The Biology of **Investment Decision-Making**

How Hormones, Stress, and Biology
Shape Portfolio Outcomes

What We Will Cover Today

01

The Biology of Risk

How hormones shape decisions

02

Winner Effect & Irrational Pessimism

Recognizing the warning signs at extremes

03

Disciplined Rebalancing

Using allocation bands to counteract biological bias

04

Stress Triggers & Market Manifestations

Novelty, uncertainty, and uncontrollability in practice

MODULE 01

The Biology of Risk

Understanding the Physiological Drivers
of Investment Decision-Making

Learning Objective: Identify how hormones influence risk appetite and decision-making, recognizing that investment choices are not purely rational but are shaped by unconscious biological responses to market conditions.

The Myth of the Rational Investor

MODULE 01 · THE BIOLOGY OF RISK

"Financial risk-taking has always been modeled as a purely cognitive activity — a matter of calculating probabilities and expected outcomes. But the body has other ideas."

— Dr. John Coates, Cambridge University (former Goldman Sachs/Deutsche Bank trader)

Traditional Economics Assumes:

- Investors process information rationally
- Preferences are stable and consistent
- Decisions maximize expected utility
- Emotions are noise to be filtered out
- Market prices reflect all available information

What Neuroscience Reveals:

- The body physically responds to market moves
- Hormones alter risk appetite in real time
- "Gut feelings" have measurable physiological roots
- Stress cascades affect cognition and judgment
- These responses emanate via survival — not investing

Source: Coates & Herbert, PNAS 2008 | Coates, The Hour Between Dog and Wolf, 2012

The Two Hormones That Influence Markets

MODULE 01 · THE BIOLOGY OF RISK

TESTOSTERONE

"The Hormone of Economic Bubbles" and Risk

Rises during:
Winning streaks, bull markets, competitive success

Key Effects:
↑ Risk appetite and confidence

↑ Optimism about future price changes

↑ Investment in high-variance assets (avg. +46%)

↓ Requirement for risk/reward trade-off

→ Euphoria and rogue-trader behavior

Research: 17 London traders, 8 days — morning T levels predicted day's P&L

CORTISOL

"The Hormone of Economic Busts" - Alarm System

Rises during:
Novelty, uncertainty, uncontrollability, market volatility

Key Effects:
↑ Trading activity and market instability

↓ Risk appetite over prolonged stress

↓ Behavioral flexibility and attention shift

→ Irrational pessimism and paralysis

Research: 68% surge in cortisol during 8-day volatility spike, London trading floor

Source: Cueva et al., Scientific Reports 2015 | Coates & Herbert, PNAS 2008 | Coates et al., PNAS 2014

Hormones Act Through Different Pathways

Testosterone's Pathway

- Testosterone drives investment risk-taking by boosting optimism by shifting price expectations upward.

Cortisol's Pathway

- Cortisol suppresses risk appetite independent of price expectations.
- Cortisol narrows attention and behavioral flexibility, steering investors toward the familiar.

The Interaction Effect

- When BOTH are elevated in tandem, the combination is destabilizing.
- High testosterone drives overconfidence; high cortisol removes the normal risk-limiting response.
- This combo creates the conditions for market bubbles.

Source: Cueva et al., Nature Scientific Reports 2015 | Carré & Olmstead, Hormones and Behavior 2015

The Brain's Ability to Categorize Threats

MODULE 01 · THE BIOLOGY OF RISK

The Amygdala Override

The amygdala — the brain's threat-detection center — responds to financial losses the same way it responds to physical danger. It activates before the prefrontal cortex (rational thinking) can intervene.

What This Means for Investors

- Portfolio drawdowns trigger a genuine fight-or-flight response
- The stress cascade begins before conscious awareness
- Risk tolerance measured in calm conditions does not predict behavior in crisis
- "Knowing" the right answer does not override the hormonal response
- Repeated market exposure does not eliminate the biological response

68%

Cortisol increase in traders during volatile 8-day stretch

2×

Pain of loss vs. pleasure of equivalent gain (loss aversion)

<1s

Time for amygdala to react before prefrontal cortex

46%

Increase in high-risk asset investment under elevated testosterone

Source: Coates et al., PNAS 2014 | Kahneman, Thinking Fast and Slow

The Physiological Cascade: From Market Event to Decision

MODULE 01 · THE BIOLOGY OF RISK

1 — Market Event

Price drop, volatility spike, news shock

2 — Amygdala Activation

Threat detected; stress hormones released

3 — Cortisol Surge

Risk appetite shifts; attention narrows

4 — Cognitive Distortion

Probability weighting skewed; losses loomed larger

5 — Biased Decision

Panic sell, freeze, or overcorrect to safety

This cascade is not a flaw — it is an adaptation to protect us from physical threats. The problem is that in financial markets, the threats are abstract and the optimal response is often the opposite of what should be prescribed.

Source: Coates, The Hour Between Dog and Wolf 2012 | Zhukov, Behavioral Sciences 2014

Module 01 Key Takeaways

- Investment decisions involve the body intervening before the mind can act.
- Testosterone rises during winning streaks and drives optimism and risk-seeking; cortisol rises with uncertainty and can initially increase risk appetite before suppressing it during crises.
- The physiological response cascade begins before conscious awareness, making self-awareness and process-based decision-making essential.

MODULE 02

The Winner Effect & Irrational Pessimism

Recognizing Overconfidence in Bull Markets and Excessive Fear in Volatile Periods

Learning Objective: Detect the warning signs of overconfidence during bull markets and excessive fear during volatile periods and understand how these feedback loops operate.

The Winner Effect: From Biology to Financial Markets

MODULE 02 · THE WINNER EFFECT & IRRATIONAL PESSIMISM

Fighting and Winning

Biologists studying competition found that animals winning a fight or competition were more likely to win the next one. The mechanism: rising testosterone levels made the winner more confident, risk-seeking, and physiologically primed for continued success.

Applied to Financial Markets

John Coates (Cambridge) measured testosterone in 17 London traders over 8 days. High morning testosterone predicted profitable days. Profitable days raised afternoon testosterone. The positive feedback loop accelerated risk-taking well beyond rational thresholds.

THE WINNER EFFECT CYCLE

Source: Coates & Herbert, PNAS 2008 | Business Insider, The Winner Effect 2012

Warning Signs of Overconfidence During Bull Markets

MODULE 02 · THE WINNER EFFECT & IRRATIONAL PESSIMISM

Reduced Sleep & Racing Thoughts

Portfolio managers report less need for sleep and accelerating ideation — physiological signs of elevated testosterone mimicking mild mania.

Expanding Risk Appetite

Risk parameters that previously seemed appropriate begin to feel conservative. Peer comparison drives further risk-taking as success is attributed to skill rather than luck.

Worsening Risk/Reward Trade-Offs

Positions are sized larger relative to expected returns. The portfolio manager begins accepting bets previously considered unattractive.

Attribution Bias

Gains are credited to insight and process when in fact there is less reliance on process

Dismissal of Dissenting Views

Investment committee members reporting contrary evidence are marginalized. Groupthink accelerates as the winning streak continues.

"This Time Is Different" Language / Infomercials

Valuation extremes are rationalized with narratives. Historical precedents are dismissed as inapplicable to current conditions.

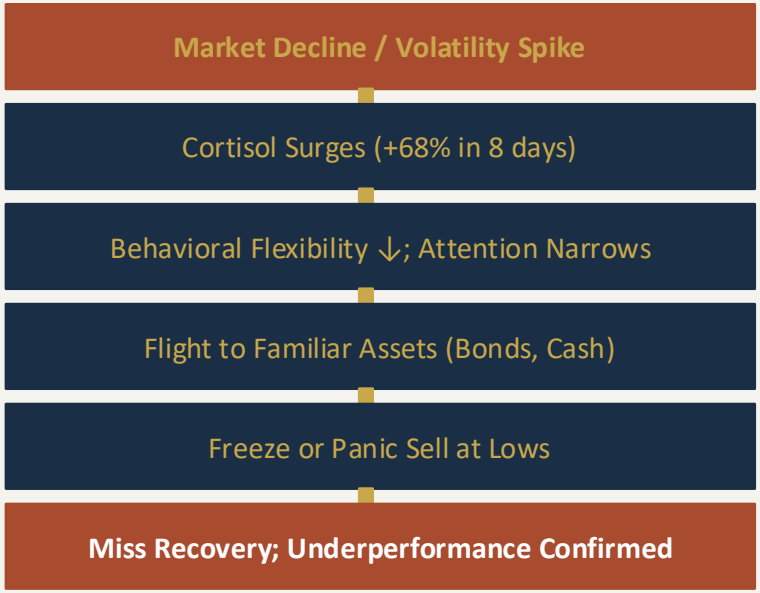
Source: Coates, The Hour Between Dog and Wolf 2012 | Picture Perfect Portfolios, Market Bubbles 2026

Irrational Pessimism: The Bear-Market Feedback Loop

MODULE 02 · THE WINNER EFFECT & IRRATIONAL PESSIMISM

The mirror image of the winner effect is equally powerful. As cortisol surges during market downturns, the stress response that was designed to protect us from physical harm begins to suppress risk-taking beyond rational thresholds.

THE PESSIMISM FEEDBACK LOOP



Evidence from the Research

68% Cortisol increase in traders during 8-day volatility spike (London floor)

–24% Avg. S&P 500 drop from peak to trough before most retail investors capitulate

3× Underperformance of panic-sellers vs. disciplined hold strategy (Dalbar study, long-run)

Source: Coates et al., PNAS 2014 | Provident Financial Group 2025

The Emotional Cycle of Market Participation

MODULE 02 · THE WINNER EFFECT & IRRATIONAL PESSIMISM

1	2	3	4	5
Optimism	**Thrill**	**Euphoria**	**Anxiety**	**Denial**
T rising	*T elevated*	*T peak / C rising*	*C surging*	*C high*

6	7	8	9	10
Panic	**Capitulation**	**Depression**	**Hope**	**Recovery**
C extreme	*C peak / T crash*	*Both suppressed*	*T beginning to rise*	*T rising again*

Source: Provident Financial Group 2025 | Coates, Cambridge Neuroscience and Finance 2012

Loss Aversion: Neurological, Not Just Psychological

MODULE 02 · THE WINNER EFFECT & IRRATIONAL PESSIMISM

What Neuroimaging Shows

Studies using fMRI demonstrate that financial losses activate regions of the *brain associated with physical pain* and distress more intensely than equivalent gains activate pleasure centers.

This is not a choice or a weakness — it is hard-wired neurology.

Practical Consequences:

- Investors hold losing positions too long and sell winning positions too early
- Loss aversion worsens with portfolio monitoring frequency

2:1

Pain of loss
vs. pleasure of equal gain

3.5×

Greater negative impact on wellbeing from losses vs. gains (behavioral finance literature)

Myopic loss aversion: Investors who check portfolios daily experience greater distress and take less risk than those who review quarterly.

Source: Kahneman & Tversky, Prospect Theory | Benartzi & Thaler, myopic loss aversion 1995

Case Study: The Winner Effect in the Dot-Com Boom

1996 – 2000: The Biology of a Bubble

Alan Greenspan's December 1996 speech coined "irrational exuberance" — yet the NASDAQ proceeded to nearly triple over the next three years. What was happening biologically?

Each gain reinforced testosterone-driven optimism. Price targets were raised, risk controls were relaxed, and qualitative measures like "eyeballs" replaced earnings metrics. The winning streak had generated a biological state where normal risk filters were bypassed. John Coates described the traders of this era as exhibiting "a narcotic-like high" — racing thoughts, reduced sleep, expanded risk appetite, and dismissal of caution.

+474%	–78%	18 months	$5T
NASDAQ gain 1995 to peak (March 2000)	NASDAQ decline March 2000 to October 2002	Average time for panic sellers to re-enter the market (missed recovery)	Estimated market cap lost in NASDAQ crash

Source: Coates, The Hour Between Dog and Wolf 2012 | NASDAQ historical data

Module 02 Key Takeaways

- The Winner Effect creates a positive feedback loop: success raises testosterone, which drives more risk-taking and further success until the system overshoots rational thresholds.
- The mirror image (irrational pessimism) occurs in downturns: cortisol surges suppress risk appetite and drive panic-selling precisely *when disciplined buying would create value*.
- Loss aversion is neurologically wired as losses activate pain circuits more intensely than equivalent gains activate pleasure circuits.
- Warning signs of overconfidence are observable: reduced sleep, worsening risk/reward ratios, and dismissal of dissenting views.

MODULE 03

Disciplined Rebalancing as a Counter to Biological Bias

Implementing Systematic Allocation Bands
to Counteract Hormone-Driven Behavioral Shifts

Learning Objective: Implement systematic rebalancing strategies using allocation bands (±5 percentage points) to counteract hormone-driven behavioral shifts, ensuring portfolio decisions remain aligned with long-term objectives.

Rebalancing: Systematically Anti-Biological

MODULE 03 · DISCIPLINED REBALANCING

Rebalancing requires an investor to sell what is rising and buy what is falling — the precise opposite of what elevated testosterone (bull market) and elevated cortisol (bear market) are compelling us to do.

What Biology Wants Us to Do:

- Buy more of what has risen (winner effect)
- Sell what has fallen (loss aversion)
- Hold on to cash during uncertainty (cortisol)
- Follow the crowd for safety (herd mentality)
- React immediately to new information
- Treat recent performance as permanent

What Rebalancing Requires:

- Sell the winner (take profits from outperformers)
- Buy the laggard (increase underperformer allocation)
- Deploy cash into the declining asset class
- Act against the consensus at extremes
- Act on a predetermined schedule/rule, not emotion
- Treat recent performance as mean-reverting

Key Point: Rebalancing is one of the few investment disciplines that can both improve returns and reduce risk — because it is systematic, not discretionary.

Source: T. Rowe Price, Portfolio Rebalancing Research 2024 | Collin Seow, Behavioral Biases in Rebalancing 2025

The ±5% Allocation Band: A Rule-Based Defense System

MODULE 03 · DISCIPLINED REBALANCING

The ±5 Percentage Point Band Rule: Rebalance when any asset class allocation drifts more than 5 percentage points above or below its target — removing the discretionary judgment that biology compromises.

Asset Class	Target	Lower Band (–5%)	Upper Band (+5%)
Domestic Equity	40%	35%	45%
International Equity	20%	15%	25%
Fixed Income	30%	25%	35%
Alternatives / Real Assets	10%	5%	15%

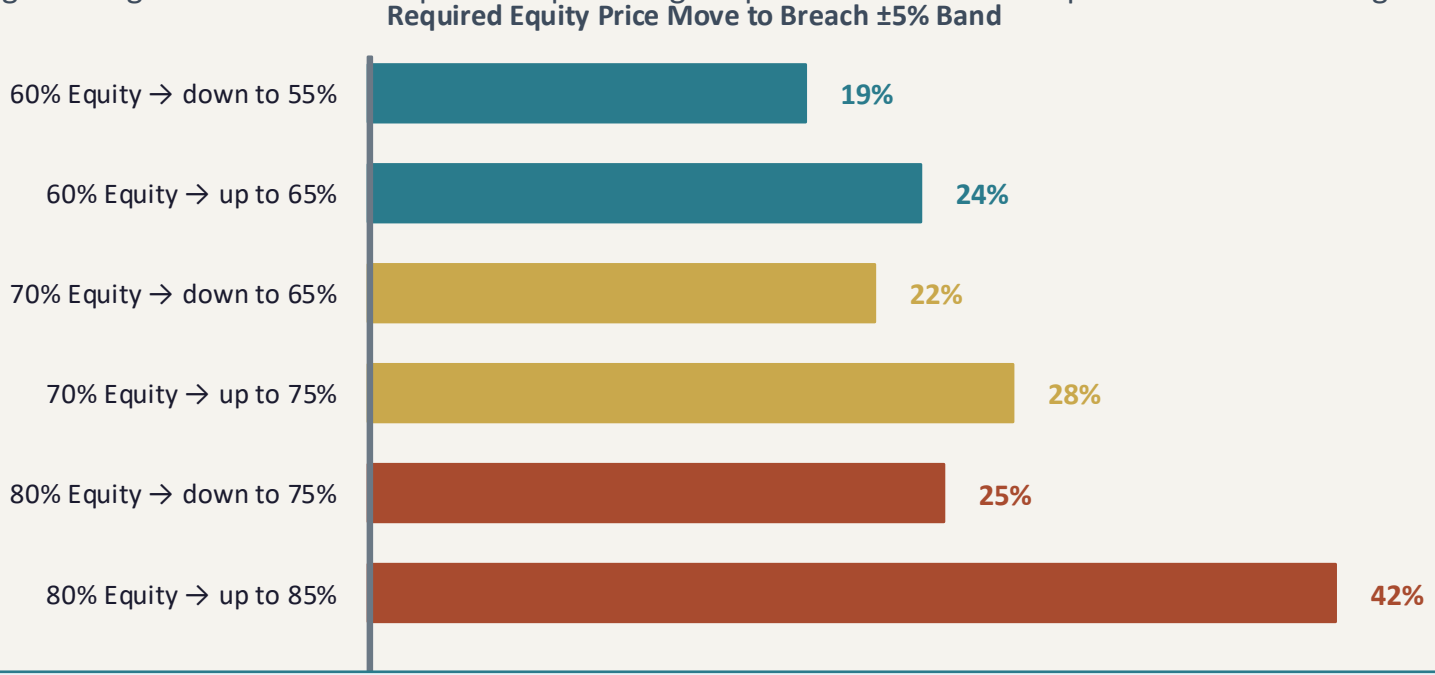
Key Research Finding: T. Rowe Price analysis of rebalancing strategies found wider tolerance bands (3%–5% fixed) generally outperformed narrower bands on risk-adjusted returns. Frequent monitoring with rule-based triggers — rather than calendar-only rebalancing — delivered the most consistent outcomes.

Source: T. Rowe Price Rebalancing Research 2024 | The Finance Buff, 5% Rebalancing Bands

What Does It Take to Breach a 5% Band?

MODULE 03 · DISCIPLINED REBALANCING

An important practical consideration: the ±5 percentage point band is not triggered by trivial market moves. Understanding the magnitude of moves required helps manage expectations and reduce premature rebalancing.



For a 60/40 portfolio, it takes an ~19% equity decline to reduce equity to 55% — roughly a mid-sized correction. This means the ±5% band avoids over-trading while still capturing meaningful drift.

Source: The Finance Buff, 5% Rebalancing Band Analysis

Implementing a Systematic Rebalancing Framework

MODULE 03 · DISCIPLINED REBALANCING

01

Define Target Allocation

Document IPS-compliant target allocations for each asset class based on long-term objectives.

02

Set Tolerance Bands

Apply ±5% bands around each major asset class, documented explicitly in the IPS.

03

Establish Monitoring Cadence

Monitor allocations monthly, more frequently in volatile markets, and flag breaches when possible.

04

Pre-Authorize Rebalancing

Investment committee pre-approves rebalancing whenever bands are breached.

05

Document and Review

Record every rebalancing action with date and action taken. Review annually to assess whether band widths remain appropriate.

06

Behavioral Override Protocol

When committee members advocate for not rebalancing, require written justification.

Source: T. Rowe Price, Rebalancing Research 2024 | ERISA Fiduciary Best Practices

Rebalancing – an Anchor for Investment Committees

MODULE 03 · DISCIPLINED REBALANCING

Beyond the mechanical function, a systematic rebalancing policy serves as a behavioral anchor — a pre-committed discipline that removes the need for hormonal willpower at precisely the moments when it is least available.

Eliminates Timing Discretion

When the rule says rebalance, you rebalance. There is no debate about whether the market has "bottomed" or whether to "wait a little longer." The committee is protected from its own cortisol.

Forces Contrarian Action

Rebalancing in falling markets requires buying equities as others are selling — the precise behavior that generates long-term value and cannot be reliably delivered through discretion under stress.

Consistent with Fiduciary Duty

A documented, systematic rebalancing policy demonstrates procedural prudence — a core element of ERISA fiduciary standards. Process is defensible; ad-hoc timing decisions are not.

Creates Accountability

When decisions are pre-authorized and rule-based, deviations require explicit documentation. This accountability structure reduces the probability that fear or overconfidence will quietly override discipline.

Source: ERISA Fiduciary Principles | Collin Seow, Behavioral Finance 2025

Module 03 Key Takeaways

- Rebalancing is anti-biological by design — it requires selling winners and buying losers, the opposite of what testosterone and cortisol are directing us to do.
- The ±5 percentage point band provides a practical trigger point that captures meaningful allocation drift while avoiding over-trading during normal market fluctuations.
- For a 60/40 portfolio, it takes approximately a 19% equity decline to breach the lower band — confirming the band filters noise while responding to genuine dislocations.
- Band-triggered rebalancing outperforms calendar rebalancing on risk-adjusted returns in research testing (T. Rowe Price, 2024).

MODULE 04

Stress Triggers & Market Manifestations

Novelty, Uncertainty, and Uncontrollability in Real-World Market Events

Learning Objective: Identify the three primary stress triggers as they manifest during Fed leadership transitions and mid-term elections, and apply evidence-based diversification strategies to maintain discipline during periods of elevated market stress.

The Three Primary Cortisol Triggers

MODULE 04 · STRESS TRIGGERS & MARKET MANIFESTATIONS

Research from PNAS (Coates, 2014) identifies three specific conditions that reliably elevate cortisol levels — each with direct parallels in financial market environments.

NOVELTY

Exposure to unfamiliar environments, new leadership, unprecedented market regimes

Biological Mechanism:

Novel stimuli activate the hippocampus and trigger cortisol release; without prior templates, the stress response intensifies.

Market Examples:

New Fed Chair taking office · First rate-hike cycle in 15 years · Post-pandemic market dynamics · AI-driven market structure changes

UNCERTAINTY

Ambiguity about outcomes where probabilities cannot be reliably estimated

Biological Mechanism:

The brain's threat system reacts more strongly to uncertainty than known risk, sustaining cortisol release rather than triggering it episodically.

Market Examples:

Policy direction under new leadership · Election outcome implications for regulation · Fed communication interpreted differently by different market participants

UNCONTROLLABILITY

Situations where no available action can meaningfully alter the outcome.

Biological Mechanism:

Loss of perceived control is a potent cortisol trigger, with helplessness driving sustained HPA axis activation and elevated stress hormones.

Market Examples:

Mid-term election results · Geopolitical shocks · Central bank decisions · Regulatory changes affecting entire asset classes

Source: Coates et al., PNAS 2014 | Zhukov, Behavioral Sciences 2014

What Can Be Done to Mitigate our Personal Risk Profile

Study Your Opponent – the Environment

Walking into arenas where the stakes are large: trading floors, performance reviews

On a Roll and Winning Big – Beware

Winning streaks — task success actually raises post-trial testosterone, which can reinforce overconfidence cycles

Help Yourself - Avoid Sleep Deprivation

Disrupts the body's cortisol feedback loop, causing sustained elevation

Help Yourself - Diet

Caffeine (cap at 200mg, stop at 12noon) and poor diet (processed sugars) spike cortisol and impair hormone regulation

Case Study: Fed Leadership Transitions as Stress Triggers

MODULE 04 · STRESS TRIGGERS & MARKET MANIFESTATIONS

Fed leadership transitions activate all three primary stress triggers simultaneously — creating compound cortisol events that measurably alter investor risk preferences.

Novelty

A new Fed Chair brings an unknown communication style, different policy priorities.

Uncertainty

Markets cannot model with confidence whether policy continuity will be maintained. Inflation tolerance, rate path preferences.

Uncontrollability

No market participant can influence the appointment, the policy framework, or the new chair's interpretation of the Fed's mandate.

Historical Context

Greenspan → Bernanke (2006)

Elevated Stock Market Volatility

Bernanke → Yellen (2014)

Taper tantrum, bond yields spiked

Yellen → Powell (2018)

Elevated Stock Market Volatility

Powell Reappointment (2022)
From inflation targeting to containing inflation

Source: Ainvest, Fed Leadership Transitions 2025 | Coates et al., PNAS 2014

Case Study: Mid-Term Elections as Compound Stress Events

The Three Triggers at Work:

- **Novelty:** New Congressional composition
- **Uncertainty:** Sector-specific regulatory risk cannot be reliably modeled.
- **Uncontrollability:** Investors are forced to accept electoral outcomes.

Date of Mid-Term Election	Following 12-Month Return on S&P 500
11/2/1954	39.0%
11/4/1958	14.7%
11/6/1962	29.0%
11/8/1966	16.7%
11/3/1970	16.3%
11/5/1974	24.1%
11/7/1978	12.4%
11/2/1982	25.4%
11/4/1986	1.3%
11/6/1990	29.3%
11/8/1994	30.4%
11/3/1998	22.1%
11/5/2002	17.0%
11/7/2006	8.7%
11/2/2010	5.8%
11/4/2014	6.7%
11/6/2018	14.0%
11/8/2022	16.4%

12-Month Return on S&P 500 Following Mid-Term Elections	
MEDIAN	**16.6%**
AVERAGE	**18.3%**

But Wait…There's More

Data Source: Bloomberg, Chart Francis LLC

Source: IG Group, US Elections & Bond Markets 2024 | Coates et al., PNAS 2014

Identifying Stress Triggers in Committee Meetings

MODULE 04 · STRESS TRIGGERS & MARKET MANIFESTATIONS

Investment committees are not immune to biological stress responses. Understanding the triggers allows fiduciaries to design meeting structures and protocols that account for the hormonal environment.

Recognize the Meeting Context
Committee meetings called during market crises or major political events bring elevated cortisol, physiologically compromising the decisions made.

Separate "Temperature-Taking" from Decision Meetings
Establish a norm that crisis meetings are for information review only, with policy decisions reserved for scheduled, lower-stress conditions.

Pre-Commitment to Stress-Event Protocols
The IPS should require a documented supermajority for any deviation from rebalancing or diversification guidelines during a stress event, creating a formal barrier to cortisol-driven decisions.

Monitor Language for Biological Signals
Warning phrases: 'This time is different' (winner effect), 'We should wait' (cortisol suppression), 'Everyone is selling' (herd instinct), 'I can't sleep' (bubble testosterone).

Quantitative Anchors are Helpful but Not the Cure
Valuation metrics, factor scores, and allocation analytics provide biological counterweights to emotional reasoning.

Build Biological Awareness
Keep learning, keep observing, and keep your awareness level in check.

Source: PNAS 2014, Cortisol and Market Behavior | Behavioral Finance, ACR Journal 2025

The Current Environment: Mapping Today's Stress Triggers

MODULE 04 · STRESS TRIGGERS & MARKET MANIFESTATIONS

Applying the three-trigger framework to present market conditions helps fiduciaries identify where biological bias risk is currently elevated.

NOVELTY

- Potential change in Fed leadership — new Chair's communication style and policy priorities unknown
- AI-driven market structure: algorithms dominating short-term price discovery in unprecedented ways
- Post-2020 fiscal policy scale: deficit levels and Treasury issuance without clear historical analogue
- Geopolitical fragmentation disrupting trade relationships that markets had treated as stable

UNCERTAINTY

- Inflation trajectory and Fed terminal rate — competing models produce divergent forecasts
- Legislative outcomes in a closely divided political environment
- International market access risk: regulatory, sanction, and capital flow restrictions
- Duration and resolution of credit cycle after the most rapid rate-hike cycle in 40 years

UNCONTROLLABILITY

- Central bank decisions remain exogenous to portfolio positioning
- Geopolitical events (Middle East, Ukraine, Taiwan Strait) outside investor control
- Index construction changes affecting passive allocation exposure involuntarily
- Regulatory reclassification risk in private credit and alternative investments

Source: Ainvest, Fed Leadership Transitions 2025 | IG Group, Elections & Markets 2024

Module 04 Key Takeaways

- The three primary cortisol triggers — novelty, uncertainty, and uncontrollability — are not vague concepts but precisely defined biological stimuli with measurable effects on risk preferences.
- Fed leadership transitions and mid-term elections are compound stress events that activate all three triggers simultaneously, creating the conditions for maximum biological influence on investment decisions.
- Markets systematically produce the highest volatility in mid-term years and the highest average returns in the 12 months following mid-term elections precisely because stress-driven behavior creates mispricing that discipline could exploit.
- Evidence-based diversification across geographies, asset classes, factors, and duration pre-positions the portfolio against the biological flight-to-familiar that stress events reliably produce.

Integrating the Four Modules: A Unified Framework

The goal is not to eliminate biological influence — it is to design governance systems that make discipline the path of least resistance.

MODULE 01

Recognize the Biology

Know that cortisol and testosterone are active participants in every investment decision. Accept that rationality is a goal, not a default state.

MODULE 02

Monitor for Feedback Loops

Watch for winner effect warning signs in bull markets and irrational pessimism signals in downturns. Awareness is the precursor to discipline.

MODULE 03

Anchor to Process

Implement systematic ±5% rebalancing bands with pre-authorized execution. Remove discretion from the moments biology most compromises it.

MODULE 04

Prepare for Stress Events

Map current market conditions to the three triggers. Pre-position diversification and governance protocols before stress events arrive.

Self-Assessment: Are You Currently Biologically Biased?

PARTICIPANT REFLECTION EXERCISE

For each question, reflect honestly on your recent investment-related thinking and behavior:

Bull Market / Winner Effect

Have you recently raised a position size because recent returns validated your thesis? (testosterone-optimism bias)

Bear Market / Irrational Pessimism

Have you delayed rebalancing into equities during a downturn because it 'feels wrong right now'? (cortisol suppression)

Novelty Stress

Has a change in policy leadership or market structure caused you to question a long-term allocation without new fundamental evidence? (novelty trigger)

Loss Aversion

Are you holding a position that has underperformed for multiple periods primarily because selling it would feel like a failure? (loss aversion)

Attribution Bias

When recent results have been strong, have you attributed them primarily to your analysis rather than market conditions? (winner effect)

Herd Pull

Have you considered changing a position because committee members or peers are moving in the same direction without independent re-analysis? (cortisol/herd instinct)

If you answered 'yes' to 2 or more: your portfolio decisions may currently be influenced by physiological bias. Consider applying the rebalancing and governance tools from this program.

Fiduciary Implications: Biology Meets ERISA

For retirement plan fiduciaries, the biological drivers of investment decision-making are not academic — they are governance risk factors that directly affect plan participants.

Procedural Prudence

Bias-aware governance, systematic rebalancing, pre-committed protocols, documented frameworks strengthens ERISA's prudent process defense.

Documentation as Defense

Stress-driven policy deviations risk cortisol rationalization SO require documented justification to create accountability and a governance audit trail.

Plan Participant Impact

Participant panic selling stems from the same cortisol cascade covered here. Education framing volatility in biological context ('your brain is wired to sell at the bottom') has greater behavioral impact than purely financial messaging.

Investment Committee Composition

Awareness of differences in hormonal response, and the benefits of diverse perspectives under stress, supports the fiduciary case for diverse investment committee composition.

Source: ERISA Fiduciary Standards | Cueva et al., Scientific Reports 2015

Recommended Practices Summary

Governance

- Codify rebalancing bands in IPS (±5pp minimum) for a Defined Benefit Pension Plan
- Require documented justification for stress-period deviations
- Establish pre-authorized rebalancing execution authority

Process

- Separate information meetings from decision meetings during crises
- Monitor portfolio review frequency (avoid myopic loss aversion)

Portfolio

- Maintain strategic diversification across geographies, factors, and asset classes
- Use systematic rebalancing (not calendar timing) as primary discipline

Education

- Include training in annual fiduciary education
- Frame participant communication with understanding typical psychological/biological patterns

Source: T. Rowe Price Rebalancing Research 2024 | Coates, Cambridge Neuroscience Research 2012

"The body has opinions about risk, and the body votes."

— Dr. John Coates, Cambridge University

The most sophisticated investment process in the world is only as reliable as the humans executing it under pressure. Building systems that account for human physiology — not just human cognition — is the next frontier of investment governance.

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Evidence-Based Diversification to Counter Stress-Driven Decisions

MODULE 04 · STRESS TRIGGERS & MARKET MANIFESTATIONS

During elevated stress events, cortisol drives investors toward the familiar (home bias) and into apparent certainty (cash, short-duration bonds). Evidence-based diversification pre-empts these behavioral failures.

Geographic Diversification

Home bias is amplified under stress. Maintaining international allocations (developed and emerging markets) pre-commits the portfolio to diversification before the cortisol-driven flight to home markets begins.

Asset Class Breadth

During stress events, correlation among equities rises (flight to quality consolidates movement). Pre-positioned real assets, inflation-linked bonds, and alternative strategies provide return streams less correlated to the stress trigger.

Factor Diversification

Quality and low-volatility factors have historically outperformed during stress events when investors flee high-beta names. Maintaining factor exposure creates a biological buffer: the portfolio declines less severely, reducing the cortisol response that drives panic selling.

Duration and Credit Diversification

Fixed income allocations diversified across duration (short, intermediate, long) and credit quality reduce concentration in any one policy-sensitive instrument. This reduces portfolio sensitivity to a single central bank decision.

Cash and Liquidity Buffer

Maintaining a defined, pre-approved liquidity buffer eliminates the physiological urgency to liquidate during stress. When cash is available, the cortisol-driven 'sell something' impulse finds an appropriate outlet without degrading the long-term portfolio.

Rules-Based Rebalancing Integration

When diversification disciplines are paired with systematic rebalancing bands, the portfolio's biological defenses are compounded. The bands ensure that stress-driven flight to quality (which concentrates risk) is automatically reversed when the allocated spread exceeds ±5%.

Source: Coates et al., PNAS 2014 — flight to familiar securities | Advances in Consumer Research, Behavioral Finance 2025