing socially appropriate responses. Most avoid violent extremes due to neurobiological interplay between limbic emotional centers and reflective prefrontal regions (dlPFC and vmPFC), balancing impulses and rational control (Goldberg, 2001: p. 2). However, individuals often fail to control desires and emotions. Taleb (2004) notes the illusion of full emotional control is akin to controlling hair growth.

Neurosociology highlights complex brain-social interaction, where social factors modulate brain activity and neurochemistry, influencing behavior from simple gestures to complex acts like attending opera. Emotional processes operate subliminally, preceding conscious feeling. This does not imply loss of behavioral control. Innate emotional intensity varies biologically, yet does not deterministically govern behavior, which is shaped by many factors, including brain architecture enabling volitional control.

I argue a physically and cognitively healthy individual holds sufficient control to bear responsibility. This neurological objectivity of control—awareness of responsibility—is central to rationality here. Awareness differs from conscious choice initiation; often, actions occur automatically, preceding awareness by milliseconds. Moral choice and rational decision-making emerge from similar neurological-cognitive processes. Social agents lack utopian libertarian “free will.” Choice exists within social and neurological constraints governed by physical laws. Though limited, choice is not wholly predetermined by biology or context. Conation enables adaptive self-regulation, underpinning responsibility. In summary, this neurosociological perspective on moral choice and rational action highlights the limited but real cognitive capacity enabling individuals to “do the right thing when it’s the hard thing,” paraphrasing [Sapolsky \(2017\)](#).

4. A Neurosociological Model of Decision Making

Driven by academic curiosity and building on prior considerations, I propose a theoretical hypothesis—a neurosociological model of decision making. This sketch does not claim empirical validation or exhaustiveness but serves as a provisional framework for further development and potential testing. Rather than a linear causal sequence, it outlines substantive elements and assumptions illuminating the complex cognitive modus operandi behind decision making. The model integrates human nature’s biological and social dimensions by exploring the dynamics between moral behavior and rational choice. Social norms and cultural standards play a pivotal role, shaping rational decisions and structuring cognitive processes and behavior. From this view, rational choice emerges as a complex, stratified process where neurobiological mechanisms continuously interact with the social environment.

Key neurobiological components include the amygdala (emotional activation), the prefrontal cortex (moral and pragmatic evaluation), and dopaminergic reward modulation. For example, the ventromedial prefrontal cortex (vmPFC) synthesizes emotional signals during choice, while the dorsolateral prefrontal cortex (dlPFC) exerts cognitive control, prioritizing moral principles amid competing alternatives.

Decision making unfolds through dialogue between automatic, intuitive System 1 and analytical, reflective System 2, deeply shaped by socially acquired cultural norms, moral categories, and meanings. System 1 triggers evolutionarily ingrained emotional reactions—empathy or fear of social sanction—mediated by amygdala

and insula, while System 2 engages frontoparietal networks to simulate futures, evaluate long-term consequences, and apply socially internalized moral principles. Analogous to the sociological Type I and Type II knowledge distinction, rationality is a continuum supporting individual adaptiveness and orienting behavior toward goals defined biologically and culturally. Culturally established moral norms—produced and reproduced by social systems—regulate rational choices by constraining, moderating, or encouraging behavioral paths. These norms permeate both intuitive moral perception and reflective judgment, conferring social legitimacy and cognitive validity. For example, affective empathy—linked to insular and cingulate cortex activity—can shape moral attitudes that divert rational choice from strict utilitarianism toward socially accepted behavior.

Thus, moral behavior and rational choice are interwoven, mutually modifying structures. Social moral conventions legitimize or delegitimize particular rational decisions within both System 1 and System 2 cognitive architecture. Therefore, decision making is not static or linear but a dynamic, evolving structure reflecting shifting social norms, cultural meanings, and institutions. Fundamentally, it rests on the biological capacity of the nervous system to integrate affective, cognitive, and social information into coherent behavior. Central to the model is the interaction of System 1 and System 2, functioning as complementary regulators of moral and rational dilemmas. These systems are modulated by social and cultural factors, enabling a synthesized, adaptive approach to decision making.

While drawing on Kahneman's Dual-Process model and Vaisey's sociological DPM, the proposed neurosociological framework advances beyond them by explicitly embedding moral reasoning and rational choice within a unified neurobiological–sociocultural system. Unlike Kahneman's model, which remains psychologically oriented, or Vaisey's, which privileges cultural schemas and moral intuition, this approach incorporates concrete neural mechanisms, emphasizes bidirectional influence between moral norms and rational deliberation, and situates both within dynamic social contexts. In sum, decisions emerge from integration between affective–intuitive and analytical–reflective processes—a neurobiologically feasible, culturally conditioned, and socially situated process.

4.1. The Climber's Dilemma: A Thought Experiment

To illustrate the proposed neurosociological concept of moral-rational action, consider the following thought experiment—the Climber's Dilemma. Empirical testing of such scenarios would require controlled field experiments capable of identifying neural responses to specific sociocultural variables—an aim beyond the scope of this volume.

Imagine five climbers ascending K2 who face a life-threatening crisis. Roped together on an icy wall, one anchor fails, leaving them suspended by a single ice axe. All know it cannot hold five; it may support two or three, but the limit is uncertain. The dilemma: Should they cut the rope, and if so, where? Should two be sacrificed to save three? What does the third climber—whose life depends on

both the rope and the others' decisions—feel? What is the morally and rationally “right” choice? Neurosociology cannot resolve this ethical dilemma but helps explain the mechanisms behind decision-making. Neuroscience shows that 300–500 milliseconds before conscious awareness, the brain initiates action via neural activity—observable as readiness potential on EEG. Structures like the basal ganglia, prefrontal cortex, and motor areas organize behavior, influenced by affective and moral inputs. This scenario illustrates that moral and rational categories, though distinct, reflect different aspects of a unified phenomenon: the behavior of the social agent. While not identical, morality and rationality both express responsible action.

4.2. Theoretical Distinction and Neurosociological Integration of Morality and Rationality in Decision Making

If we examine the Climber's Dilemma from a theoretical perspective rooted in academic ethics, morality and rationality can be clearly and conceptually distinguished as separate domains. However, such an approach risks remaining an abstract metaphysical exercise, detached from the realities of social behavior. When social behavior is considered as a neurosociological object of study, the focus shifts to the interaction between neurological processes and culturally acquired cognitive models in the formation and enactment of decisions—that is, to the conditions under which decision becomes action. The neurosociological perspective calls for an objective understanding and delineation of the factors—both neurobiological and sociocultural—that enable responsible behavior. It is precisely within this framework that morality and rationality become empirically inseparable. If it is morally justified to save a certain number of lives to prevent the loss of all, then it is likewise rational, and vice versa. Morality and rationality function as social fictions—that is, socially constructed but functionally indispensable cognitive frameworks that emerge post factum, after choice and action, serving to cloak behavior in cultural meaning and to interpret and conceptualize it. Although these constructs are “fictions” in the sense of being intersubjective creations rather than objective entities, they are indispensable, for it is through them that societies make sense of, formulate, and institutionalize the notion of responsibility.

4.3. Formulating Neurosociological Hypotheses for Empirical Investigation

Following this reasoning, the natural next step involves formulating hypotheses and outlining empirical pathways for testing the core assumptions of the proposed neurosociological model. These hypotheses are designed to investigate the neurobiological, cognitive, and social mechanisms structuring moral-rational behavior in decision making, particularly under critical or high-stakes conditions. This opens the door to methodological concretization and operationalization of central concepts introduced here. For illustrative purposes, and without claiming exhaustiveness, I propose the following three hypotheses within the neurosociological framework:

Hypothesis 1: Neural Integration in Normative Conformity

When moral and rational evaluations align, synchronized neural activity occurs between the ventromedial prefrontal cortex (vmPFC)—linked to affective valence and social valuation—and the dorsolateral prefrontal cortex (dlPFC)—associated with cognitive control, working memory, and behavioral regulation. This co-activation reflects the neurobiological integration of emotional and cognitive components during morally relevant decision making, wherein the vmPFC assesses the emotional significance of alternatives, while the dlPFC modulates this evaluation through analytical processing. Socially conditioned norms, internalized via cultural socialization, facilitate this interaction by steering behavior toward socially consensual and normatively sanctioned actions. In sociocultural contexts marked by strong collective solidarity and moral homogeneity, this neural configuration exhibits increased intensity, reflecting alignment between intuitive affect and rational judgment under conditions of normative clarity.

Hypothesis 2: Neurodynamics of Moral-Cognitive Conflict

In situations of moral-cognitive conflict—when an intuitive moral judgment, shaped by socialization, contradicts utilitarian or strategic reasoning—brain regions implicated in cognitive control and conflict resolution, notably the dlPFC and anterior cingulate cortex (ACC), become engaged. The ACC functions as a detector of cognitive dissonance, while the dlPFC executes reappraisal and regulation of automatic moral impulses originating from System 1. This neural dynamic and the subjective experience of conflict are moderated by cultural factors such as individualism and collectivism: in strongly collectivist cultures, internalized moral norms dominate and may override utilitarian evaluation. Thus, a culturally mediated neurosocial mechanism emerges to manage moral-cognitive dilemmas.

Hypothesis 3: Cognitive-Affective Synergy in Socially Affirmed Moral Choice

In scenarios characterized by clear social consensus regarding the moral legitimacy of a given behavior (e.g., sacrificing one individual to save the majority), co-activation is observed between brain structures involved in automatic affective evaluation—such as the amygdala and insula—and those implicated in reflective social perspective—taking and integrative processing, including the dorsolateral and dorsomedial prefrontal cortex and posterior cingulate cortex. This neural configuration reflects the interplay between the emotional valence of the action and the rational assessment of its social and moral consequences. Within a stable cultural framework and consistent moral conventions, the synergy between automatic and reflective neural systems is enhanced, facilitating normatively guided and socially coordinated behavior. Hence, neurosociological regulation of moral decision making manifests as culturally validated cognitive-affective coordination.

5. Concluding Remarks on Methodological Prospects

These proposed hypotheses do not aim for immediate empirical verification but rather function as conceptual and methodological guides illustrating the feasibil-

ity of operationalizing a neurosociological framework. They suggest promising avenues for future research employing contemporary methods such as functional neuroimaging, controlled moral dilemma experiments, and culturally contextualized behavioral studies. It should be stressed that, in their present form, these hypotheses are theoretical schematizations rather than concrete research protocols. Their rigorous testing will require refinement of experimental design, methodological tool adaptation, and development of context-specific indicators for observation and measurement. Beyond their theoretical value, the proposed model may also have practical relevance—for example, informing economic policy through a better understanding of how moral framing shapes rational decision-making, or offering insights into organizational behavior in contexts demanding collective responsibility. At the same time, the empirical application of these hypotheses will face significant methodological and ethical challenges, including controlling for cultural variability, ensuring ecological validity, safeguarding participant well-being, and addressing the interpretive limitations of neuroimaging data. Consequently, these hypotheses neither claim comprehensiveness nor immediate applicability but serve as illustrative examples demonstrating the translation of abstract conceptualizations into empirically accessible research programs. This positions the current work not as a final contribution to empirical science but as a foundation for a long-term research agenda aimed at establishing neurosociology as a robust interdisciplinary analytical perspective.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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