Collective Intuition

And The Predictive Body

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The Emergence of Collective Intuition from an
Active Interoceptive Inference Perspective

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Preface

In today's world, strategic agility and the ability to anticipate change are vital. Maintaining a competitive advantage requires early detection of potential threats. In areas such as society, economics, politics, and especially security and safety, there is an increasing emphasis on identifying hidden or *weak signals*.

A persistent challenge in modern management theory is the disconnect between perceiving external signals and processing them internally, from initial perception to implementation. This gap often leads to misinterpretation of weak signals, sometimes without conscious awareness. Notably, this issue has persisted since the concept of weak signals was introduced in 1975, despite the Signals Intelligence (SIGINT) market now being valued at approximately $20 billion annually.

While this book is not the only one to discuss weak signal processing, it offers an alternative to outdated management models by focusing on collective intuition from the perspective of the predictive body. It explores new ways to consider weak signals, memory, communication, schemas, and perception. These insights are especially valuable for safety professionals, change managers, issue managers, and risk managers who must react quickly to emerging information. The aim is to foster the intuitive processing of weak signals at the organizational level—through collective intuition. This book serves as a useful addition to the toolkit of anyone dealing with current or future risks.

Weak signals manifest in various forms and may often appear ordinary. For example, during my time in business school, a marketing lecturer, who also worked daily at the Aalsmeer flower auction, noted that he could anticipate evening sales trends by observing forklift driving behavior in the morning. Similarly, at a veterinary pharmaceutical company, a supervisor was able to forecast afternoon warehouse staffing needs based on logistical flow, even before official planning estimates were available. Furthermore, my wife, a department head at a healthcare institution, possessed a nuanced awareness of her work environment; she could discern when employees whose reported illnesses might not reflect their actual condition, and she was adept at identifying early signs of unrest among staff.

It is evident that my wife has a deeper understanding of team dynamics than I can fully perceive. I continue to value her intuition, which is why this book is dedicated to my wife, Monique.

This is also a tribute to my children—Chilin, Miosia, Kenly, and Luan—as well as to Grandma Els and everyone else who still have to put up with me. This is only the beginning.

At one point, I aspired to pursue a PhD focused on weak signals, but personal circumstances led me to set that goal aside. Nevertheless, the topic continued to captivate me, and I felt it would eventually resurface. A Tai Chi teacher once humorously suggested that I 'lay ostrich eggs,' implying that my ideas take a long time to develop. My 'attic knowledge' exemplifies this process.

Attic knowledge

The coronavirus lockdowns provided me with several opportunities, including the chance to gain valuable insights from my attic. During this time, I focused on recovering and laying the groundwork for this book. I relied solely on publicly available digital resources and was curious to see what I could accomplish with them. As Lao Tzu said: "From my attic I know the world." Everything in this book is something you could have imagined yourself; I dedicated the time to exploring it.

This book serves as an application of established scientific insights, supported by relevant literature. It does not propose new theories but integrates and translates existing knowledge into practical use. Since I am not a scientist, this work is not meant to be scientific. However, I strive to capture the tone and ideas of the scientific articles I reference, explaining them in plain language when possible.

I have examined various theories from different perspectives, which may result in concepts and terms being presented in unexpected ways. I prioritize consistency to create clarity in my understanding. Consequently, this book presents theories from different disciplines, often employing a degree of poetic license. I may be comparing apples and oranges; however, I am concerned with the fruit basket.

Here are things to keep in mind:

- This book was originally written in Dutch and has been translated into US English.
- We occasionally explore the details, but translating technical jargon into everyday language may undermine the content and the work of researchers. It is preferable to not understand something rather than to misunderstand it.
- At the same time, this book is not written from a technical neurological perspective. I am not a neurologist. Therefore, translations may not always be technically accurate; it is about the message I want to convey. For technical content, please refer to the references.
- Where 'he' or 'him' is used, both men and women are intended.
- The predictive body refers to both the body and the brain.

- While dopamine is referenced (but not testosterone), the discussion of neurotransmitters and hormones extends beyond the scope of this book. It is regrettable, as these substances do impact the development of predictive schemas. However, that topic will not be addressed here.

- Several chapters include examples, case studies, and thought experiments for illustrative purposes. The "Frits Kaper Home" is a fictional institution created solely for this purpose. Actual events are clearly identified and accompanied by references.

- In this book I refer here and there to research within the autism domain (neurotypical people are people who believe they don't have a disorder).

- GPT for Word was used to address grammar and spelling errors, and to reduce unnecessary repetition and detail. However, a degree of repetition—particularly regarding explanations of new concepts to the lay public—was unavoidable.

During the coronavirus lockdowns, I started researching and writing. A personal event gave this book additional meaning and support:

> Institution K, a government agency tasked with ensuring child safety, holds the belief that mothers with autism spectrum disorder (ASD) are not capable of adequately caring for their children. They argue that these mothers may simply react to situations rather than respond appropriately to subtle 'concern signals,' which are viewed as weak indicators within their field. In one instance, this agency issued such a statement without supporting research, relying instead on stigmatized views. As an autistic person myself, I could not ignore this. Throughout this book, I will refer to studies from within the autism community.

Writing on the Edge of Chaos

Dear reader, please be aware that this book has not yet been proofread. Before starting my research, I did not have a sharp vision of the actual result. Publishers typically recommend starting with an outline. It is important to have answers to questions like: What is your mission? What problems are you solving? Who is your target audience?

In reality, these questions are often addressed later, following extensive work and meditation. This book reflects my experiences with autism and ADHD. The writing process involved a blend of organized and chaotic thinking, with unexpected twists and turns that changed the project's direction.

I did not begin with the clarity I have today. My ideas resembled a wiki page, where content changes as insights evolve, but the core concepts remain relatively stable. Initially, ideas floated without order: fragments collided, thoughts vanished, and others unexpectedly took hold. This phase allowed for endless possibilities, in which small ideas could later assume significant roles.

Gradually, order began to emerge. I found myself repeatedly generating the same ideas, indicating that a natural pattern was developing over time. Writing is not a linear process; it resembles a series of snowball effects and involves listening to oneself: What does the text aspire to become?

Throughout this journey, there were pivotal moments that shifted my direction, such as a meeting with An Gaiser (check out the book *Hidden Signals* (Gaiser, 2025)). New sources, insights, or questions sometimes necessitated a course correction. These bifurcation points are not interruptions; rather, they serve as engines of creativity, that keep the work dynamic and open. As a result, the manuscript evolved into something greater than the sum of its initial ideas. When I shifted my focus from *weak signals* to *collective intuition*, I received positive, albeit often surprising, reactions. The question arose: 'Does collective intuition even exist?' At that moment, I felt a sense of ownership over my work. Only then did the writing truly begin.

It was only in the penultimate phase that I engaged in actual organization: polishing, deleting, and refining. This book may never reach a final form; it is not a predetermined draft but an emergent whole that unfolds and develops over time. Although it is considered a living document, there inevitably comes a point in time when a project must be concluded. In this spirit—writing on the edge of chaos, open to unexpected twists and turns, and trusting in the ability of ideas to organize themselves—this work was created, imperfections included…

Contents

1 Introduction

1.1   What kind of yesterday will tomorrow be?

"Grandpa, what kind of yesterday will tomorrow be?" my four-year-old grandson asked. How could I have prepared myself yesterday for tomorrow's unforeseen events? His question suggests it is possible, but apparently not for me. I am not the observant type.

If I had paid closer attention, I would have realized sooner how frequently the media report unexpected events—such as accidents, disasters, and crises—which they later deem predictable. Notable examples such as the Bhopal disaster in 1984, the Challenger explosion in 1986, and the Columbia Space Shuttle disaster in 2003 demonstrate the concept of predictable surprises. In hindsight, the signs of these events seem clear, but they were often overlooked beforehand. Many people recognize that unexpected events can appear predictable after they occur. In the case of the Columbia disaster, there were several warnings that, if heeded, might have prevented the tragedy.

- Sinking of the Titanic (1912)
- Pearl Harbor (1941)
- The fire at 'Our Lady of the Angels School' (1958)
- Aberfan Disaster (1966)
- American Airlines Flight 191 (1979)
- Bhopal disaster (1984)
- Space Shuttle Challenger (1986)
- 9/11 Terrorist Attack (2001)
- Space Shuttle Columbia (2003)
- Turkish Airlines Flight 1951 (2009)
- Fukushima nuclear disaster (2011)
- Reduan (2018), Derk Wiersum (2019), and Peter R. de Vries (2021)
- Hamas attack (2023)

Table 1. Famous Examples of Predicted Disasters.

That clarity is somewhat exaggerated in retrospect: "...in hindsight, people consistently exaggerate what could have been anticipated in foresight" (Fischhoff, 1982, p. 83). As public or political outrage increases, accusations often arise that the disaster could have been avoided with greater attention. In response, the media, politicians, pundits, and self-proclaimed experts quickly move to assign blame. Individuals are expected to anticipate momentous events based on subtle indicators, such as the movement of a grass blade or the flutter of a butterfly.

How beneficial would it be if this were actually achievable? The world is constantly changing. According to the Clingendael Institute, borders—whether physical or other-wise—no longer shield us from external threats. Unexpected events such as floods, earthquakes, financial crises, conflicts, and cyberattacks have exposed vulnerabilities across social, technological, economic, and political domains.

These domains are interconnected (The Clingendael Institute, 2020). We must respond more quickly and effectively to these surprises, which will continue to arise. We all need to become more agile. Many management books address this issue, although it is often unclear who is meant by the term "we."

True surprises are, by definition exceptional, improbable, and often unimaginable events. Therefore, it is crucial to pay attention to even the smallest details, such as a single blade of grass. According to Mitroff, a crisis is typically preceded by a series of early warning signs. These signs indicate potentially undesirable events, including accidents, disasters, and other calamities that may arise in the future:

> "Long before its actual occurrence, a crisis sends off a repeated and persistent trail of early warning signals" (Mitroff, 1988, p. 18).

These are problems that usually start small and develop over time until they reach a critical point (Ansoff, 1975; Turner, 1997; Eijnatten, 2002), much like an untreated disease. Therefore, it is crucial to recognize these omens in time. Blades of grass have a strategic property.

1.2 Weak signals and anticipating VUCA 3.0?

In today's dynamic and uncertain world, agility is essential, and the ability to anticipate challenges is more critical than ever. In our VUCA world—characterized by Volatility, Uncertainty, Complexity, and Ambiguity—early recognition of threats is vital for staying ahead of competitors and adversaries. This is particularly important in sectors such as society, politics, and safety and security, where there is a growing focus on weak signals.

Crises do not arise in isolation. As Mitroff suggests, with careful observation, crises can often be detected early. The emergence of innovative technologies, such as artificial intelligence and quantum computing, indicates that a new phase of the VUCA world—VUCA (3.0)—is developing.

In that world, relying solely on trend measurements and digital scanning is insufficient. Anticipating signals and developments before they occur requires intuition. A profound understanding of human situations—encompassing emotions, social nuances, context, and values—is challenging to quantify. Although artificial intelligence may one day reach this level of understanding, it does not possess consciousness, subjective experience, or empathy. While AI can simulate or predict emotions, it does not genuinely experience feelings such as suspicion, discomfort, unease, or gut instincts. These are uniquely human experiences.

From the perspective of 'the predictive brain,' a weak signal results from a small, low-impact surprise in the brain, which points to a potentially impactful event outside the brain, without a clear explanation, cause, or internal consultation. We recognize this concept through our intuition, often referred to as "proto-signals." Proto-signals are intuitive cues that evoke feelings of uncertainty and unease. While these signals are not new, they remain under-researched in management, undervalued in safety contexts, and politically sensitive. Nevertheless, they are extensively employed in various fields, where they often play a pivotal role in ensuring safety and informing decisions. Therefore, collective intuition is important in all organizations, but its significance is more pronounced in certain sectors. For example, in creative industries and commerce—including both entrepreneurs and publicly traded companies—collective intuition plays a vital role. Additionally, it is essential in healthcare, emergency services, security, police, and defense.

1.3   A personal perspective

The desire to recognize omens early stems from personal experiences. As a child, I often drifted into daydreams or became intensely focused on single tasks, causing me to miss events around me. I frequently overlooked unexpected occurrences, partly because I was not particularly observant. Social cues often seemed unimportant or irrelevant. If your child often says that 'nobody ever tells him anything,' it is key to take notice of this pattern.

In my childhood, many small events could happen out of nowhere, seemingly without any reason or cause. Later, my world was even labeled magical. As a consultant, I observed that companies faced similar challenges in managing surprises. Their typical response was one of panic. I recognized parallels between my personal experiences and the organization I worked with. These included issues such as information overload, an abundance of choices, and a tendency to focus on everything at once, resulting in a lack of clear direction or, at times, excessive concentration on specific areas. Autism and ADHD have their own (annoying) challenges and characteristics; there is nothing magical about them.

After yet another surprise during an assignment, I thought: "Can Mitroff's assertion be reversed?" After all, weak signals are usually recognized only in retrospect. Is it even possible to identify such signals in advance, so that we can predict critical events or at least expect something? And when does that recognition occur?

A better understanding of weak signals and how to address them can enhance strategic positioning against competitors, criminals, or hostile states. Additionally, it improves your standing in social contexts. Being aware of potential developments allows individuals and organizations to stay ahead of the competition or adversaries and to be better prepared. And perhaps there is a way to know what kind of yesterday tomorrow will be.

1.4   Wht R W go'ng to tlk a bt?

The subtitle's meaning should be clear to you, despite some missing letters. This illustrates how context and prior knowledge enable humans to recognize and comprehend words, even when they are not fully or accurately spelled. The brain predicts what should be there based on the sentence structure, context, and experience. This predictive capability extends beyond reading; it also applies to speaking, creating, and appreciating art, and engaging with music. Navigating traffic exemplifies the theory of the predictive brain, which posits that our brains constantly make predictions and adapt.

This book delves into the idea of the predictive body, highlighting the brain's role and the connections and communication between individuals. The concept of the predictive body incorporates the *free energy principle* at all levels. The body is structured to decrease uncertainty (free energy) by minimizing prediction errors. By the end of this book, you'll have a clear understanding of what this means.

The book consists of sixteen chapters, preceded by a preface and followed by appendices and an extensive list of references. Most chapters start with an introduction, cover theory, provide examples and case studies, and end with reflections on social relevance. Topics covered include weak signals, intuition, social processes, and collective decision-making. The **Introduction** addresses why we are often caught off guard by crises that could have been anticipated with greater awareness of weak signals. It introduces *collective intuition* as a valuable management tool.

Chapter 2 examines both classical and contemporary perspectives on weak signals, using historical and management literature examples, including a Case study on the Child Benefits Affair (in the Netherlands), to illustrate how organizations can overlook critical signals.

Chapter 3 discusses the incubation period of crises, emphasizing how weak signals often go unnoticed or are normalized and highlights the importance of recognizing tipping points.

Chapter 4 presents the theory of the predictive brain, portraying the brain as a prediction machine that continuously formulates and adjusts hypotheses based on sensory input. Social interactions are framed as mutual *prediction-and-adaptation* processes, necessitating a re-evaluation of weak signals.

In **Chapter 5**, the focus shifts from weak signals as *incoming information* to their emergence as *prediction errors* (Pe) within the predictive brain.

Chapter 6 underscores the body's crucial role in predicting and processing sensory information, discussing various levels of processing and the significance of interoceptive

signals, such as gut feelings, in decision-making and social interactions. Proto-signals are introduced as early warning indicators that precede weak signals.

In **Chapter 7**, communication is redefined as a dynamic, reciprocal process of prediction, interpretation, and adaptation, rather than a linear sender-receiver model.

Chapter 8 explores how social connections are formed through synchronization, resonance, and consensus, with *social synchronization* serving as the foundation for deeper emotional alignment and shared understanding. It emphasizes that communication and connection are interdependent.

Chapter 9 distinguishes four levels of intuition, examining the roles of experience, interoception, and active inference in intuitive decision making, illustrated by the Mann Gulch drama as a case study of instinctive action under stress.

Chapter 10 describes how groups develop joint prediction models through personal interaction, detailing the processes of shared meaning making, joint action, and reflection, using a care team case as an example. While collective inference fosters shared predictability and stability, collective intuition is presented in **Chapter 11** as an emergent phenomenon. It enables groups to reach insights and decisions without explicit consultation, distinct from individual contributions. Neuroscientific insights into brain synchronization are also discussed.

Chapter 12 treats narratives as prediction schemas that influence individuals and groups, highlighting how effective stories incorporate prediction errors to enhance engagement.

Chapter 13 introduces the 6 ICS Conceptual Model as a practical reference for processing weak signals[Pe] in organizations, emphasizing social resonance, open dialogue, and shared intention for successful implementation, illustrated with a real-life health care example.

Chapters 14 and **15** explore how collective prediction complexes and social constructs impact societal stability and change. The book concludes in **Chapter 16** with a reflection on the limitations of the predictive body theory, addressing the roles of prejudice, stress, and social power in signal processing, as well as the necessity for awareness and adaptation of mental models.

The reference list contains an extensive bibliography to support the book.

1.5   For whom is this book relevant?

This book complements existing knowledge and provides insights into the concept of conventional weak signals for officials whose core responsibility is *signaling*.

Here are some examples:

- *Strategists and policymakers.* They use weak signals to create future scenarios, identify risks early, and develop proactive policies. This approach is relevant for government advisors, policymakers, and strategic advisors.
- *Innovation managers and R&D teams.* They use weak signals to generate new product ideas, identify market opportunities, and recognize disruptive technologies. This approach is employed by product developers, innovation consultants, and technology scouts.
- *Trend watchers and futurists.* Weak signals serve as the main source for identifying future trends before they become mainstream. This approach is commonly used by futurists, scenario planners, and foresight experts.
- *Risk analysts and crisis managers.* They use weak signals to identify potential threats, disruptions, or shocks at an early stage. This approach is employed by risk managers, change managers, security advisors, issue managers, and resilience planners.
- *Organizational advisors and business consultants.* They use weak signals both externally and internally to monitor programs.

The concept of collective intuition, viewed from the perspective of the predictive body, presents a unique and novel approach. It enriches the current set of anticipatory tools and is becoming increasingly essential. But does collective intuition even exist?

In team sports, music, and crisis management, groups often demonstrate an instinctive ability to collaborate effectively with minimal communication. This phenomenon reflects a shared, implicit understanding among individuals. Traditionally regarded as mysterious, collective intuition has recently been shown by brain studies utilizing hyperscanning—simultaneous measurement of brain activity across multiple individuals—to have a measurable biological basis.

This book aims to foster the development of collective intuition within your organization by presenting a range of ideas, concepts, and terminology that may challenge conventional perspectives. Some concepts may require repeated explanations, occasionally in a detailed and technical manner. When delving into complex topics, I will preface them with "for the technical reader" and provide references for further reading.

In our knowledge-driven society, we often prioritize facts, seeking assurance that something functions as intended. However, knowledge without understanding is inherently limited. Those who can only recite facts lack the deeper insight necessary to grasp their significance and interconnectedness. True comprehension involves critical thinking and leveraging both your intuition and that of your colleagues or employees.

1.6   Key terms and concepts

Free energy principle (FEP)

Life systems, including the brain, aim to minimize surprise or uncertainty by maintaining an internal model of the world that is continuously updated with sensory input. This process serves as a fundamental principle: all actions—observation, learning, and movement—are understood as efforts to minimize *'free energy.'*

Predictive processing

Within the free energy principle, *predictive processing* refers to the brain's method of making predictions about incoming sensory information. Sensory input is then compared to these predictions, and only the prediction errors are transmitted to higher brain areas, allowing them to refine their models.

Active inference

Active inference is an extension of predictive processing that incorporates action. The brain can reduce prediction errors in two ways:

1. Adjusting the model (learning and perception).

2. Adjusting the world so that it fits better with predictions (action).

Signal

A *signal* is a state change that exceeds a threshold or bandwidth, thereby initiating a process to manage the effects that follow from the difference.

Exteroception

Exteroception is the body's ability to perceive external sensory information, such as sounds, light, smells, temperature, and touch. Therefore, it refers to the perception of stimuli from the outside world. The brain compares this external information with its external expectations.

Interoception

Interoception refers to our capacity to sense internal bodily signals, including feedback from organs, muscles, and other internal systems. This process allows us to notice when we are hungry, thirsty, tired, aware of our heartbeat, or breathing. By heightening our awareness of these inner states, interoception significantly influences our physical and emotional well-being, as well as how we manage stress and regulate emotions.

Intuition

Direct perception of truth or facts occurs independently of any reasoning process. For now, *intuition* is assumed to be a local phenomenon that reflects individual direct or indirect experiences from the past.

Rapport

'*Rapport*' refers to the quality of the connection between two individuals, particularly regarding trust and mutual understanding.

Social synchronization

Social synchronization refers to the coordination of movement, gestures, and pacing among individuals.

Social resonance

Social resonance refers to the alignment of an individual's emotions, thoughts, or behaviors with those of others, creating a deeper emotional or cognitive connection. It builds upon the concept of social synchronization, operating at a more advanced level of values and beliefs.

1.7 Positioning among organizational logics

Reflecting on my work experience, I have observed a significant evolution in my understanding of organizations and their processes. In various companies, I witnessed a transition from planned changes to more spontaneous, autonomous developments, now categorized as the *Make-and-Sell*, *Sense-and-Respond*, and *Anticipate-and-Lead* organizations. This shift has created a framework of organizational principles centered on agility, future-proofing, and adaptability to unforeseen challenges. For now, the discussion of the need for greater agility within the Dutch government will be set aside.
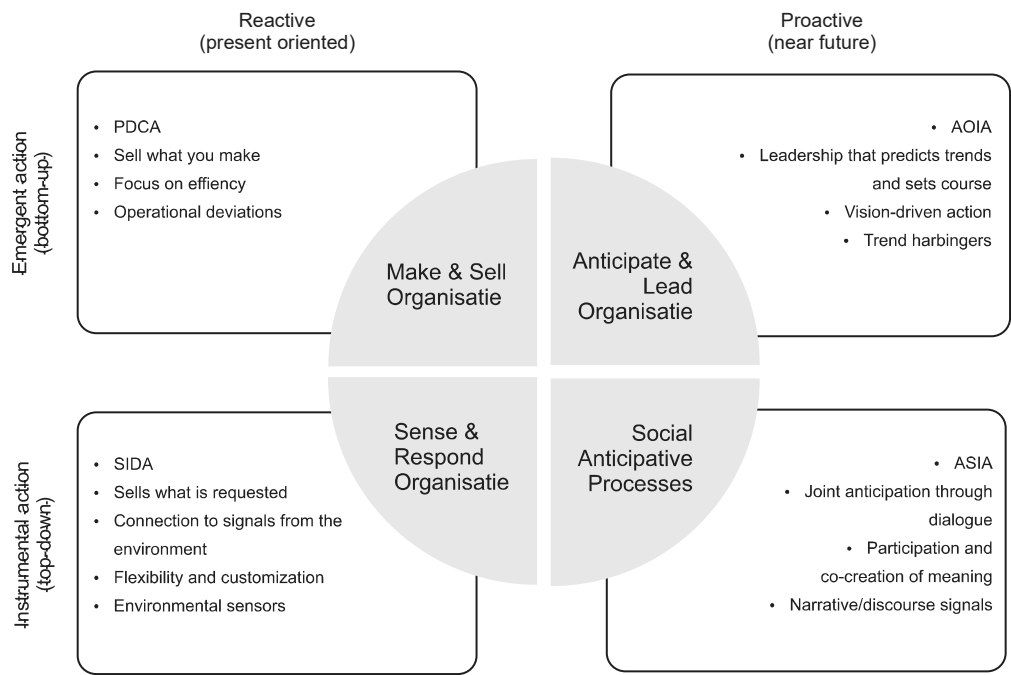

Figure 1. Position Matrix, Acting in Context.