



Chapter 15

Neurobehavioral Foundations of Risk Perception in Financial Decision Making


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ABSTRACT

This chapter explores neurobehavioral underpinning of the risk of risk in financial decision, unifying the endless neuroscience, behavioral money, and psychoanalysis. It investigates how the regions of the brain such as amygdala, prefrontal cortex and insula influence the response of financial risk and uncertainty. The role of emotional process, heuristics, and justice bias is emphasized to shape investors' behavior. This chapter also discusses individual differences, stress and hormonal effects (eg,

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cortisol, dopamine) modulate risk tolerance. Understanding these mechanisms, we gain critical insights of irrational market behavior, enabling the development of more effective financial models and investors' decision-support systems.

INTRODUCTION

In the complex world of financial decisions, the risk vision is acting as a basic determinant of behavior, how individuals evaluate uncertainty, allocate resources, and respond to unstable markets. While traditional economic principles have long assumed rational agents that decide on the basis of objective prospects and expected utility, the growing organization of behavioral money and evidence in neuroscience challenges this concept. Real-world investors are often rationalized, demonstrating systematic bias, inconsistent preferences and emotionally charged reactions to risk. These behaviors suggest that making financial decisions is not a full-minded process, but in neurobiological mechanisms, the deeply is originally original and is shaped by evolution, emotional and mental powers(Aho et al., 2021).

Understanding the neurobehavioral foundations of risk vision requires inter-acoustic lenses, to draw from cognitive neuroscience, psychoanalysis. Neuro-finance, as an emerging field, bridges these domains by examining how brain activity and neurochemical processes affect financial behavior. At the root of this inquiry, it is believed that the risk is not a fixed, external dose, but a subjective experience - interpretation, experienced, and reacting differently by each person based on internal states and reference signals. For example, the opportunity for the same investment can be threatened by one investor and attracted by another, not by the difference in information but also by a variation in neural circuitry and emotional response(Gao et al., 2022).

At the neural level, many regions of the brain play a major role in the risk evaluation and decision-making. amygdala, in the center of the process of fear and emotional impairment, often responds to signs of potential damage, stimulating the behavior of avoiding. The prefrontal cortex, especially dorsolateral and ventromedial areas, are responsible for executive functions, including planning, emotion regulation and evaluation of long-term results. When working best, the prefrontal cortex modules emotional impulses, allowing more deliberate financial preferences. However, under stress, its influence may be reduced, leading to the behavior of impulse or risk detection. The insular cortex, the second critical area, is involved in the introspective awareness - which is our vision of internal physical states - and plays a role in feelings of discomfort or discomfort during risk exposure. These systems indicate that the risk of risk is both emotional and emotional experience, which is influenced by the dynamic interplay of multiple brain regions(Gard et al., 2022).

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